



ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ
ਡਾਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ।

(ਪੰਜਾਬ ਸਰਕਾਰ ਦੁਆਰਾ ਐਕਟ ਨੰ: 5 ਆਫ 2015 ਅਤੇ ਯੂ.ਜੀ.ਸੀ. ਐਕਟ 1956 ਦੇ ਮਦ 2(ਐਫ) ਅਤੇ 12ਬੀ ਰਾਹੀਂ ਸਥਾਪਤ)

Maharaja Ranjit Singh Punjab Technical University
Dabwali Road, Bathinda.

(Estb. by Govt. of Punjab vide Act No. 5 [2015] and u/s 2(f) and 12 B of UGC Act, 1956)

ਹਵਾਲਾ ਪੱ: ਨੰ: / Univ/Regi/8397

ਮਿਤੀ : 03/10/23

To

Respected Members,
Academic Council,
Maharaja Ranjit Singh Punjab Technical University,
Bathinda.

Sub.: Approved Minutes of 9th Meeting of Academic Council of Maharaja Ranjit Singh Punjab Technical University, Bathinda.

Greetings from the University

Please find enclosed herewith a copy of approved minutes of 9th Meeting of Academic Council of Maharaja Ranjit Singh Punjab Technical University held on 26.09.2023 at 1:00 PM in the Committee Room. GZSCCET, MRSPTU, Bathinda via dual mode (Offline/Online) for your kind information and record please.

Registrar-cum-Secretary
Academic Council
Maharaja Ranjit Singh
Punjab Technical University, Bathinda

Copy to:

1. Hon'ble Vice-Chancellor-cum-Chairman, Academic Council, MRSPTU, Bathinda.
2. Office of Dean Academic Affairs, MRSPTU, Bathinda for necessary action to be taken on the decisions taken in this meeting.
3. Prof. Incharge (Finance & Purchase), MRSPTU, Bathinda.



**Maharaja Ranjit Singh
Punjab Technical University,
Bathinda-151001**

MINUTES OF MEETING

**FOR THE 9TH MEETING OF
ACADEMIC COUNCIL**

HELD

ON

26.09.2023 (Tuesday) at

01:00 PM

IN

**COMMITTEE ROOM, GZSCCET,
MRSPTU, Bathinda**

MINUTES OF 9TH MEETING OF ACADEMIC COUNCIL, MRSPTU, BATHINDA

The 9th Meeting of Academic Council of Maharaja Ranjit Singh Punjab Technical University, Bathinda was held on 26-09-2023 at 01:00 P.M onwards under the chairmanship of Hon'ble Vice Chancellor-cum-Chairman, Academic Council of the University in the Committee Room, GZSCCET, MRSPTU, Bathinda in an offline/online mode.

The following members were present OFFLINE in the meeting.

- | | |
|--|------------------------|
| 1. Dr. Sandeep Kansal
Dean Faculty (Sciences),
Professor, Department of Physics,
Maharaja Ranjit Singh Punjab Technical University, Bathinda
(Mobile No. 98720-00814 Email: skansal@mrsptu.ac.in) | Member |
| 2. Dr. Ashish Baldi
Dean Faculty (Pharmacy),
Professor, Deptt. of Pharmaceutical Sciences & Tech,
Maharaja Ranjit Singh Punjab Technical University, Bathinda
(Mobile No. 89684-23848) ashishbaldi@mrsptu.ac.in | Member |
| 3. Dr. Bhupinder Pal Singh Dhot
Dean Faculty (Architecture),
Professor, GZS School of Architecture & Planning
Maharaja Ranjit Singh Punjab Technical University, Bathinda
(Mobile No. 88722-00061 Email: bpaldhot@mrsptu.ac.in) | Member |
| 4. Campus Director,
Giani Zail Singh Campus College of Engineering & Technology, Bathinda | Member |
| 5. Director,
Punjab Institute of Technology, Nandgarh, District Bathinda | Member |
| 6. Director,
Punjab Institute of Technology, GTB Garh, District Moga | Member |
| 7. Dean Academic Affairs,
MRSPTU, Bathinda | Co-opted Member |
| 8. Dean R & D,
MRSPTU, Bathinda | Co-opted Member |
| 9. Dean Planning & Development,
MRSPTU, Bathinda, | Co-opted Member |
| 10. Director (College Development Council),
MRSPTU, Bathinda | Co-opted Member |
| 11. Dean Distance Education Program,
MRSPTU, Bathinda, | Co-opted Member |
| 12. Controller of Examinations,
MRSPTU, Bathinda | Co-opted Member |
| 13. Head,
Department of Civil Engineering,
GZSCCET, MRSPTU, Bathinda | Member |
| 14. Head,
Department of Electrical Engineering,
GZSCCET, MRSPTU, Bathinda | Member |

15. Head, Department of Electronics & Comm. Engineering, GZSCCET, MRSPTU, Bathinda	Member
16. Head, Department of Textile Engineering, GZSCCET, MRSPTU, Bathinda	Member
17. Head, Department of Computer Sc. & Engineering, GZSCCET, MRSPTU, Bathinda	Member
18. Head, Department of Computational Sciences MRSPTU, Bathinda	Member
19. Head, GZS School of Planning & Architecture, MRSPTU, Bathinda	Member
20. Head, Department of Physics, MRSPTU, Bathinda	Member
21. Head, Department of Chemistry, MRSPTU, Bathinda	Member
22. Head, Department of Mathematics, MRSPTU, Bathinda	Member
23. Head, Department of University Business School, MRSPTU, Bathinda	Member
24. Head, Department of Pharmaceutical Sc. & Technology, MRSPTU, Bathinda	Member
25. Head, Department of Food Sc. & Technology, MRSPTU, Bathinda	Member
26. Head, School of Agriculture Sciences & Engineering, MRSPTU, Bathinda	Member
27. Dr. G.P.S. Brar Registrar, MRSPTU, Bathinda	Secretary

The following members were present ONLINE in the meeting.

28. Dr. Sundar Singh, Dean Faculty (Engineering & Technology), Former Professor, Civil, Thapar Institute of Engineering & Technology, Patiala.	Member
29. Prof. Rajnit Kohli, Dean Faculty (Hospitality and Tourism Management) Principal, IHM Bathinda	Member
30. Dr. Bhola Ram Gurjar, Director, National Institute of Technical Teachers Training, Chandigarh.	Member
31. Director, Punjab State Aeronautical Engg. College, Patiala	Member
32. Director, Punjab Institute of Technology, Rajpura	Member



33. Head, Department of Mechanical Engineering, GZSCCET, MRSPTU, Bathinda	Member
34. Principal, Guru Gobind Singh College of Management and Technology, G.T Road, Near Malwa School, Giddarbaha	Member
35. Principal, M. L. Memorial Technical College, V.P.O. Killi Chahal, Distt. Moga.	Member
36. Principal, S.F.C. Institute of Management & Technology, Dharmkot Road, Village Fatehgarh, Korotana, Distt. Moga	Member
37. Principal, Sainik Institute of IT & Management, C/o District Defence Services Welfare Office, Talwandi Road, Faridkot	Member
38. Principal, Aryans College of Pharmacy, Village Nepra/Thuha, Chandigarh- Patiala Highway, Tehsil Rajpura, District Patiala.	Member
39. Principal, Swami Vivekanand College of Management and Technology, Chandigarh-Patiala Highway, Village Ramnagar, Near Banur	Member
40. Principal, Dolphin PG College, Vpo Chunni kalan, District Fatehgarh Sahib Punjab- 140408	Member
41. Principal, Guru Ram Dass College of Pharmacy, Bathinda Road, Village Theri-Malout, Sri Muktsar Sahib – 152107	Member
42. Principal, Bhai Gurdas Institute of Allied Sciences, Main Patiala Road, Sangrur – 148001	Member

At the outset Secretary, Academic Council formally welcomed all the members who have joined the meeting in online as well as off-line mode. This was followed by detailing of all the Agenda items by Associate Dean (Academic Affairs).

The various agenda items were discussed in detail and following decisions were taken:

ITEM NO. 09.01 CONFIRMATION OF THE MINUTES OF 8th MEETING OF ACADEMIC COUNCIL HELD ON 05.04.2023

DECISION: Confirmed.

ITEM NO. 09.02 ACTION TAKEN REPORT OF 8th MEETING OF THE ACADEMIC COUNCIL HELD ON 05.04.2023.

DECISION: Noted



Regarding item no. 08.06; the nomenclature of Integrated/Dual Degree programme being run in the University was pointed out by one of the members of Academic Council. The member was of the opinion that either the nomenclature should be Integrated or Dual. Deliberation was held in length on this by the members of Council.

The UGC rule mentioned in "The Gazette of India, July 5, 2014 (Asadha 14, 1936), Part III-Sec-4]" is reproduced as under:

*"If the Integrated/Dual Degree Programmes intend to offer two separate degrees with an option for an interim exit or lateral entry, the duration of the Integrated/Dual Degree Programme must not be less than the duration equal to the sum total of the prescribed duration of the two degrees that are being combined in the Integrated/Dual Degree Programme. Provided that all such programmes would carry the nomenclature of **"Integrated/Dual Degree (name of the first degree) - (name of the final degree)"**. Provided further that both the degrees awarded under the Integrated/Dual Degree programme shall be individually and separately recognized as equivalent to corresponding degrees and not as one single integrated degree. If the Integrated Programme intends to offer a single degree without permission to exit and lateral entry, the programme duration may be relaxed by not more than 20% of the sum total of the prescribed duration of the two degrees that are being combined to make the single Integrated degree."*

The decision on this Agenda Item is same as per the nomenclature specified by UGC and notified by the University.

Regarding item no. 08.07 & S-08.19; discussion was held by the members and it was approved to put cases for approval of award of Ph.D. degree to Academic Council directly after issuance of Provisional degree. List of Ph.D. degrees awarded in this manner should also be put in URB meeting for information.

ITEM NO. 09.03 TO APPROVE THE MINUTES OF MEETINGS OF VARIOUS FACULTIES OF UNIVERSITY.

DECISION:

Approved.

The council pointed out that the MoM of Faculty of Architecture & Planning were neither approved nor clearly recommended. Dean (Faculty of Architecture & Planning) in response to the objections raised by the members admitted inadvertent errors in the MoM and confirmed that all the items were approved by the Faculty of Architecture & Planning. Further, it was decided that Dean (Faculty of Architecture & Planning) will correct all the errors in the MoM and submit the revised MoM to the office of Dean (Academic Affairs).

In general, it was also decided by the council that all the MoM of BoS/Faculties that are placed for approval in the Academic Council should be either Approved or clearly Recommended by the concerned BoS/Faculties. Also concerned Dean Faculty should make sure that all the scheme & syllabi of the programmes should be correct in all aspects before submission to the office of Dean (Academic Affairs).



ITEM NO. 09.04 TO APPROVE VARIOUS SCHEMES & SYLLABI OF UG, PG & INTEGRATED/DUAL DEGREE PROGRAMMES.

DECISION: Approved.
The discussion was held regarding the matter written on the cover page of the syllabi after pointing out an error by one of the members. The discussion was held and the council approved the cover page as such.

ITEM NO. 09.05 TO APPROVE THE ELIGIBILITY OF NEW PROGRAMMES STARTED FROM SESSION 2023-24.

DECISION: Approved.
Further, the council advised that the eligibility should be in line with concerned statutory body/council of the programme wherever applicable. In this regard, concerned BoS chairperson will make sure as well as undertake that the “eligibility, programme duration, nomenclature, scheme and syllabi of the programme provided be in accordance with the guidelines of the relevant governing body of the programme i.e. AICTE/ UGC/ PCI/ COA/ ICAR/ MCI/ BCI/ NCTE/ DCI/ INC etc. wherever applicable and existing. Further, council has advised the Deans of Faculties to deeply involve and give inputs while approving/verifying the documents.
There were some inadvertent mistakes pointed out by Associate Dean (Academic Affairs) as well as members in the eligibility as mentioned in the table given at the Item No. 09.05. However, Associate Dean (Academic Affairs) clarified that the eligibility of various programmes have been correctly mentioned in the Annexure-VIII.

ITEM NO. 09.06 RATIFICATION OF THE PROGRAMMES WITH SANCTIONED INTAKE NOTIFIED FOR THE UNIVERSITY MAIN CAMPUS/ GZSCCET/ PITs/ PSAEC PATIALA FOR ACADEMIC SESSION 2023-24.

DECISION: Ratified.

ITEM NO. 09.07 RATIFICATION OF THE NEW PROGRAMMES OFFERED FOR AFFILIATED COLLEGES OF MRSPTU FROM ACADEMIC SESSION 2023-24.

DECISION: Ratified.



ITEM NO. 09.08 RATIFICATION OF THE NOTICE ISSUED REGARDING MEDIUM OF EXAMINATION OF TWO PROGRAMMES OFFERED IN PUNJABI MEDIUM FROM ACADEMIC SESSION 2023-24.

DECISION: Ratified.
As the agenda item only stated about the medium of examination of the said programmes. However, the Notice issued by office of Dean (Academic Affairs) having no. DAA/MRSPTU/2023/4153 dated 19.04.2023 clearly stated about programmes to be offered in both the languages, choice of students to opt the programme in either of the languages as well as choice of examination. Further, the office of DAA will check the implementation of the order issued by the office.

ITEM NO. 09.09 RATIFICATION OF REVISED ACADEMIC CALENDAR 2022-23.

DECISION: Ratified.
Subjected to modification in exigencies.

ITEM NO. 09.10 RATIFICATION OF ACADEMIC CALENDAR 2023-24.

DECISION: Ratified.

ITEM NO. 09.11 RATIFICATION OF FEE REFUND RULES FOR SESSION 2023-24.

DECISION: Ratified.

ITEM NO. 09.12 RATIFICATION OF CHIEF MINISTER SCHOLARSHIP SCHEME FOR UNIVERSITY MAIN CAMPUS/ GZSCCET/ PITs/ PSAEC, PATIALA FOR SESSION 2023-24.

DECISION: Ratified.

ITEM NO. 09.13 RATIFICATION OF ONE TIME SCHOLARSHIP SCHEME FOR PHARM. D PROGRAMME AT UNIVERSITY MAIN CAMPUS FOR THE ACADEMIC SESSION 2023-24.

DECISION: Ratified.



ITEM NO. 09.14 **RATIFICATION OF THE CLOSURE OF PROGRAMMES OFFERED IN UNIVERSITY MAIN CAMPUS/PITs FOR ACADEMIC SESSION 2023-24.**

DECISION: Ratified.
Further, it was decided by the council that from the next session i.e. 2024-25, all the HoDs/Directors/Principals should note that before putting any proposal to DAA office for starting a new programme, a demand survey should be conducted by the concerned Department/PIT's/Institutes.

ITEM NO. 09.15 **RATIFICATION OF DURATION OF THE PROGRAMME B.Sc.(ANESTHESIA TECHNOLOGY) & B.Sc. MEDICAL TECHNOLOGY (ANESTHESIA AND OPERATION THEATRE TECHNOLOGY) FROM 2023-24 BATCH ONWARDS.**

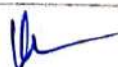
DECISION: Ratified.

ITEM NO. 09.16 **RATIFICATION OF IMPLEMENTATION OF THE NON-CREDIT COURSE 'THE MAHARAJA OF PEOPLE' FROM 2022 BATCH ONWARDS FOR UG-AICTE/ UG-NON-AICTE PROGRAMMES.**

DECISION: Ratified.
Further, it was decided that a committee comprising of following members shall make necessary guidelines for better implementation of the course.
(i) Dr. R. K. Bansal, Director PITN
(ii) Dr. Karanvir Singh, CoE, MRSPTU
(iii) Dr. Kawaljit Singh Sandhu, Associate Dean (Academic Affairs)
(iv) Dr. Veerpaul Kaur, Head, Department of UBS, MRSPTU

ITEM NO. 09.17 **RATIFICATION TO OFFER ONE YEAR SKILL CERTIFICATE COURSE ALONGWITH REGULAR UG PROGRAMMES IN LINE WITH NEP-2020.**

DECISION: Ratified.
The Notification 171 dated 19.08.2023 regarding offering one year skill certificate course along with regular UG programmes has already been issued by the office of DAA, however, it has not been implemented by the departments. Thus, Chairman, Academic Council instructed all the Heads of Departments / BoS Chairpersons as well as the office of DAA to finalize the modalities and implement the instructions already notified within two months from the date of 9th Academic Council.



ITEM NO. 09.18: RATIFICATION OF APPROVAL GRANTED FOR CLASSES OF M.PLANNING PROGRAMME DURING EVENING SESSION.

DECISION: Ratified.

ITEM NO. S-09.19 TO APPROVE THE MINUTES OF 6TH MEETING OF FACULTY OF SCIENCES HELD ON 14.09.2023 AT MRSPTU, BATHINDA.

DECISION: Approved.

ITEM NO. S-09.20 TO APPROVE VARIOUS SCHEMES & SYLLABI OF UG, PG & INTEGRATED-DUAL DEGREE PROGRAMMES.

DECISION: Approved.

ITEM NO. S-09.21 RATIFICATION OF THE EXTENSION OF BOARD OF STUDIES IN AGRICULTURE SCIENCES UPTO 08.08.2024.

DECISION: Ratified.

ITEM NO. S-09.22 RATIFICATION OF SANCTIONED INTAKE INCREASED FROM 40 SEATS TO 60 SEATS IN PROGRAMME BMS (AIRLINES, TOURISM & HOSPITALITY) FROM ACADEMIC SESSION 2023-24.

DECISION: Ratified.

ITEM NO. S-09.23 RATIFICATION OF VARIOUS INTER / INTRA UNIVERSITY MIGRATION CASES APPROVED AS SPCECIAL CASE.

DECISION: Ratified.

ITEM NO. S-09.24 REGARDING APPROVAL FOR ISSUING OF Ph.D. DEGREE.

DECISION: Approved.


Further, it was unanimously approved by all the members to authorize Vice Chancellor to issue degrees to candidates who complete their Ph.D. after the 9th Academic Council held on 26.09.2023 and before the 2nd Convocation. The details of the same will be placed in subsequent meeting of Academic Council for ratification.



General Discussions:

1. The Academic Council appreciated the members of Admission Committee as well as Chairman, Admission Committee for their sincere and dedicated efforts done by them for admissions during academic session 2023-24.
2. The Academic Council appreciated whole committee constituted for 1st cycle of NAAC accreditation of the University as well as Director, IQAC for their contribution and hard work in getting NAAC accreditation of the University. Further, the council congratulated Vice Chancellor for his visionary guidance.
3. The committee also appreciated Director, CDC for associating new affiliated colleges with MRSPTU, Bathinda.
4. Director Training and Placement was appreciated for the efforts made by him for the Internship/placement of the students in the various reputed companies on an attractive packages.
5. For scoring below 100 rank in ARIIA, Deptt. of Pharmaceutical Sciences & Technology, MRSPTU was appreciated. Further, the department was advised for more efforts to improve the ranking. Taking motivation from the Deptt. of Pharmaceutical Sciences & Technology, other departments were also suggested to make efforts in the same directions.
6. The following committee constituted by the Academic Council upon recommendation of Chairman to review the number of students in existing programmes, new programmes to be started, programmes in demand and closure of programmes. The committee will submit its report within 10 days from the date of notification.
 - (i) Dr. Savina Bansal, Dean (Planning & Development), MRSPTU
 - (ii) Dr. Balwinder Singh Sidhu, Director (CDC), MRSPTU
 - (iii) Dr. Karanvir Singh, CoE, MRSPTU
 - (iv) Dr. Harish Kumar Garg, P/I Finance, MRSPTU
 - (v) Dr. Ashish Baldi, Dean (R&D), MRSPTU
 - (vi) Dr. Kawaljit Singh Sandhu, Associate Dean (Academic Affairs), MRSPTU
7. Member Secretary cum BoS Chairperson, Faculty of Commerce & Management placed Minutes of 6th meeting of Faculty of Commerce & Management as Table Agenda for the approval of Academic Council. The council approved the MoM as well as the revised syllabus of 3rd & 4th semester of MBA (Hospital Administration) as recommended by Faculty of Commerce & Management.

The meeting ended with the vote of thanks to the Chair.


Registrar-cum-Secretary
Academic Council
Maharaja Ranjit Singh
Punjab Technical University, Bathinda

Submitted for approval please.

~~Hon'ble Vice Chancellor-cum-Chairman~~
Academic Council
Maharaja Ranjit Singh Punjab Technical University, Bathinda

Mridul
29/09/2023





MRSPTU
Bathinda

Head of Department Architecture <hodarch@mrsptu.ac.in>

Updated syllabus and scheme approved in Faculty of Architecture & Planning meeting held on 17-08-2023

2 messages

Head of Department Architecture <hodarch@mrsptu.ac.in>

Wed, Nov 15, 2023 at 1:24 PM






To: Dean Academic Affairs MRSPTU <daa@mrsptu.ac.in>, Dean Academic Affairs <daaoffice@mrsptu.ac.in>, Assistant Registrar Daa <ar.daa@mrsptu.ac.in>

Sir,

As discussed with your goodself and decided in **9th Academic council meeting please find updated syllabus and scheme** of BFA & MFA (Integrated Course) & ongoing BFA (2022 scheme) alongwith Master of Fine Arts (MFA Painting) and Master of Arts (MA Fine Arts) approved in Faculty of Architecture & Planning meeting held on 17-08-2023. Submitted for your consideration and necessary action please.

Head,
GZS School of Architecture & Planning,
MRSPTU, Bathinda.

5 attachments

-  Minutes of the Meeting Faculty of Architecture dated 17-08-2023.pdf
70K
-  BFA MFA INTRGRATED FINAL.docx
1016K
-  MFA PAINTING.docx
571K
-  MFA Fine Arts.docx
524K
-  BFA Applied Art 2022 Syllabus.docx
1491K

Head of Department Architecture <hodarch@mrsptu.ac.in>






Tue, Jul 9, 2024 at 12:27 PM

To: Amninder Dhaliwal <Amninderdhaliwal786@gmail.com>

Head,
GZS School of Architecture & Planning,
MRSPTU, Bathinda.

[Quoted text hidden]

5 attachments

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70K
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Maharaja Ranjit Singh Punjab Technical University

Dabwali Road, Bathinda -151001

(Established by Govt. of Punjab vide Punjab Act No. 5 of 2015)

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GZS SCHOOL OF ARCHITECTURE & PLANNING

Ref. No.Arch/D/23/4073

Date: 15/11/2023

Faculty of Architecture & Planning Meeting- GZSSAP, MRSPTU, Bathinda

Sub. : Minutes of Meeting of Faculty of Architecture & Planning held on 17-08-2023 from 10:30 AM onwards with ref. to mail dated 03.08.2023

Prof. (Dr.) Bhupinder Pal Singh (HoD) extended warm welcome to all the members followed by the briefing of the agenda of the meeting and requested them to give their valuable inputs.

Following members were present:

1. Dr. Bhupinder Pal Singh Dhot	Professor & Head, GZSSAP	Present Physically
2. Ar. Kapil Arora	Assistant Professor, GZSSAP	Present Physically
3. Ar. Kajal Handa Arshi	Assistant Professor, GZSSAP	Present Physically
4. Dr. Karamjit Singh Chahal	Prof., Deptt. of Archi., GNDU, Amritsar	Present through Digital Mode
5. Ar. Sohan Lal Saharan	Asso. Prof., CCA, Chandigarh	Present through Digital Mode
6. Ar. Jit Kumar Gupta	Sr. Town Planner (Retd.) Chandigarh & Former Director, IET, Bhabhal	Present through Digital Mode

Following issues were discussed in detail and **approval** of the same was made by the committee members .

A) Regarding syllabus and scheme of BFA & MFA (Integrated Course) & ongoing BFA (2022 scheme)

All members deliberated on the proposed scheme of BFA & MFA (Integrated Course) to be started from 2023 session onwards & ongoing BFA (2022 scheme) and **approved with the** following improvements:

- Content of syllabus for BFA & MFA (Integrated Course) course upto 1st year was discussed and approved with minor changes.
- Content of syllabus for ongoing BFA course upto 2nd year was discussed and approved with minor changes.
- Every year, training/internship of 4-6 weeks duration during summer vacations with agencies such as art & advertisement etc. has been incorporated in the syllabus. A faculty training co-ordinator will guide the students in this regard.
- An Annual Art Festival/Exhibition Shall be organized by the students to create awareness about the courses in the region.

B) Regarding syllabus and scheme of Master of Fine Arts (MFA Painting) and Master of Arts (MA Fine Arts)


All members deliberated on the proposed syllabus and scheme of Master of Fine Arts (MFA Painting) and Master of Arts (MA Fine Arts) and **approved it** with the following improvements:


- i. Mandatory inclusion of at least 04 expert lectures/workshops has been made during a semester for giving the students practical exposure in the field.
- ii. Feedback after every semester shall be taken from the students regarding the course outcomes & contents.

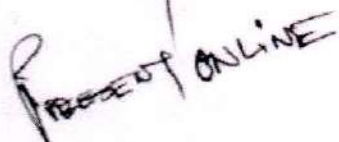
Prof. (Dr.) Bhupinder Pal Singh appreciated the efforts of Prof. Hardarshan Singh Sohal and Ms. Amninder Kaur for preparing the study scheme & Syllabus of all the courses in a short span of time and thank all the committee members.

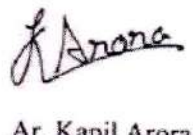
Meeting ends with a vote of thanks to all.


Dr. (Prof.) Bhupinder Pal Singh


Ar. Jit Kumar Gupta


Ar. Sohan Lal Saharan


Dr. Karamjit Singh Chahal


Ar. Kapil Arora


Ar. Kaja Handa Arshi



ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਤਕਨੀਕੀ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ
ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ - 151001

Maharaja Ranjit Singh Punjab Technical University
DABWALI ROAD, BATHINDA-151001

[A State University Estb. by Govt. of Punjab Act No. 5(2015) u/s 2(f) & Approved u/s 12B of UGC Act, 1956]

ਐਸੋ. ਡੀਨ (ਅਕਾਦਮਿਕ ਮਾਮਲੇ)

Associate Dean (Academic Affairs)

Ref. No.: DAA/MRSPTU/2023/ 4322

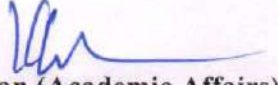
Date: 05/10/2023

(Through E-mail only)

OFFICE ORDER

Consequent upon the decision of 9th Academic Council as per Minutes of Meeting vide agenda item no. 09.16 dated 03.10.2023, the following committee has been constituted to make necessary guidelines for better implementation of the course "THE MAHARAJA OF PEOPLE" from 2022 batch onwards for UG-AICTE/ UG-Non-AICTE programmes.

1. Dr. R.K. Bansal, Director PIT, Nandgarh (**Chairman**)
2. Dr. Karanvir Singh CoE, MRSPTU, Bathinda
3. Dr. Kawaljit Singh Sandhu, Associate Dean (Academic Affairs)
4. Dr. Veerpaul Kaur, Head, Department of UBS, MRSPTU, Bathinda


Associate Dean (Academic Affairs)
MRSPTU, BATHINDA

Copy to the following for information and further necessary action as applicable:-

1. PA to Vice Chancellor for information to the Hon'ble Vice Chancellor please
2. Registrar, MRSPTU, Bathinda
3. Campus Director, GZSCCET, MRSPTU, Bathinda
4. All concerned members

Shelly Pathania 11/10

Note # 1**Note for Approval**

SUBJECT: REGARDING ISSUING OF PROVISIONAL DEGREE CERTIFICATE Ph.D. NOTIFICATION OF THE Ph.D. CANDIDATE Ms. Shelly Pathania (Pharmacy)

It is stated that the Ph.D. viva-voce examination of following candidate was held on 15.09.2023. In which candidate successfully defended her Ph.D. thesis.

Name	Registration No.	Faculty	Title of Thesis
Ms. Shelly Pathania	17201FPE03	Pharmacy	DESIGN AND SYNTHESIS OF DIVERSITY-ORIENTED PYRIMIDINE HETEROCYCLES AS ANTICANCER AGENTS

The report of viva-voce examination has been received in the office of Dean (R&D). As reported by department she fulfils all the conditions for award of Ph.D. degree by the University as MRSPTU Ph.D. regulations – 2016 which shall be awarded after the approval of the Academic Council and Board of Governors of the University.

Meanwhile you are requested to allow the office of Dean (R&D) to issue Provisional Degree Certificate to the candidate.

As per the decision of Academic Council, this case should be put up for approval to award the degree in upcoming convocation, to be held on 17/10/2023. The case shall be subsequently put up to Academic Council for ratification in its next meeting.

11/10/2023 03:46 pm

VEENA SHARMA
ASST. DEAN(R&D)-MRSPTU

Note # 2

12/10/2023 10:39 am

LAKHAN SHARMA
CDEO(EE)-GZSCCET

Note # 3

Put up for further processing please.

12/10/2023 10:42 am

VEENA SHARMA

ASST. DEAN(R&D)-MRSPTU

Note # 4

Put up for approval please

12/10/2023 10:43 am

ASHISH BALDI
DEAN (R&D)-MRSPTU

Note # 5

Approved.

12/10/2023 01:03 pm

BUTA SINGH SIDHU
VICE CHANCELLOR-MRSPTU-BTD

Note # 6

Do the needful as per approval

12/10/2023 01:15 pm

ASHISH BALDI
DEAN (R&D)-MRSPTU

Note # 7

Close the file after confirming whether the degree was issued to candidate during convocation.

20/11/2023 02:44 pm

VEENA SHARMA
ASST. DEAN(R&D)-MRSPTU

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA
OFFICE OF DEAN PLANNING & DEVELOPMENT

Ref: P&D/441

dt: 26.02.2024

To

The Registrar as Secretary Academic Council
MRSPTU, Bathinda

Sub: COMMITTEE REPORT

Ref: DAA/MRSPTU/2023/4323 dt 5.10.2023 of the o/o Associate DAA



*A DAA
discuss
Discussed and signed*

*21/6/24
Registrar
Put this report
on part of
Academic
Council
22/7/24
A DAA*

In reference to decision of 9th meeting of Academic Council held on 26.9.2023, the report of the committee, constituted to review the number of students in existing programs, new programs to be introduced, programs in demand, and closure of programs (if any), is enclosed herewith.

2. One of the committee members, Dr K S Sandhu, has reservations in regard to recommended increase in seats from 30 to 60 for BSc (Food Sc & Tech) citing deficiency in staff. He has neither documented his comments nor signed the report.

Submitted for records and further necessary action at your end please.

[Signature]
26/2/24
Chairperson
(Dean P&D)

Encls:

1. Report (7 pages)
2. Annexure (A): 1 page
3. Annexure (B): 9 pages

REPORT

As per the approval of 9th Academic Council meeting of MRSPTU held on 26.09.2023, vide o/o DAA/MRSPTU/2023/4323 dt 05.10.2023, a committee was constituted to review the number of students in existing programmes, new programmes to be introduced, programmes in demand and closure of programmes (if any). The committee met on 05.10.2023, deliberated on the matter and sought needed information on a desired format up to 12.10.2023 from concerned sections through MoM circulated vide P&D/433 dt 05.10.2023 (Annexure A). The data supplied by o/o CDC (in response to "S.No. 3") via CDC/154 dt 03.11.2023 is attached herewith. The o/o DAA supplied admission related information (pertaining to "S.No.1") under 169 programmes pertaining to MRSPTU main campus/ constituent colleges vide revised e-mail on 08.02.2024 (Annexure B), and no information was received on "S.No. 2" as desired. The information made available was compiled under Undergraduate and Postgraduate courses, with broad categorization under different Faculties: - Engineering, Sciences, Computer Applications, Commerce, Management, Pharmacy, Architecture, and Humanities - and skill related courses, for the MRSPTU main campus, and its constituent colleges namely: GZSCCET-Bathinda, PIT-Nandgarh (hereafter PITN), PIT- Rajpura (hereafter PITR), PIT-Moga (hereafter PITM), PSAEC-Patiala (hereafter PSAEC). Another pre-scheduled meeting was held on 19.02.2024 after receiving the data, that was attended by following members-

1. Dr Savina Bansal (Dean P&D, Chairperson)
2. Dr Harish Garg (PI-Finance, Member)
3. Dr Neeraj Gill (CoE, Member)
4. Dr Kawaljit S. Sandhu (Associate DAA, Member)

Dr Ashish Baldi (Dean R&D, Member) & Dr Balwinder S Sidhu (Director CDC, Member) were on leave and could not attend the meeting. Another meeting was held on 23.02.2024 to finalize on the matter. After deliberating on the supplied data, compiled report and the other inputs supplied by affiliated colleges, following observations and recommendations are made –

- Over the past five years, at MRSPTU's Main campus and Constituent colleges, the total number of admitted students across Undergraduate (UG), Postgraduate (PG), and Skill certificate courses amounts to 6721. Among these, approximately 80% are enrolled in UG programs, 13% in PG programs, and 07% in skill certificate courses.

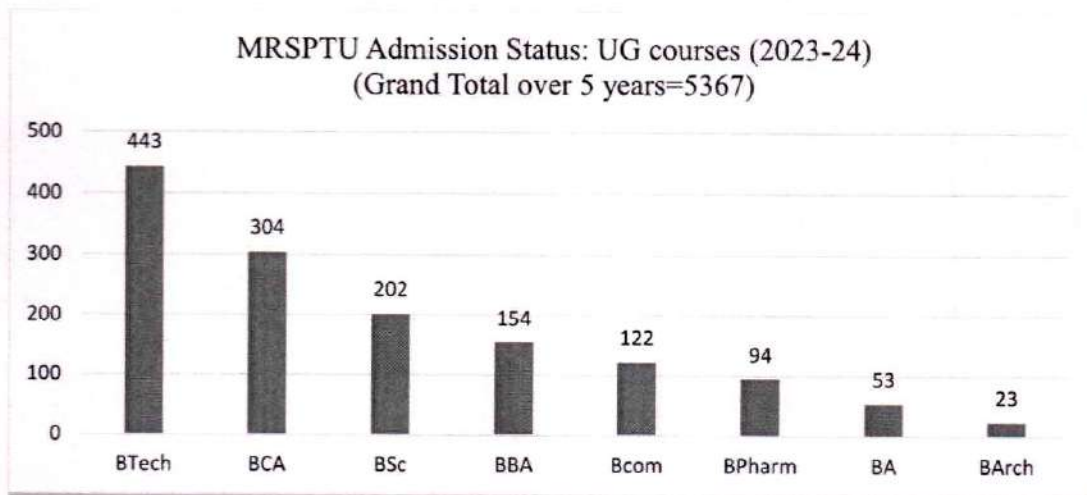
- In the past five years (2019-2023), the total admissions for undergraduate (UG) courses in major faculties at the University's Main campus and Constituent colleges are as follows:

Engineering (1924) > Computer Applications (1208) > Sciences (654) > Commerce (560) > Management (468) > Pharmacy (371) > Architecture (120) > Humanities (62)

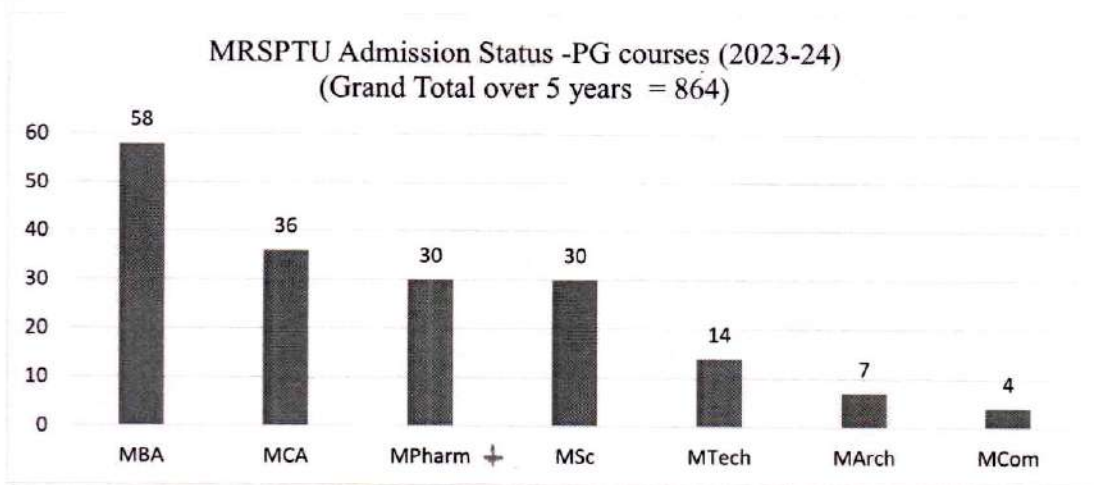
- In the past five years (2019-2023), the total admissions for postgraduate (PG) courses, in major faculties, at the university's main campus and constituent colleges are as follows:

Sciences (250) > Management (209) > Computer Applications (166) > Engineering (96) > Pharmacy (93) > Architecture & Planning (30) > Commerce (20)

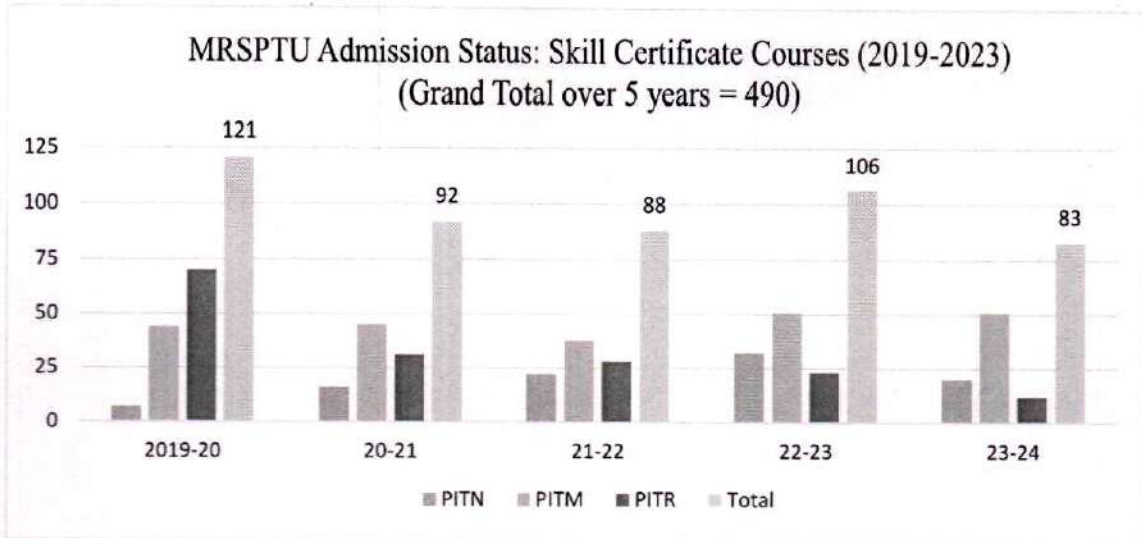
- For the current session 2023-24, UG admissions status is as follows-



- For the current session 2023-24, status of PG admissions is as follows-



- Over the past five years, the total admissions for skill certificate courses amount to 490 students. Further details on the yearly admissions is as shown below:



The highest admission seeking stream is Engineering @ GZSCCET under UG programmes and Management @MRSPTU Main campus under PG programmes

1. Computer Science & Engg related programmes (BTech/BCA/BA(CS)) and the allied emerging areas like BTech (AI & ML) are major attractions for admissions, though somewhat at the cost of other core engineering streams like Mechanical, EE, ECE, Civil, Textile, Aeronautical, and Aerospace Engg that could not attain their sanctioned targets in the last 5 years, though, in latest admissions the trend has started improving somewhat for Civil, EE though only at GZSCCET, and Aeronautical and Aerospace programmes at PSAEC.
2. Commerce & Management and Computer Application related courses (like BBA/BCA/BCom) are next in line to Engineering in terms of admitted students' strength and preferred choice among admission seekers. Though, the rise in admissions for a program at the university main campus has come at the expense of declining admissions in other constituent colleges potentially leading to an imbalance in enrolment distribution across the University's different academic offerings (Fig 1-3). Accordingly, concrete strategy for allocating dedicated programmes to constituent colleges only need to be devised for their survival.

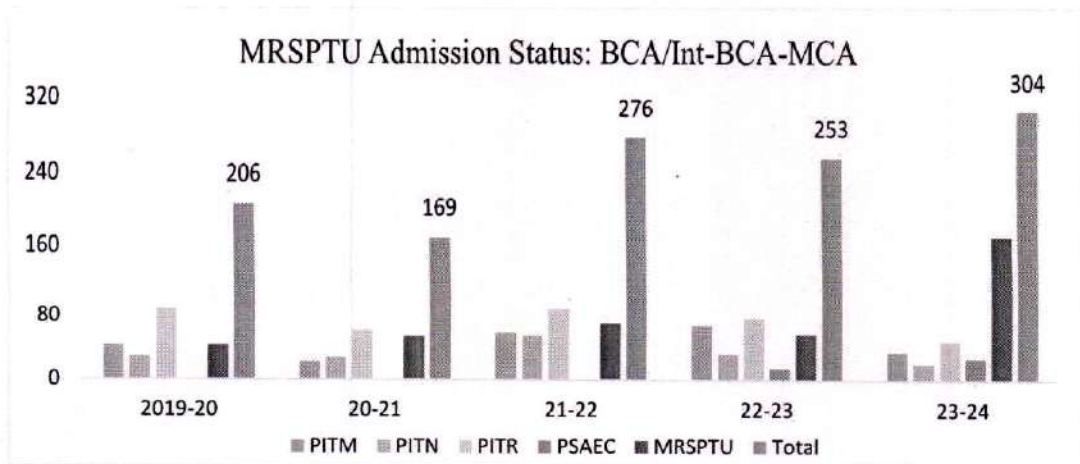


Fig. 1

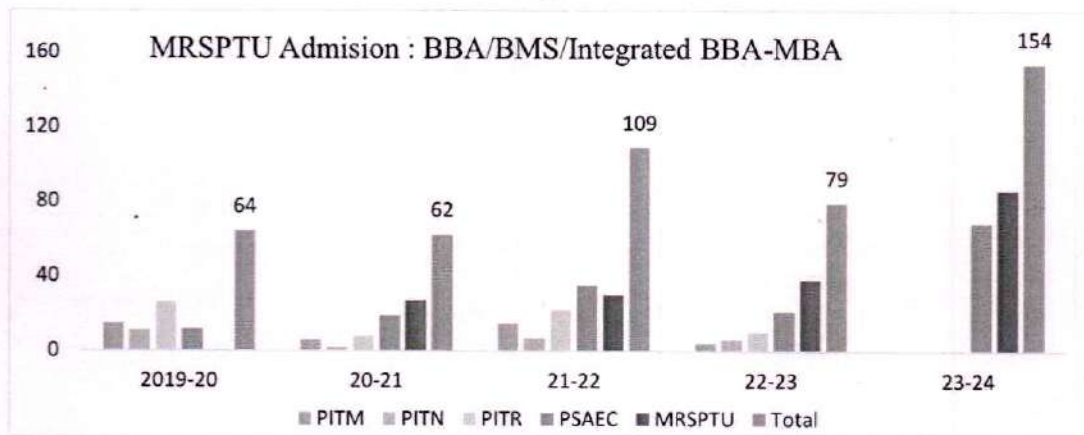


Fig. 2

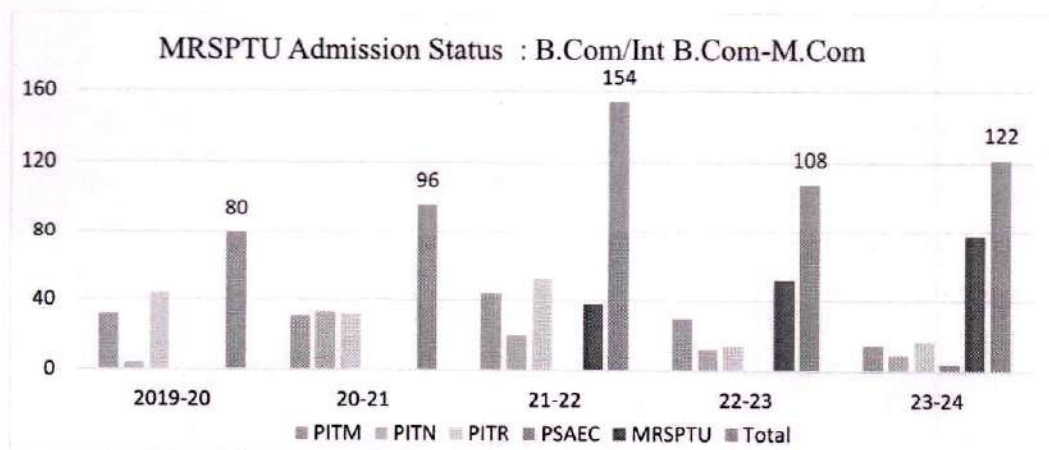


Fig. 3

- Among the Faculty of Sciences programmes, BSc(Hons) (Food Sc & Tech), BSc(Hons) (Agriculture), BSc(Non-Med), BSc(Hons) (Math) are potential courses at main campus (retaining about 65% of total admissions during 2023-24 (131 out of 202)). Seats can be considered for increase from 30 to 60 in the Integrated B.Sc. (Food Science & Tech.) /Bachelor of Food Sciences & Tech. (Hons.) programme, which is consistent in its

admissions for the last five years, so as to increase University revenues. At constituent colleges, UG/PG Science courses could not take off and may be considered for closure, if no ground infrastructure or faculty recruitment is done for these courses.

4. Newly started programmes that did not find any admission seeker for two/three successive years may be considered for closure.
5. Declining trend in MSc admissions needs to be revived with proper incentives or reviewing fee structures in comparison to other competing Universities in the area.

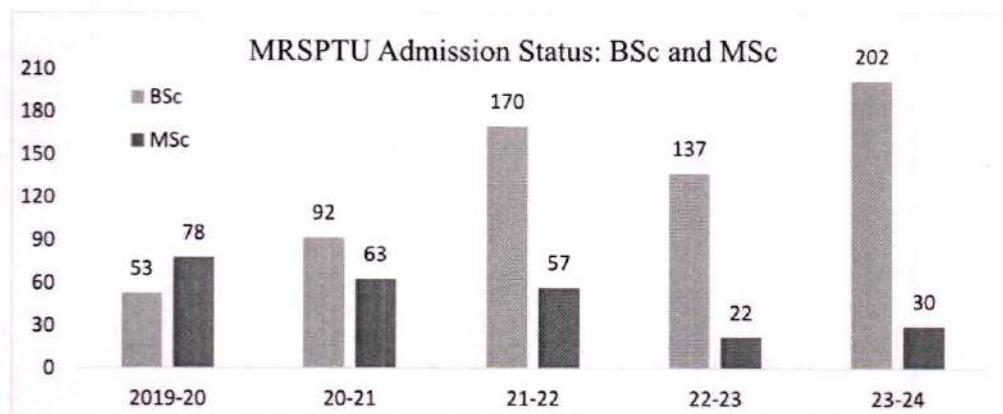


Fig. 4

6. Admissions under the faculty of Pharmacy (BPharm/MPharm) are as per the sanctioned seats strength over the last 5 years and further increase can be planned if admissions in Pharm-D, the newly started programme, reaches the sanctioned strength of 30 during 2024-25 session.
7. Among the newly started courses, BTech (AI & ML), BSc (Graphics & Web designing), BSc (Medical Lab Sc), BSc (Fashion Technology), Integrated BSc-MSc (Forensic Sc), BTech (Biomedical Engg) programme have started gaining ground over the last 1-2 years, and needs further grooming and support in improving their visibility in the public domain to attain sanctioned targets. Seats can be enhanced under the BA(CS) programme (under the Faculty of Humanities) that has shown good response in the latest admissions.
8. Keeping in view the admission trend and to utilize the available manpower resources, BTech programmes in core engineering with emerging areas as specializations can be offered like- AI and Data Science/AI and Robotics/Data analytics/ Electronics & Computers/Electrical & Electronics/ Electrical Vehicle (EV) Technology/Automobile Engg/Cyber security/Digital Forensics/Digital Marketing/ Fire and safety management and likewise. Inputs may be sought in this concern from concerned faculties and BoS.

The programmes in demand, as suggested by the 10 affiliated colleges through o/o CDC, were also deliberated and it is observed that-

9. Many a desired skill-certificate and UG/PG Degree level programs are already in active state at MRSPTU and affiliated Institutes can avail them as per applicable norms. For offering new courses under BTech/BBA/BCA/MBA with any kind of specialization, the needed Institute shall have to seek prior compliance and approval of AICTE and University.
10. Furthermore, at present, MRSPTU, functioning primarily as a technical university, lacks the requisite Faculty to launch core undergraduate (UG) and postgraduate (PG) programs in law, Paramedical sciences, Medical-health care assistance, and Nursing, which are also in demand. Though at MRSPTU main campus some of the programs with such specializations can be explored in collaboration with appropriate neighbouring Institutes and allied concerned Faculty.

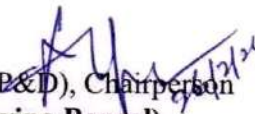
GENERAL REMARKS

- a) Emerging areas in Engineering/Management/Pharmacy/Sciences/Architecture may be explored as value addition to the existing programmes for seeking better admissions. Manpower/Faculty needs to be groomed and trained, if needed, for specific domains/skill-sets before floating a new programme.
- b) Fee structure should be designed keeping an eye on the fee-structure of other competing Govt/Semi-Govt Universities in the area. Higher intake is better for improving and enhancing the University image, visibility, and social impact.
- c) Frequent addition/deletion in core UG/PG programmes should be refrained from, as it may lead to undue overloading of the system. Feedbacks from admission cell and demand survey by concerned college should be considered before starting a new course. Further, a new program should be started provided the needed trained manpower and hardware resources can be ensured for maintaining quality and the desired academic standards of University and related statutory bodies.
- d) Interdepartmental Collaborative programmes like- BTech(Hons) with specialization in an emerging area and BTech with minor degree in another stream should be encouraged and popularized among the students for value addition to the core degree programme. The notified norms of the University are already in place, which need to be popularized more among students.

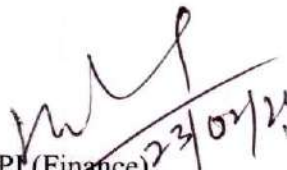
- e) As permitted by AICTE in latest APH-2024, evening programmes can be planned for working professionals, who wish and need to enhance their qualifications.
- f) To improve social responsibility aspect, Skill certificate courses, which facilitate an individual to be self-sufficient for starting a small business enterprise of her/his own should be focussed. Though, initially these could be on No-Profit-No-Loss basis for the needy individuals.

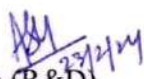
Submitted for kind perusal and further necessary action, as applicable please.

Annexures (a/a: 10 pages)


Dean (B&D), Chairperson
(Dr Savina Bansal)

~~on leave~~
Director, CDC
(Dr Balwinder Singh)


PT (Finance) 23/02/24
(Dr Harish Garg)


Dean (R&D) 23/2/24
(Dr Ashish Baldi)


CoE 23/2/24
(Dr Neeraj Gill)


Associate DAA
(Dr Kawaljeet Sandhu)

ਪ੍ਰੋ. (ਡਾ.) ਸਵੀਨਾ ਬਾਂਸਲ
ਡੀਨ (ਪਲਾਨਿੰਗ & ਡਿਵਲਪਮੈਂਟ)

Prof. (Dr) SAVINA BANSAL
PhD (Engg) FIE, FIETE, SMCSI
DEAN (Planning & Development)



ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ
(ਯੂ.ਜੀ.ਸੀ. ਵੱਲੋਂ ਮਾਨਤਾ ਪ੍ਰਾਪਤ)
Maharaja Ranjit Singh Punjab Technical University

(Act 5 (2015) of Pb & 2(f) of UGC
ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ (ਪੰਜਾਬ) -151 001
Dabwali Road, Bathinda (Punjab)-151001

Ref. No. P&D/433

Dated: 05/10/2023

MINUTES OF MEETING

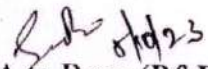
In reference to the Office Order DAA/MRSPTU/2023/4323 dated 05.10.2023, a meeting was held on dated 05.10.2023 at 4:00 pm in the office of Chairperson, Dean (P&D), MRSPTU as below-


1. Dr. Savina Bansal, Dean (Planning & Development), MRSPTU (Chairperson)
2. Dr. Balwinder Singh Sidhu, Director (CDC), MRSPTU
3. Dr. Karanvir Singh, CoE, MRSPTU
4. Dr. Ashish Baldi, Dean (R&D), MRSPTU (on leave)
5. Dr. Harish Kumar Garg, P/I (F), MRSPTU (did not attend meeting due to pre-occupation).
6. Dr. Kawaljit Singh Sandhu, Associate Dean (Academic Affairs), MRSPTU

The matter was discussed in detail and the following decisions were arrived at-

1. In regards to review the number of students in existing programmes, it was decided that O/o DAA shall provide the information from the main campus/ constituent /affiliated colleges in this regard as per the attached format 'A' upto - 10.10.2023.
2. In regards to "new programmes to be introduced", it was decided that information shall be sought from all Dean Faculty, MRSPTU and Chairperson BoS upto 12.10.2023 by the O/o DAA as per the attached format 'B'. The committee members at Sr. no. 04 and 05 shall put up the compiled report and recommendation in next meeting for discussions.
3. In regards to "programmes in demand", the committee members at Sr. no. 02 and 03 shall seek information from the Principals of all affiliated and constituent colleges upto 12.10.2023 on the attached format 'C' and shall put up their recommendation in the next meeting for consideration and discussions.

The meeting ended with vote of thanks to the chair.


PA to Dean (P&D)


Dean (P&D)
05/10/23

CC: All concerned for necessary action.

Office No. : ADMN-116, Mob. +91 81466 00954
Email: pa-deanpnd@mrsptu.ac.in Website: www.mrsptu.ac.in



Maharaja Ranjit Singh Punjab Technical U

Dabwali Road, Bathinda -151001

(Estb. by Govt. of Punjab vide Act No. 5 [2015] and u/s 2(f) and 12 B of UGC Act, 1956)

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ।

Director, College Development Council

Annexure - B1 Pg 0

Ref No: MRSPTU/CDC/154

Dated 03-11-2023

ਡੀਨ ਯੋਜਨਾਬੰਦੀ ਅਤੇ ਵਿਕਾਸ
ਮ.ਰ.ਸ. ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ,
ਬਠਿੰਡਾ।

ਵਿਸ਼ਾ: ਯੂਨੀਵਰਸਿਟੀ ਦੇ ਐਫੀਲੇਟਿਡ ਕਾਲਜਾਂ ਵੱਲੋਂ ਨਵੇਂ ਪ੍ਰੋਗਰਾਮਾਂ ਦੀ ਮੰਗ ਸਬੰਧੀ।
ਹਵਾਲਾ ਪੱਤਰ ਨੰ. P&D/433 ਮਿਤੀ 05/10/2023 ਦੇ ਸਬੰਧ ਵਿੱਚ।
ਉਪਰੋਕਤ ਵਿਸ਼ੇ ਅਤੇ ਹਵਾਲਾ ਪੱਤਰ ਦੇ ਸਬੰਧ ਵਿੱਚ ਆਪ ਜੀ ਨੂੰ ਦੱਸਿਆ ਜਾਂਦਾ ਹੈ ਕਿ ਆਪ ਜੀ ਵੱਲੋਂ Point no. 3
"Programmes in demand" the committee members at Sr. no. 02 and 03 ਵੱਲੋਂ (Format 'C') ਰਾਹੀਂ
ਮੰਗੀ ਗਈ ਜਾਣਕਾਰੀ ਇਸ ਪੱਤਰ ਨਾਲ ਨੱਥੀ ਕਰਕੇ ਭੇਜੀ ਜਾ ਰਹੀ ਹੈ ਜੀ।

ਡਾਇਰੈਕਟਰ

ਕਾਲਜ ਡਿਵੈਲਪਮੈਂਟ ਕੋਸਲ

Compiled Information received from the
 o/o Director, CSE on 3.11.2023.

1 Name of College: Dolphin Pg College, VPO Chunni Kalan, Sirhind, Fatchgarh Sahib - 140406			Name of Principal: Dr. Manu 8427244882, 8427244772		
Sr. No.	Name of Programme	Duration	Level of Programme	Faculty of MRSPTU	Status of demand survey attached (Yes/No)
1.	Diploma in Medical Technology (AT&OT Technology)	2 Yr.	UG	Pharmacy	No
2.	Diploma in Radio medical Imaging	2 Yr.	UG	Pharmacy	No
3.	Diploma in MLT	2 Yr.	UG	Pharmacy	No
2 Name of College: Universal College, Shiv mandir, AC market, Village Nail, City-Patran, District Patiala-147105 (Pb)			Name of Principal: Dr. Amrish Dhawan 9779146689, 9888960645 8146526002		
1.	Beauty & Wellness	1 Yr.	Skill Certificate Course	Humanities	No
3 Name of College: Asra College of Engineering & Technology, NH-64, Patiala Sangrur Highway, Village Rajpura, Tehsil Bhawanigarh, Distt. Sangrur, Pincode-148026 (Pb)			Name of Principal: Dr. Amandeep Singh 9781986327, 9814401107		
1.	B. Tech CSE (Data Science)	4 Yr.	Graduation		NO
2.	B. Tech CSE (IOT & Cyber Security Including Block chain Technology)	4 Yr.	Graduation		No
3.	B. Tech Robotics & AI	4 Yr.	Graduation		No
4.	B. Tech Production Engg.	4 Yr.	Graduation		No
5.	BBA Digital Marketing	3 Yr.	Graduation		No
6.	Diploma in Fire and Safety Management	3 Yr.	Diploma		No
7.	Certificate in Fire and Safety Management	1 Yr.	Certificate		No
8.	Certificate in Nanny	1 Yr.	Certificate		No
9.	B.Sc in Health Information Management	3 Yr.	Graduation		No
10.	5 Year Dual degree Programme in B.tech/M.tech and B.tech/MBA	5 Yr.	PG		No

4 Name of College: Bharat Group of Colleges, Village Khera Khurad, Delhi Road, Tehsil Sardulgarh, Distt. Mansa- 151507 (Pb)			Name of Principal: Dr. Geetesh Goga 8558820800		
1.	Skill Course for Electrician	1 Yr.	Under- Graduation		No
2.	Skill Course for Welder	1 Yr.	Under- Graduation		No
3.	Skill Course for Plumber	1 Yr.	Under- Graduation		No
5 Name of College: Bharat Institutes of Management Studies, Village Khera Khurad, Delhi Road, Tehsil Sardulgarh, Distt. Mansa- 151507 (Pb)			Name of Principal: Dr. Dalwinder Singh Dhaliwal 9779520800		
Sr. No.	Name of Programme	Duration	Level of Programme	Faculty of MRSPTU	Status of demand survey attached (Yes/No)
1.	B.A. LLB (Integrated)	5 Yr.	Under - Graduation		No
2.	B.A. LLB	3 Yr.	Under - Graduation		No
3.	B Lib	3 Yr.	Under - Graduation		No
4.	Skill Course for Hotel management/catering	1 Yr.	Under - Graduation	E and ge.	No
6 Name of College: National College of Information Technology, Gurdwara Dattan Sahib road, Backside PU, regional Campus, Sri Muktsar Sahib – 152026			Name of Principal: Mr.Gaurav Kumar Director 9779590781		
1.	M. Sc (IT) LEET	1 Yr.		Yes	No
7 Name of College: Guru Gobind Singh College Of Management and Technology, G.T Road, Near Malwa School, Giddarbaha, Pincode- 152101 (Pb)			Name of Principal: Dr. Jaya Ashish Sethi 9691900048, 8200138085, 8200138085		
1.	BA (Police & Defense Services)	3 Yr.	UG	Humanities	No

**Name of College: Abhishek College, Abohar-
Sri Ganganagar Road, Village
Daulatpura, Near Khuian Sarwar,
Abohar, Fazilka, Punjab-152128**

**Name of Principal: Dr. Rajveer Kaur
9501638111**

1.	BA(CS)-B.Ed	4 Yr.	Integrated		
2.	BBA-MBA	5 Yr.	Integrated		
3.	BCA-MCA	5 Yr.	Integrated		
4.	BA(CS)-LLB	5 Yr.	Integrated		
5.	B.Com-LLB	5 Yr.	Integrated		
6.	LLB	3 Yr.	Integrated		
7.	B.Sc (Nursing)	4 Yr.	UG		
8.	B.Lib	1 Yr.	UG		
			UG		

**Name of College: Saraswati Group of
Colleges, Bathinda Road, Maur Mandi, Distt.
Bathinda, Punjab**

**Name of Principal: Dr. Rajesh Singla
9356460660, 9417460660**

1.	Dental Assistant	1 Yr.	Certificate & Diploma	Pharmacy	Field Counseling
2.	Dental Assistant	2 Yr.	Certificate & Diploma	Pharmacy	Field Counseling
3.	D.M.L.T	2 Yr.	Certificate & Diploma	Applied Science	Field Counseling
4.	Diploma in O.T.	2 Yr.	Certificate & Diploma	Pharmacy	Field Counseling
5.	Ophthalmic Assistant	2 Yr.	Certificate & Diploma	Pharmacy	Field Counseling
6.	Physiotherapist Assistant	2 Yr.	Certificate & Diploma	Applied Science	Field Counseling
7.	X-ray Technician	2 Yr.	Certificate & Diploma	Applied Science	Field Counseling
8.	Diploma in Hospital Management	2 Yr.	Certificate & Diploma	Pharmacy	Field Counseling
9.	Diploma in Frontline Healthcare	2 Yr.	Certificate & Diploma	Pharmacy	Field Counseling

**Name of College: Nirman Campus of
Education, Research & Training, Jakhepal-
Ghasiwala Road, Bakhtaur
Nagar, SUNAM, Sangrur, Punjab-148028**

**Name of Principal: Dr. Vikas Kansal
9501898500, 9417169303
9501010979**

1.	AI	1 Yr.	Diploma		No
2.	Digital Marketing	1 Yr.	Diploma		No
3.	Photo Shop	1 Yr.	Diploma		No

Minutes of meeting held on 05.10.2023 at P&D office

Annexure - B2 - Pgo.

Dean Academic Affairs MRSPTU <daa@mrsptu.ac.in>
To: PA to Dean Planning and Development <pa-deanpnd@mrsptu.ac.in>

Tue, Feb 13, 2024 at 1:06 PM

----- Forwarded message -----

From: Dean Academic Affairs MRSPTU <daa@mrsptu.ac.in>
Date: Thu, Feb 8, 2024 at 3:54 PM
Subject: Re: Minutes of meeting held on 05.10.2023 at P&D office
To: Dr. Ashish Baldi <baldiashish@gmail.com>
Cc: Dr. Savina Bansal <savinabansal@mrsptu.ac.in>, Dr Harish Kumar Garg Mechanical <harishgarg@mrsptu.ac.in>

Sir/Madam

Please find the attached revised information desired by the Committee.

On Thu, Feb 8, 2024 at 1:05 PM Dr. Ashish Baldi <baldiashish@gmail.com> wrote:

Dear Sir
With reference to attached MoM and instructions received for P&D office, please provide requisite information so that it can be put to committee accordingly.
Kind regards
Dr. Ashish Baldi
Dr. Harish Garg

On Fri, Oct 13, 2023, 11:01 Dr. Ashish Baldi <baldiashish@gmail.com> wrote:

Dear Sir
With reference to attached MoM and instructions received for P&D office, please provide requisite information so that it can be put to committee accordingly.
Kind regards
Dr. Ashish Baldi
Dr. Harish Garg

----- Forwarded message -----

From: PA to Dean Planning and Development <pa-deanpnd@mrsptu.ac.in>
Date: Thu, Oct 5, 2023, 17:57
Subject: Minutes of meeting held on 05.10.2023 at P&D office
To: Balwinder Singh Mechanical engineering <mechgzs@mrsptu.ac.in>, Karan Vir Math <karanvir@mrsptu.ac.in>, Ashish Baldi <ashishbaldi@mrsptu.ac.in>, Dr Harish Kumar Garg Mechanical <harishgarg@mrsptu.ac.in>, Kawaljit Singh Sandhu Department of Food Science and Technology <kssandhu@mrsptu.ac.in>
Cc: Dr. Savina Bansal <savinabansal@mrsptu.ac.in>

[Quoted text hidden]

Dr. Kawaljit Singh Sandhu


Associate Dean (Academic Affairs),

Maharaja Ranjit Singh Punjab Technical University,

Bathinda-151001 (Punjab)

Mob.: 70157-09403

[Quoted text hidden]

 Sanctioned Admitted Students 2019 to 23 - Copy.xlsx
23K

Annexure B-2
 Information
 received
 from go
 DAA on
 8.2.2024.

Sr. No.	Name of the Programme	Admitted students status of last five years/sanctioned seats												Name of the College
		2019-20		2020-21		2021-22		2022-23		2023-24		Sanctioned seats	Admitted	
		Sanctioned seats	Admitted	Sanctioned seats	Admitted	Sanctioned seats	Admitted	Sanctioned seats	Admitted	Sanctioned seats	Admitted			
1	B. Arch.	60	34	---	---	---	---	---	---	---	---	---	---	---
2	B. Tech. (Civil Engineering)	60	44	60	43	60	35	60	32	60	60	62	60	62
3	B. Tech. (Civil Engineering) LEET	---	27	---	21	---	20	---	8	---	---	18	---	18
4	B. Tech. (Computer Science & Engineering)	150	115	150	137	150	138	150	132	150	150	148	150	148
5	B. Tech. (Computer Science & Engineering) LEET	---	17	---	9	---	9	---	9	---	---	7	---	7
6	B. Tech. (Electrical Engineering)	60	41	60	34	60	28	60	11	60	60	39	60	39
7	B. Tech. (Electrical Engineering) LEET	---	22	---	17	---	18	---	10	---	---	11	---	11
8	B. Tech. (Electronics & Communication Engineering)	60	9	60	27	60	11	60	6	60	60	5	60	5
9	B. Tech. (Electronics & Communication Engineering) LEET	---	---	---	4	---	1	---	1	---	---	3	---	3
10	B. Tech. (Mechanical Engineering)	120	31	90	19	90	10	90	6	90	90	16	90	16
11	B. Tech. (Mechanical Engineering) LEET	---	6	---	5	---	12	---	3	---	---	5	---	5
12	B. Tech. (Textile Engineering)	60	6	60	25	60	6	60	6	60	60	1	60	1
13	B. Tech. (Textile Engineering) LEET	---	29	---	17	---	12	---	13	---	---	14	---	14
14	M. Tech. (Computer Science & Engineering)	18	5	18	1	18	5	18	5	18	18	2	18	2
15	M. Tech. (Construction Technology and Management)	18	5	18	2	18	5	18	0	18	18	1	18	1
16	M. Tech. (Mechanical Engineering)	18	1	18	2	18	1	18	0	18	18	1	18	1
17	B. Arch.	---	---	---	---	---	---	---	---	---	---	---	---	---
18	B. Pharm.	60	55	60	63	60	62	60	61	60	100	90	60	18
19	B. Pharm. LEET	---	6	---	10	---	10	---	10	---	---	4	---	4
20	B. Tech (Biomedical Engg)	---	---	---	---	---	---	---	---	---	60	2	---	2
21	B. Tech Mechatronics	30	0	---	---	---	---	---	---	---	---	---	---	---
22	Btech. (Agricultural Engg)	---	---	---	---	---	---	---	---	---	---	---	---	---
23	Btech (Biomedical Instrumentation)	---	---	---	---	---	---	---	---	---	---	---	---	---
24	Btech (Civil Engg. With Computer Application)	---	---	---	---	---	---	---	---	---	---	---	---	---
25	B. Tech. CSE (Artificial Intelligence & Machine Learning)	---	---	---	---	---	---	---	---	---	---	---	---	---
26	B. Tech. CSE (Artificial Intelligence & Machine Learning) LEET	---	---	---	---	---	---	---	---	---	---	---	---	---
27	B.Sc. (Fashion Technology)	---	---	---	---	---	---	---	---	---	---	---	---	---
28	B.Sc. (Graphics & Web Designing)	---	---	---	---	---	---	---	---	---	---	---	---	---
29	B.Sc. (Hons.) Agriculture	---	---	---	---	---	---	---	---	---	---	---	---	---
30	B.Sc. (Hons.) Chemistry	60	8	60	13	60	13	60	3	60	60	2	60	2
31	B.Sc. (Hons.) Mathematics	60	11	60	33	60	47	60	26	60	60	26	60	26
32	B.Sc. (Hons.) Physics	60	5	60	19	60	20	60	3	60	60	6	60	6
33	B.Sc Medical Lab Science	---	---	---	---	---	---	---	---	---	---	---	---	---
34	B.Sc Medical Technology (Anesthesia & Radiology)	---	---	---	---	---	---	---	---	---	---	---	---	---
35	B.Sc (Radio medical imaging Technology)	---	---	---	---	---	---	---	---	---	---	---	---	---
36	B.Sc. (Non-Medical)	---	---	---	---	---	---	---	---	---	---	---	---	---
37	B.A (Computer Scienc)	---	---	---	---	---	---	---	---	---	---	---	---	---
38	Bachelor of Design (Interior Design)	30	0	---	---	---	---	---	---	---	---	---	---	---
39	Bachelor of Management Studies (Hotel Management & Catering Technology)	---	---	---	---	---	---	---	---	---	---	---	---	---
40	Bachelor of Fine Arts (Applied Arts)	---	---	---	---	---	---	---	---	---	---	---	---	---

GZSCCET, MRSPTU,
 Bathinda

MRSPTU, Bathinda

41	Integrated Dual Degree B.Sc. (Food Sciences & Tech.) 3 years / Bachelor of Food Sciences & Tech. (Hons.) 4 years	30	29	30	30	27	30	29	30	15	30	31
42	Integrated/Dual Degree B.Com.-M.Com.	60	60	60	60	60	60	38	60	52	90	84
43	Integrated/Dual Degree B.Sc.-M.Sc (Forensic Science)	60	60	60	60	60	60	60	60	30	30	4
44	Integrated/Dual Degree BBA-MBA	60	60	60	60	60	60	30	60	38	90	75
45	Integrated/Dual Degree BCA-MCA	60	60	60	60	60	60	71	60	55	180	167
46	Integrated/Dual Degree BCA-MCA LEET	60	60	60	60	60	60	1	60	3	30	2
47	Integrated/Dual Degree BFA-MFA (Applied Arts)	60	60	60	60	60	60	60	60	60	30	20
48	M. Arch. (Building Engg. & Management)	18	3	18	18	2	18	18	18	18	18	0
49	M. Pharm. (Pharmaceutics)	9	9	9	9	9	9	9	9	6	9	9
50	M. Pharm. (Pharmacology)	9	9	9	9	9	9	9	9	3	9	9
51	M. Planning	18	8	18	18	2	18	2	18	6	18	7
52	M. Tech. (Electronics & Communication Engineering)	18	4	18	18	1	18	1	18	18	18	0
53	M.tech (Structural and Foundation engg) Part time	18	18	18	18	18	18	18	18	18	18	0
54	M. Tech. (Mechanical Engineering) Part time	18	18	18	18	18	18	18	18	18	18	0
55	M. Tech. (Electronics & Communication Engineering) (Part time)	18	18	18	18	18	18	18	18	18	18	0
56	M.Tech (Environment Science & Engg.) Part time	18	18	18	18	18	18	18	18	18	18	0
57	M. Tech. (Textile Engineering)	18	18	18	18	2	18	3	18	6	18	2
58	M.Tech. (Computer Application)	18	0	18	18	18	18	18	18	18	18	0
59	M. Tech. (CSE) Part Time	18	18	18	18	18	18	18	18	18	18	0
60	M.Tech. (Construction Tech & Management)	18	18	18	18	18	18	18	18	18	18	0
61	M. Tech. (Textile Engineering) Part Time	18	18	18	18	18	18	18	18	18	18	0
62	M. Tech. Civil Engineering (Geo Technical Engineering)	18	18	18	18	18	18	18	18	11	18	5
63	M. Tech. Electrical Engineering (Power System)	18	2	18	18	3	18	1	18	2	18	0
64	M. Tech. Electrical Engineering (Power System) Part Time	18	18	18	18	18	18	18	18	18	18	0
65	M.Sc. (Chemistry)	60	27	60	60	17	60	11	60	4	30	5
66	M.Sc. (Clinical Research)	15	15	15	15	15	15	15	15	15	15	0
67	M.Sc. (Food Science & Technology)	30	30	30	30	29	30	27	30	16	30	18
68	M.Sc. (Mathematics)	60	3	60	60	5	60	8	60	1	30	3
69	M.Sc. (Mathematics & Computing)	18	0	18	18	18	18	18	18	18	18	0
70	M.Sc. (Physics)	60	18	60	60	12	60	11	60	3	30	4
71	MBA	60	30	60	60	25	60	30	60	19	60	26
72	MBA (Agri Business)	60	60	60	60	60	60	60	60	60	60	26
73	MBA (Hospital Administration)	60	60	60	60	60	60	60	60	60	60	26
74	MBA Executive	60	60	60	60	60	60	60	60	60	60	26
75	MCA	60	0	60	60	6	60	10	60	19	30	17
76	MCA LEET	60	60	60	60	60	60	60	60	60	60	26
77	Master of Fine Arts (Painting)	60	60	60	60	60	60	60	60	60	60	26
78	MA (Fine Arts)	60	60	60	60	60	60	60	60	60	60	26
79	PG Diploma in Pharmacovigilance	60	60	60	60	60	60	60	60	60	60	26
80	PG Diploma in Intellectual Property Rights	60	60	60	60	60	60	60	60	60	60	26
81	PG Diploma Artificial Intelligence and Pharm D	60	60	60	60	60	60	60	60	60	60	26
82	Skill Certificate course in Additive	60	60	60	60	60	60	60	60	60	60	26
83		60	60	60	60	60	60	60	60	60	60	26



MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY

DABWALI ROAD, BATHINDA-151001

(Estb. by Govt. of Punjab Act 5(2015) & Approved u/s 2(f) & 12(b) of UGC. Act, 1956)

www.mrsptu.ac.in

Ref. No.: CHEM/24/212

Date: 12/08/2024

Sub: MINUTES OF 7th MEETING OF FACULTY OF SCIENCES HELD ON 06.08.2024

7th meeting of Faculty of Sciences of Maharaja Ranjit Singh Punjab Technical University, Bathinda was held on 06.08.2024 at 3.15 PM onwards in virtual mode. The following members were present:-

1. **Dr. Sandeep Kansal**,
Dean Faculty of Sciences,
Maharaja Ranjit Singh Punjab Technical University, Bathinda
Chairperson
2. **Dr. Sanjay Bhatnagar**
Head, Deptt of Computational Sciences MRSPTU, Bathinda.
(87250-72319) sanjay@mrsptu.ac.in
Member
3. **Dr. Seema Sharma**
Head, Department of Chemistry, MRSPTU, Bathinda.
(94171-14169) chemseema@mrsptu.ac.in
Member & Convener
(for 7th Meeting of Faculty of Sciences)
4. **Dr. Kawaljit Singh Sandhu**
Head, Deptt of Food Science & Technology, MRSPTU, Bathinda
(70157-09403) kssandhu@mrsptu.ac.in
Member
5. **Dr. Mamta Kansal**
Head, Deptt of Mathematics, MRSPTU, Bathinda
(88722-11700) mamtakansal@mrsptu.ac.in
Member
6. **Dr. Veena Sharma**
Head, Deptt of Physics, MRSPTU, Bathinda
(9781601059), hodphysics@mrsptu.ac.in
Member
7. **Dr. Sudhanshu Pratap Singh**
Deptt. of Chemistry, MRSPTU, Bathinda.
(99971-82264) chemsudhanshu@mrsptu.ac.in
Member
8. **Dr. Anju Sharma**
Head, Deptt of Computational Sciences, PSAEC, Patiala.
(98889-97297) anju.sharma@mrsptu.ac.in
Member
9. **Dr. Santosh Kumar Mahapatra**
Professor, Department of Physics
School of Basic Sciences, Central University of Punjab, Ghudda, Bathinda.
(98776-29971, 94715-58674) sk.mahapatra@cup.edu.in
Member
10. **Dr. Rajesh Kumar**
Professor, Department of Chemistry, Central University of Punjab, Bathinda.
(99149-69694) rajeshchem01@gmail.com
Member

MINUTES of 7th MEETING OF FACULTY OF SCIENCES ON 06.08.2024

Page 1 of 3




After detailed deliberation following decision were taken:

Sr. No	Agenda Item no.	Agenda	Decision Taken
1	ITEM No. 07.01	TO APPROVE THE MINUTES OF MEETING & SYLLABI OF UG PROGRAMME IN THE DEPARTMENT OF SCHOOL OF AGRICULTURE SCIENCE & ENGINEERING	
		A. The minutes of meeting of Board of Studies of School of Agriculture Science & Engineering held on 06.10.2023	Approved.
		B. Syllabus (7 th & 8 th semester) of B.Sc. (Hons.) Agriculture	Approved.
2	ITEM No. 07.02	TO APPROVE THE THE MINUTES OF MEETING & SYLLABI OF UG PROGRAMME IN THE DEPARTMENT OF PHYSICS	
		A. The minutes of meeting of Board of Studies of Physics held on 12.07.2024.	Approved.
		B. Study Scheme (1 st to 6 th semester) & Syllabus (1 st & 2 nd semester) of B.Sc. Non-Medical (Computer Science), a New Program	Approved.
		C. Modification of Syllabus of 6 th semester of already running B.Sc (Hons.) for two subjects	Approved.
3	ITEM No. 07.03	TO APPROVE THE SYLLABI OF TWO UG PROGRAMMES IN THE DEPARTMENT OF COMPUTATIONAL SCIENCES.	
		A. The Syllabus of B.Sc. Graphics & Web Designing 3 rd Year (5 th & 6 th semester)	Approved.
		B. The Syllabus of BA (CS) 2 nd Year (3 rd & 4 th semester)	Approved.
4	ITEM No. 07.04	TO APPROVE SYLLABUS OF ONLINE COURSES RUN BY CORPORATE RESOURCE CENTRE, MRSPTU	
		A. Diet and nutrition coach beginner to advanced	Approved.
		B. SQL-MySQL for Data Analytics	Approved.

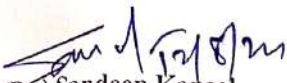



	C. Adobe Premier Pro 2021 Video Editing for Beginners	Approved.
	D. Autodesk Maya 2018	Approved.
	E. Adobe Photoshop 2021 for Beginners	Approved.
	F. Blender for Beginners	Approved.
	G. 120 hr course in Computer Application	Approved.

Submitted for approval please.


12/08/24

Dr. Seema Sharma
Member & Convener for
7th meeting of Faculty of Sciences
MRSPTU, Bathinda.


Prof (Dr.) Sandeep Kansal
Dean, Faculty of Sciences
MRSPTU, Bathinda.

CC:- All the members (through email)



MINUTES OF 6th MEETING OF FACULTY OF ENGG. & TECH. HELD ON 14.07.2022

A pre-scheduled 6th Meeting of Faculty of Engineering & Technology of Maharaja Ranjit Singh Punjab Technical University, Bathinda was held on 14.07.2022 at 11:00 AM onwards in online mode (Google meet code: iby spyz hqc). The following members were present:

- | | |
|---|------------------|
| 1. Dr. Sundar Singh
Former Professor, Civil
Thapar IET, Patiala
(98761-78224) sundersingh453@gmail.com | Chairperson |
| 2. Dr. Sarbjeet Kaur Bath
Head, Department of Electrical Engg
GZSCCET, MRSPTU Bathinda
(94638-36070) sjkbath77@gmail.com | Member Secretary |
| 3. Er. J.S. Tiwana
Department of Mechanical Engg.
GZSCCET, MRSPTU Bathinda,
(94631-35222) rg91@rediffmail.com | Member |
| 4. Dr. Rajeev Varshney
Head, Department of Textile Engg
GZSCCET, MRSPTU Bathinda
(87250-72426) textilegzscetbti@gmail.com | Member |
| 5. Dr. Gurpreet Singh Bath
For Head, Department of Civil Engg
GZSCCET, MRSPTU Bathinda
(75891-96148) rkumar_s@rediffmail.com | Member |
| 6. Dr. Neeraj Gill
Head, Deptt of Electronics & Comm Engg
GZSCCET, MRSPTU Bathinda
(94646-62132) neeraj.ece@mrsptu.ac.in | Member |
| 7. Er. Jyoti Rani
Head, Department of Computer Sc & Engg
GZSCCET, MRSPTU Bathinda
(94174-60026) cse.gzscet@gmail.com | Member |
| 8. Dr. Sarbjeet Kaur Bath
Department of Electrical Engg
GZSCCET, MRSPTU Bathinda | Member |

[Handwritten signature]

- (94638-36070) sjkbath77@gmail.com
9. Dr. Balwinder Singh Sidhu Member
Department of Mechanical Engg
GZSCCET, MRSPTU Bathinda
(87250-72415) drbwssidhu07@gmail.com
10. Dr Paramjeet Singh Member
Department of Computer Sc & Engg
GZSCCET, MRSPTU Bathinda
(87250-72459) param2009@yahoo.com
11. Dr. Shaveta Rani Member
Department of Computer Sc & Engg GZSCCET,
MRSPTU Bathinda
(98885-85202) garg_shavy@yahoo.com
12. Dr. Manjeet Bansal Member
Department of Civil Engg
GZSCCET, MRSPTU Bathinda
(98151-26102) push_kar5@yahoo.com
13. Dr. Rajeev Kumar Varshney Member
Department of Textile Engg
GZSCCET, MRSPTU Bathinda,
(70093-00964) rajeev_varshney2002@yahoo.co.in
14. Dr. Naresh Kumar Garg Member
Department of Computer Sc & Engg GZSCCET,
MRSPTU Bathinda
(94630-77886) naresh2834@rediffmail.com
15. Dr. Rajesh Gupta Member
Department of Mechanical Engg
GZSCCET, MRSPTU Bathinda,
(94631-35222) rg91@rediffmail.com
16. Dr. Devanand Uttam Member
Department of Textile Engg
GZSCCET, MRSPTU Bathinda
(94172-33925) d_a_uttam@yahoo.co.in
17. Dr. Harish Garg Member
Department of Mechanical Engg
GZSCCET, MRSPTU Bathinda
(92176-89991) harish_k_garg@rediffmail.com
18. Prof. Naveen Singla Member
Department of Mechanical Engg
GZSCCET, MRSPTU Bathinda

- (94632-59653) single.naveen2@gmail.com
19. Prof. Jasvir Singh Tiwana Member
 Department of Mechanical Engg
 GZSCCET, MRSPTU Bathinda
 (94175-42454) jstiwana1@rediffmail.com
20. Prof. Vivek Kaundal Member
 Department of Mechanical Engg
 GZSCCET, MRSPTU Bathinda
 (94171-93018) vivkris@mrsptu.ac.in
21. Dr. Anil Jindal Member
 Department of Mechanical Engg
 GZSCCET, MRSPTU Bathinda
 (96022-14677) aniljindal@mrsptu.ac.in
22. Dr. Rakesh Kumar Member
 Professor, Deptt of Aerospace Engg
 Punjab Engineering College, Chandigarh
 (98782-15676) rakpec@gmail.com

At the outset, after verifying the quorum of the meeting, the Chairperson welcomed all the members attending 6th Meeting of Faculty of Engg. & Tech. at Bathinda in online mode. Thereafter he asked Member Secretary to take up agenda items one by one for discussion. After detailed deliberations, the following unanimous decisions were arrived at:

ITEM 6.01	CONFIRMATION OF THE MINUTES OF 5TH MEETING OF FACULTY OF ENGG. & TECH. OF MRSPTU BATHINDA HELD ON 20/06/2022. (ANNEXURE-I)
DECISION	❖ Confirmed
ITEM 6.02	TO APPROVE THE MINUTES OF 8th MEETING of BOS of Aeronautical and Aerospace Engineering held on 10/06/2022 - as per following details and are attached herewith as ANNEXURE - II.
06.02.01	Minutes of 8th Meeting of BOS of Aeronautical and Aerospace Engineering held on 10/06/2022
DECISION	❖ Approved after incorporating the correction suggested by some faculty members.
ITEM 6.03	APPROVAL OF SYLLABI OF UG-ENGG. PROGRAMMES
06.03.01	Scheme and Syllabus of B. Tech. (Aerospace Engineering) 7th – 8th Sem. for Batches 2018 onwards
DECISION	❖ Approved after incorporating the change suggested by Dr. Rakesh Kumar, Prof. Department of Aerospace Engg., PEC Chandigarh.

ITEM 06.04	ANY OTHER AGENDA ITEM/ITEMS WITH THE PERMISSION OF CHAIR.
DECISION	❖ No other agenda item

Mob.
 MRSPTU
 Bathinda
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 s.

The Meeting concluded with a vote of thanks to the Chair.

[Signature]
 15/7/2022
 Member Secretary
 (Dr. Sarbjeet Kaur Bath)

For Approval please
CHAIRPERSON
 (Dr. Sundar Singh)
 (Meeting attended in on-line mode)
 (through Google Meet) (Meet code: iby spyz hqc)
 (Approval from Dean got through email)
 (Copy of email attached)



MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY
DABWALI ROAD, BATHINDA-151001
(Estb. by Govt. of Punjab Act 5(2015) & Approved u/s 2(f) & 12(b) of UGC Act, 1956)

www.mrsptu.ac.in

Ref. No.: HCED-190

Date: 15/05/23

MINUTES OF 7TH MEETING OF FACULTY OF ENGINEERING & TECHNOLOGY HELD ON 15.05.2023

A pre-scheduled 7th Meeting of Faculty of Engineering & Technology of Maharaja Ranjit Singh Punjab Technical University, Bathinda was held on 15.05.2023 at 11.00 AM onwards in offline as well as online mode. The following were present in offline mode.

- | | |
|---|-------------------------|
| 1. Prof. SUNDAR SINGH
Former Professor, Civil
Thapar IET, Patiala
(98761-78224) sundarsingh453@gmail.com | Chairperson |
| 2. Dr Manjeet Bansal
Head Department of Civil Engg
GZSCCET, MRSPTU Bathinda
(98151-26102) manjeet.civil@mrsptu.ac.in | Member Secretary |
| 3. Dr Rajeev Kumar Varshney
Head, Department of Textile Engg
GZSCCET, MRSPTU Bathinda
(94177-53339) txtrkvarshney.gzscet@mrsptu.ac.in | Member |
| 4. Prof J S Tiwana
Head, Department of Mechanical Engg
GZSCCET, MRSPTU Bathinda
(94175-42454) jstiwanamech@mrsptu.ac.in | Member |
| 5. Dr Neeraj Gill
Head, Deptt of Electronics & Comm Engg
GZSCCET, MRSPTU Bathinda
(94646-62132) neeraj.ece@mrsptu.ac.in | Member |
| 6. Dr Jyoti Rani
Head, Department of Computer Sc & Engg
GZSCCET, MRSPTU Bathinda
(94174-60026) jyoti_cse@mrsptu.ac.in | Member |
| 7. Dr Gagandeep Kaur
Head, Department of Electrical Engg
GZSCCET, MRSPTU Bathinda
(9417129985) dr.gagandeepkauree@mrsptu.ac.in | Member |

SSingh

Minutes of 7th MEETING OF FACULTY OF ENGG & TECHNOLOGY ON 15.05.2023

Page 1 of 6

MP

8. **Dr Savina Bansal** Member
 Department of Electronics & Comm. Engg
 GZSCCET, MRSPTU Bathinda
 (81466-00954) savinabansal@mrsptu.ac.in
9. **Dr Rakesh Kumar Bansal** Member
 Department of Electronics & Comm. Engg
 GZSCCET, MRSPTU Bathinda
 (94630-00954) rkbansal@mrsptu.ac.in
10. **Dr Sanjiv Kumar Aggarwal** Member
 Department of Civil Engg
 GZSCCET, MRSPTU Bathinda
 (94780-22281) sanjiv.civil@mrsptu.ac.in
11. **Dr Sarbjeet Kaur Bath** Member
 Department of Electrical Engg
 GZSCCET, MRSPTU Bathinda
 (94638-36070) sjkbath.gzscet@mrsptu.ac.in
12. **Dr Paramjeet Singh** Member
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13. **Dr Anupam Kumar** Member
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14. **Dr Naresh Kumar Garg** Member
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15. **Dr Devanand Uttam** Member
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16. **Dr Balraj Singh Sidhu** Member
 Director PSAEC, Patiala,
 Constituent college of MRSPTU, Bathinda
 (97816-49000) balrajsinghsidhu@mrsptu.ac.in
17. **Dr Gurpreet Singh** Member
 Director & Associate Professor, Dept. of CSE
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18. **Dr Shweta Rani** Member
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19. Dr Sandeep Mann

Member

Principal Scientist (APE) & HOD Transfer
of Technology Division, ICAR-Central Institute of Post-Harvest Engg. & Tech. Ministry of
Agriculture and
Farmer's Welfare, Govt. of India.
P.O. P.A.U. Ludhiana
(94630-43396) sandeep_mann76@yahoo.com

Whereas following were present in online mode:

20. Dr Shaveta Rani

Member

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21. Dr Kanwal Jit Singh

Member

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22. Dr Harish Kumar

Member

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23. Dr Dhirendra Singhal

Member

Professor, Deptt of Civil Engg
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24. Dr T K Jindal

Member

Professor, Deptt of Aerospace Engg
Punjab Engineering College, Chandigarh
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25. Dr Ajay Bansal

Member

Professor, Deptt of Chemical Engg
National Institute of Technology, Jalandhar
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26. Dr Tejinder Pal Singh Sarao

Member

Department of Mechanical Engg
Baba Farid CET, Deon, Bathinda
(95011-15438) hodmebfcet@gmail.com

SSingh
At the outset, after verifying the quorum of the meeting, the Chairperson welcomed all the members attending 7th Meeting of Faculty of Engg. & Tech. at Bathinda. Therafter he asked Member Secretary

to take up agenda items one for discussion. After detailed deliberations, the following unanimous decisions were arrived at:

ITEM NO. 07.01 CONFIRMATION OF THE MINUTES OF 6TH MEETING OF FACULTY OF ENGG. & TECH. OF MRSPTU BATHINDA HELD ON 14/07/2022 ANNEXURE-I (Page 1-4)

DECISION:- Confirmed

ITEM NO. 07.02 TO APPROVE THE MINUTES OF MEETING of BOS of Computer Science and Engineering held on 28/04/2023 - as per following details and are attached herewith as ANNEXURE - II.

S. No.	ITEM	Annexure - II
		Page No.
07.02.01	Minutes of Meeting of BOS of Computer Science and Engineering held on 28/04/2023	05

DECISION:- Noted

ITEM NO. 07.03 APPROVAL OF SYLLABI OF PG-ENGG. PROGRAMMES

The Scheme and Syllabi of M.Tech. Regular and M.Tech. Part-time has been prepared and approved by the concerned BOS as per following details:

S. No.	ITEM	Annexure - III
		Page Nos.
07.03.01	Complete Scheme and Syllabus of M.Tech. (Textile Engineering) Regular and Part-time mode for Batch 2022 onwards	06-35
07.03.02	Complete Scheme and Syllabus of M.Tech. Electrical Engineering (Power System) Regular and Part-time mode for Batch 2022 onwards	36-85
07.03.03	Complete Scheme and First Semester Syllabus of M.Tech. (Electronics and Communication Engineering) Regular and Part-time mode for Batch 2022 onwards	86-102

DECISION:- It was unanimously decided for the above mentioned programs following criteria shall be followed:

For the project = 06 Credits & 12Hrs.

For Dissertation/Thesis = 16Credits

ITEM NO. 07.04 APPROVAL OF SYLLABI OF UG-ENGG. PROGRAMMES

The Scheme and Syllabi of B.Tech. Regular has been prepared and approved by the concerned BOS as per following details:

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S. No.	ITEM	Annexure - IV
		Page Nos.
07.04.01	Scheme and Syllabus of B.Tech. Computer Science and Engineering (Artificial Intelligence and Machine Learning) (3 rd – 4 th Sem.) for Batch 2K22 onwards	103-120

DECISION:- To be put up in the next meeting of Faculty of Engg. & Tech. of MRSPTU, Bathinda after incorporating the changes suggested by members.

ITEM NO. 07.05 TO APPROVE THE SYLLABUS OF OPEN ONLINE COURSES STARTING FROM 2K22.

Scheme and syllabi of following online courses were approved by respective Board of Studies ANNEXURE-V (Page 121-141)

S.No.	ITEM
1.	AWS Cloud Practitioner
2.	Basics of C#
3.	Cyber Security and Ethical Hacking
4.	Database Management System
5.	Fundamental of Java
6.	Introduction to Cloud Computing
7.	Office Automation
8.	Operating System
9.	PHP
10.	Python for Data Science

DECISION:- To be put up in the meeting of Faculty of sciences of MRSPTU, Bathinda

ITEM NO. 07.06 TO APPROVE THE CO-PO OF M.TECH. CSE AND B.TECH. CSE.

The revised CO-PO of M.Tech. CSE and B.Tech. CSE has been received from the concerned BoS attached as ANNEXURE-VI (Page 142-172)

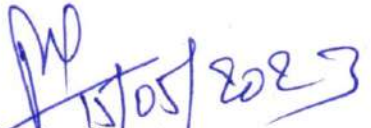
DECISION:- To be put up in the next meeting of Faculty of Engg. & Tech. of MRSPTU, Bathinda after incorporating the changes suggested by members.

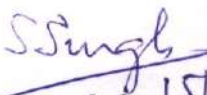
SSingh
MP

ITEM NO. 07.07 Any other agenda Item/Items with the permission of the chair.

DECISION:- No other agenda item

The Meeting ended with a vote of thanks to the Chair.


Member Secretary
(Dr Manjeet Bansal)


For Approval please
CHAIRPERSON
(Prof. SUNDAR SINGH)



Ref No. MCED - 459

Date: 17/10/2023

**MINUTES OF 8TH MEETING OF FACULTY OF ENGINEERING & TECHNOLOGY
HELD ON 06.10.2023**

A pre-scheduled 8th Meeting of Faculty of Engineering & Technology of Maharaja Ranjit Singh Punjab Technical University, Bathinda was held on 06.10.2023 at 10.00 AM onwards in offline as well as online mode. The following were present in offline mode.

- | | |
|---|-------------|
| 1. Prof. SUNDAR SINGH
Former Professor, Civil
Thapar IET, Patiala
(98761-78224) sundarsingh453@gmail.com | Chairperson |
| 2. Dr Bal Krishan
Secretary
Head, Department of Civil Engg
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(88723-20600) balkrishan.civil@mrsptu.ac.in | Member |
| 3. Head
Head, Department of Textile Engg
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| 4. Prof J S Tiwana
Head, Department of Mechanical Engg
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| 5. Dr Neeraj Gill
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| 6. Prof. Jyoti Rani
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| 7. Dr Gagandeep Kaur
Head, Department of Electrical Engg
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- | | |
|---|---------------|
| 8. Dr Savina Bansal
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| 9. Dr Sanjiv Kumar Aggarwal
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| 10. Dr Sarbjeet Kaur Bath
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| 11. Dr Paramjeet Singh
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| 12. Dr Shaveta Rani
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| 13. Dr Manjeet Bansal
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| 14. Dr Rakesh Kumar
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| 15. Dr Rajesh Gupta
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| 16. Dr Devanand Uttam
Department of Textile Engg
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(94172-33925) tstduttam.gzscet@mrsptu.ac.in | Member |



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19. **Dr Shweta Rani** Member
Department of Electronics & Comm. Engg.
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(89689-99118) shweta.ece@mrsptu.ac.in
20. **Dr Dharendra Singhal** Member
Professor, Deptt of Civil Engg
DCR Univ of Science & Technology, Murthal
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Members present Online

1. **Dr. MANINDER SINGH** Chairperson
Prof. & Head, Department of CSE
Thapar IET, Patiala
(98156-08309) msingh@thapar.edu
2. **Dr Harish Kumar** Member
Professor, Deptt of Computer Science,
PU, Chandigarh
(98159-64121) harishk@pu.ac.in
3. **Dr T K Jindal** Member
Professor, Deptt of Aerospace Engg
Punjab Engineering College, Chandigarh
(94171-33408) tkjindal@yahoo.com



ITEM NO. 08.01 CONFIRMATION OF THE MINUTES OF 7TH MEETING OF FACULTY OF ENGG. & TECH. OF MRSPTU BATHINDA HELD ON 15/05/2023 ANNEXURE-I (Page No. 1-6)

DECISION: Confirmed. It was further decided that from 2024 batch onwards for all M.Tech Programmes, Syllabi and study scheme will be as per Model Course Curriculum prescribed by the AICTE.

ITEM NO. 08.02 ACTION TAKEN REPORT OF 7TH MEETING OF FACULTY OF ENGG. & TECH. OF MRSPTU BATHINDA HELD ON 15/05/2023

DECISION: Noted

ITEM NO. 08.03 APPROVAL OF SYLLABI OF PG-ENGG. PROGRAMMES

Decision: Approved. However from 2024 batch onwards for all M.Tech Programmes, Syllabi and study scheme will be as per Model Course Curriculum prescribed by the AICTE.

ITEM NO. 08.04 TO INFORM ABOUT THE EVALUATION OF M.TECH. DISSERTATION

Decision: Approved

ITEM NO. 08.05 APPROVAL OF REVISED SCHEME/SYLLABI OF B.TECH. PROGRAMMES FOR 7TH AND 8TH SEMESTER (2020 BATCH OF GZSCCET STUDENTS ONLY) TO FACILITATE THE STUDENTS OPTING FOR INTERNSHIP IN THEIR LAST SEMESTER.

SSingh
BN
Decision: Approved.

ITEM NO. 08.06 APPROVAL OF SYLLABI OF UG-ENGG. PROGRAMMES

Decision: Approved with the condition that the course objectives must be included where ever missing in the syllabi.



ITEM NO. 08.07 TO APPROVE THE CO-PO OF B.TECH. CSE.

Decision: Complete Syllabi / Course Scheme approved.

ITEM NO. 08.08 TO APPROVE THE SYLLABUS OF OPEN ONLINE COURSES
STARTING FROM 2K22.

Decision: Being non-academic courses, these do not fall in the purview of the Faculty of Engg. & Tech. and hence these should be referred to Director Skill Development, MRSPTU, Bathinda.

ITEM NO. 08.09 TO APPROVE SCHEME AND SYLLABI OF M.TECH COMPUTER
SCIENCE AND ENGINEERING FOR 2023 BATCH ONWARDS

Decision: Approved.

The Meeting ended with a vote of thanks to the Chair.

Bal Krishan
Member Secretary 13/10/2022
(Dr. Bal Krishan)

For Approval please
CHAIRPERSON
(Prof. SUNDAR SINGH)

SSingh



**GIANI ZAIL SINGH CAMPUS COLLEGE OF ENGINEERING & TECHNOLOGY,
MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA.**

DEPARTMENT OF ELECTRICAL ENGG.

Ref. No. HEED/10161

Dated: 16-09-2024

To

Dean Academic Affairs,
MRSPTU, Bathinda,

Sub: Regarding 9th Meeting of Faculty of Engineering & Technology.

ਉਪਰੋਕਤ ਵਿਸ਼ੇ ਦੇ ਸਬੰਧ ਵਿੱਚ ਮਿਤੀ 12-09-2024 ਨੂੰ 9th Meeting of Faculty of Engineering & Technology ਕਰਵਾਈ ਗਈ ਸੀ ਮੀਟਿੰਗ ਨਾਲ ਸਬੰਧਤ ਦਸਤਾਵੇਜ਼ ਹੇਠ ਲਿਖੇ ਅਨੁਸਾਰ ਇਸ ਪੱਤਰ ਨਾਲ ਨੱਥੀ ਕਰਕੇ ਭੇਜੇ ਜਾਂਦੇ ਹਨ।

1. Minutes of Meeting of 9th Meeting of Faculty of Engineering & Technology. (01 to 06 page)
2. Agenda ~~9th Meeting~~ ^{ਦੀ} of 9th Meeting of Faculty of Engineering & Technology. (01 to 03 page)
3. Annexure -IV (A) & (B) (02 page)

HOD *[Signature]*
16-9-24
Electrical Engg. Deptt.
GZSCCET MRSPTU,
Bathinda.



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Ref. No.:HEED/10157

Date: 13/09/2024

SUBJECT: MINUTES OF MEETING OF 9TH MEETING OF FACULTY OF ENGINEERING & TECHNOLOGY HELD ON 12/09/2024

A prescheduled meeting of Faculty of Engineering & Technology of Maharaja Ranjit Singh Punjab Technical University, Bathinda was held on 12/09/2024 at 11:30 am onwards in offline mode in committee room of GZSCCET MRSPTU Bathinda. Following members were present.

- | | |
|--|-------------------------|
| 1. Dr. SUNDAR SINGH
Former Professor, Civil
Thapar IET, Patiala
(98761-78224) sundersingh453@gmail.com | Chairperson |
| 2. Dr. Sarbjeet Kaur Bath
Head, Department of Electrical Engg
GZSCCET, MRSPTU Bathinda
(94638-36070) sjkbath.gzscctet@mrsptu.ac.in | Member Secretary |
| 3. Dr. Bal Krishan
Head, Department of Civil Engg
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| 4. Prof. J S Tiwana
Department of Mechanical Engg.
GZSCCET, MRSPTU Bathinda,
(94631-35222) jstiwanamech@mrsptu.ac.in | Member |
| 5. Dr. Neeraj Gill
Head, Deptt of Electronics & Comm. Engg.
GZSCCET, MRSPTU Bathinda
(94646-62132) neeraj.ece@mrsptu.ac.in | Member |
| 6. Dr. Jyoti Rani
Head, Department of Computer Sc. & Engg.
GZSCCET, MRSPTU Bathinda
(94174-60026) jyoti_cse@mrsptu.ac.in | Member |
| 7. Dr. Reetipal Singh
Head, Department of Textile Engg
(94780-98044) textilegzscetbti@gmail.com | Member |
| 8. Dr. Savina Bansal
Department of Electronics & Comm. Engg
GZSCCET, MRSPTU Bathinda
(81466-00954) savina.bansal@gmail.com | Member |

MoM - 9th MEETING OF FACULTY OF ENGINEERING & TECHNOLOGY ON 12.09.2024

Page 1 of 6

- | | | |
|-----|--|--------|
| 9. | Dr. Rakesh Kumar Bansal
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MRSPTU Bathinda
(94630-00954) rkbansal@mrsptu.ac.in | Member |
| 10. | Dr. Sanjiv Kumar Aggarwal
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| 11. | Dr. Sarbjeet Kaur Bath
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| 12. | Dr. Anupam Kumar
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| 13. | Dr. Manjeet Bansal
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| 14. | Dr. Rakesh Kumar
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| 17. | Dr. Rajesh Gupta
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| 18. | Dr. Devanand Uttam
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| 19. | Dr. Balraj Singh Sidhu
Director PSAEC, Patiala
Constituent College of MRSPTU, Bathinda
(97816-49000) balrajsinghsidhu@mrsptu.ac.in | Member |

20. **Dr. Tejinder Pal Singh Sarao**
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21. **Dr. Jayoti Arora Bansal**
Department of Computer Sc & Engg
Baba Farid CET, Deon, Bathinda
(94011-15405) dean.bfcet@gmail.com **Member**
22. **Dr. Gurpreet Singh**
Director & Associate Prof., Deptt. of CSE
PIT Rajpura
(87250-72481) gurpreetsinghpitr@mrsptu.ac.in **Member**
23. **Dr. Shweta Rani**
Deptt of Electronics & Comm Engg
GZSCCET, MRSPTU Bathinda
(89689-99118) Shweta.ece@mrsptu.ac.in **Member**
24. **Dr. Sandeep Mann**
Principal Scientist (APE) &
HoD Transfer of Technology Division,
ICAR – Central Institute of Post-Harvest Engg. & Tech.
Ministry of Agriculture and Farmer's Welfare, Govt. of India,
PO. PAU Ludhiana
(94630-43396) sandeep_mann76@yahoo.com **Member**

ITEM 09.01 CONFIRMATION OF THE MINUTES OF 8TH MEETING OF FACULTY OF ENGG. & TECH. OF MRSPTU BATHINDA HELD ON 06/10/2023. (ANNEXURE-I)

Decision: Confirmed

ITEM 09.02 APPROVAL OF SCHEME AND SYLLABI of 3rd year of B. Tech CSE (Artificial Intelligence and Machine Learning)

Scheme and Syllabi has been prepared by the BOS of Computer Science and Engineering as per following details:

S. No.	ITEM	Page Nos.
Annexure -II	Scheme and Syllabus of B. Tech. CSE (Artificial Intelligence and Machine Learning) 5 th – 6 th Sem. for Batches 2022 onwards	01-24

Decision1: The study scheme and syllabus of 5th and 6th semester of BTech Artificial Intelligence and Machine Learning course has been presented with deliberations carried out only by internal members of the BoS. The external members of BoS were intimated on E-mail and they gave their consent to it. The members of Faculty of Engineering are of the opinion that the same should have been deliberated and discussed in the full BoS

MoM - 9th MEETING OF FACULTY OF ENGINEERING & TECHNOLOGY ON 12.09.2024

meeting before finalizing the same. Hence it is decided that a meeting of BoS of CSE should be conducted as soon as possible in off-line mode. It has also been suggested that some experts from the concerned branch of **Artificial Intelligence and Machine Learning** can be invited as special invitees to this BoS meeting. Hence the study scheme and syllabus of 5th and 6th semester should be resubmitted after due deliberations in the BoS.

Decision2: All the members authorised the Dean, Faculty of Engg. & Tech. to give approval to the resubmitted scheme and syllabus of **Artificial Intelligence and Machine Learning** and there is no need to hold a meeting of Faculty of Engg. again for this purpose.

ITEM 09.03 APPROVAL OF SCHEME AND SYLLABI of 2nd year of B. Tech CSE (Internet of Things and Cyber Security Including Block Chain Technology)

This Scheme and Syllabus has been prepared by the BOS of Computer Science and Engineering as per following details:

S. No.	ITEM	Page Nos.
Annexure -III	Scheme and Syllabus of 2 nd year of B.Tech CSE (Internet of Things and Cyber Security Including Block Chain Technology) 3 rd – 4 th Sem. for Batches 2023 onwards	01-19

Decision1: The study scheme and syllabus of 3rd and 4th semester of BTech **Internet of Things and Cyber Security Including Block Chain Technology** course has been presented with deliberations carried out only by internal members of the BoS. The external members of BoS were intimated on E-mail and they gave their consent to it. The members of Faculty of Engineering are of the opinion that the same should have been deliberated and discussed in the full BoS meeting before finalizing the same. Hence it is decided that a meeting of BoS of CSE should be conducted as soon as possible in off-line mode. It has also been suggested that some experts from the concerned branch of **Internet of Things and Cyber Security Including Block Chain Technology** can be invited as special invitees to this BoS meeting. Hence the study scheme and syllabus of 3rd and 4th semester should be resubmitted after due deliberations in the BoS.

Decision2: All the members authorise the Dean Faculty of Engg. & Tech. to give approval to the resubmitted scheme and syllabus of IOT and Cyber Security including Block Chain Technology and there is no need to hold a meeting of Faculty of Engg. again, for this purpose.

ITEM 09.04 To confirm the semester wise fixed list of Open Electives for academic years 2024-25 (Annexure-IV)

According to DAA office letter No. 6249, Dated 30/8/2024 in response to HoD Civil Engg. letter No. HCE/24-25/215, dated 04/07/2024, to confirm the semester wise fixed list of Open Electives (selected from the already existing open electives) of various branches of Engineering for the academic year 2024-25.

SSingh

Decision: This list is meant for GZSCCET MRSPTU only and applicable for the academic year 2024-25 only.

ITEM 09.05 To decide about the semester wise fixation of Open Electives for the academic years 2025-26 and onwards (Annexure-V)

To deliberate and decide about the semester wise fixation of Open Electives of various branches of Engineering for the academic years 2025-26 and onwards for GZSCCET and all other colleges of MRSPTU (constituent as well as affiliated) Bathinda and to decide about the deletion of old ones and inclusion of some new ones.

Decision: BoS of all engineering branches will decide a new list of Open Electives and fix it semester wise. Then it will be deliberated in the next meeting of Faculty of Engg. & Tech. It will be announced well before the commencement of the academic year 2025-26. It will be applicable for all colleges of MRSPTU Bathinda for 2025-26 and onwards.

ITEM 09.06 To bring uniformity in the names of various Trainings/Internships (4-weeks/6weeks) (Annexure-VI)

To deliberate about the different credits and various names of Trainings/Internships being imparted to different engineering branches and to decide a uniform nomenclature to remove the ambiguity between various existing names such as; Manufacturing Practices, Institutional Training, Workshop Training, Industrial Training, Summer Internship etc. written in various study schemes of Engg. branches.

Decision: It has been decided that name of institutional training of 4 weeks duration to be imparted after 2nd semester should be uniformly renamed as: Training – I, and it should have 3 credits for all branches. Moreover, in the footnote of 1st year scheme of all branches ‘Manufacturing Practices Training’ should be replaced with Institutional Training to avoid confusion with another 1st year subject named Manufacturing Practice.

ITEM 09.07 To introduce a subject on “Science & Practice of Happiness” in the curriculum (Annexure-VII)

To deliberate and decide about the introduction of a new subject entitled above suggested by Baba Farid College of Engg. & Tech. Bathinda

Decision: Item Dropped. Not approved.

ITEM 09.08 To ask office of DAA to upload the revised study scheme of B.Tech Textile Engg. after incorporating changes (Annexure-VIII)

To upload the revised study scheme of B.Tech Textile Engg. after interchanging two departmental Electives (I & II) of 7th semester with two core subjects (Mechanics of Textile Process – BTEXS1-801 and Mill Planning & Management – BTEXS1-802) of 8th semester for Bathes 2020 onwards. Incorporation of Course Objectives and Course Outcomes in B.Tech Textile Engg. courses of 1st, 2nd, 3rd, and 4th sem. There is no change in the content of the subjects.

Decision: Item Dropped as no point of discussion here.

ITEM 09.09 To decide about inclusion of 6-month Industrial Training in 8th semester

To deliberate and decide whether or not to permit students for 6-month Industrial Training in 8th semester, especially those, who have not got any job placement.

Decision: The Campus Director will hold meeting with heads of all Engg. Departments to decide about this issue for GZSCCET, MRSPTU Bathinda. Constituent Colleges will decide on their own. After that this issue can be brought in the meeting of Faculty of Engg. & Tech. for further discussion and decision.

ITEM 09.10 To ask office of DAA to upload the revised study schemes of various branches of Engg. after incorporating changes

To upload the revised study schemes of various branches of Engg. to include Universal Human Values (UHV-II) and Maharaja of People course.

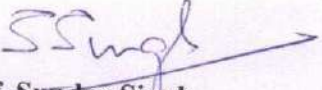
To upload the revised study schemes of all branches of B.Tech after reshuffling courses of 7th and 8th semesters to facilitate the students to attend 6-month Industrial Training in 8th semester.


Also to upload revised study schemes and syllabus of M Tech programmes applicable for batches 2022 onwards.

Decision: Item Dropped as no point of discussion here.

ITEM 09.11 Any other agenda Item/Items with the permission of the chair.

The point of some courses not approved by AICTE (like BTech AIML and BSc Fashion Technology), but being run by the Engineering Departments of GZSCCET came for discussion. It was proposed that all such courses should be run under a separate Faculty or School of Engg. & Tech in the University, to avoid potential objections/complications by the AICTE regarding use of common faculty and resources. However, faculty from GZSCCET engineering department may be shared as adjunct faculty to run these courses under university.


Prof. Sundar Singh
Chairperson
Faculty of Engg. & Tech.,
MRSPTU Bathinda


Dr. S. K. Bath
Member Secretary,
Faculty of Engg. & Tech.,
MRSPTU, Bathinda

**AGENDA – 9th MEETING OF FACULTY OF ENGG. & TECH. OF MRSPTU BATHINDA
TO BE HELD ON 12/09/2024**

**ITEM NO. 09.01 CONFIRMATION OF THE MINUTES OF 8TH MEETING OF
FACULTY OF ENGG. & TECH. OF MRSPTU BATHINDA HELD ON
06/10/2023. (ANNEXURE-I)**

Put up before Faculty of Engineering & Technology for confirmation please.

**ITEM NO. 09.02 APPROVAL OF SCHEME AND SYLLABI of 3rd year of B. Tech CSE
(Artificial Intelligence and Machine Learning)**

Scheme and Syllabi has been prepared by the BOS of Computer Science and Engineering as per following details:

S. No.	ITEM	Page Nos.
Annexure -II	Scheme and Syllabus of B. Tech. CSE (Artificial Intelligence and Machine Learning) 5 th – 6 th Sem. for Batches 2022 onwards	01-24

Put up before Faculty of Engineering & Technology for deliberations and approval for further recommending it to Academic Council please.

**ITEM NO. 09.03 APPROVAL OF SCHEME AND SYLLABI of 2nd year of B. Tech CSE
(Internet of Things and Cyber Security Including Block Chain Technology)**

This Scheme and Syllabus has been prepared by the BOS of Computer Science and Engineering as per following details:

S. No.	ITEM	Page Nos.
Annexure -III	Scheme and Syllabus of 2 nd year of B.Tech CSE (Internet of Things and Cyber Security Including Block Chain Technology) 3 rd – 4 th Sem. for Batches 2023 onwards	01-19

Put up before Faculty of Engineering & Technology for deliberations and approval for further recommending it to Academic Council please.

**ITEM NO. 09.04 To confirm the semester wise fixed list of Open Electives for academic
years 2024-25 (Annexure-IV)**

According to DAA office letter No. 6249, Dated 30/8/2024 in response to HoD Civil Engg. letter No. HCE/24-25/215, dated 04/07/2024, to confirm the semester wise fixed list of Open Electives (selected from the already existing open electives) of various branches of Engineering for the academic year 2024-25. This list is meant for GZSCCET MRSPTU only.

**ITEM NO. 09.05 To decide about the semester wise fixation of Open Electives for the
academic years 2025-26 and onwards (Annexure-V)**

**AGENDA – 9th MEETING OF FACULTY OF ENGG. & TECH. OF MRSPTU BATHINDA
TO BE HELD ON 12/09/2024**

- To deliberate and decide about the semester wise fixation of Open Electives of various branches of Engineering for the academic years 2025-26 and onwards for GZSCCET and all other colleges of MRSPTU (constituent as well as affiliated) Bathinda and to decide about the deletion of old ones and inclusion of some new ones.
- ITEM NO. 09.06** To bring uniformity in the names of various Trainings/Internships (4-weeks/6weeks) (Annexure-VI)
- To deliberate about the different credits and various names of Trainings/Internships being imparted to different engineering branches and to decide a uniform nomenclature to remove the ambiguity between various existing names such as; Manufacturing Practices, Institutional Training, Workshop Training, Industrial Training, Summer Internship etc. written in various study schemes of Engg. branches.
- ITEM NO. 09.07** To introduce a subject on “Science & Practice of Happiness” in the curriculum (Annexure-VII)
- To deliberate and decide about the introduction of a new subject entitled above suggested by Baba Farid College of Engg. & Tech. Bathinda
- ITEM NO. 09.08** To ask office of DAA to upload the revised study scheme of B.Tech Textile Engg. after incorporating changes (Annexure-VIII)
- To upload the revised study scheme of B.Tech Textile Engg. after interchanging two departmental Electives (I & II) of 7th semester with two core subjects (Mechanics of Textile Process – BTEXS1-801 and Mill Planning & Management – BTEXS1-802) of 8th semester for Bathes 2020 onwards.
- Incorporation of Course Objectives and Course Outcomes in B.Tech Textile Engg. courses of 1st, 2nd, 3rd, and 4th sem. There is no change in the content of the subjects.
- ITEM NO. 09.09** To decide about inclusion of 6-month Industrial Training in 8th semester
- To deliberate and decide whether or not to permit students for 6-month Industrial Training in 8th semester, especially those, who have not got any job placement.
- ITEM NO. 09.10** To ask office of DAA to upload the revised study schemes of various branches of Engg. after incorporating changes

**AGENDA - 9th MEETING OF FACULTY OF ENGG. & TECH. OF MRSPTU BATHINDA
TO BE HELD ON 12/09/2024**

To upload the revised study schemes of various branches of Engg. to include Universal Human Values (UHV-II) and Maharaja of People course.

To upload the revised study schemes of all branches of B.Tech after reshuffling courses of 7th and 8th semesters to facilitate the students to attend 6-month Industrial Training in 8th semester.

Also to upload revised study schemes and syllabus of M Tech programmes applicable for batches 2022 onwards.

ITEM NO. 09.11

Any other agenda Item/Items with the permission of the chair.

9/9/24



Annexure-IV (B)

GIANI ZAIL SINGH CAMPUS COLLEGE OF ENGINEERING AND TECHNOLOGY,
MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY
DEPARTMENT OF MECHANICAL ENGINEERING



HMED/2139

Date: 24/05/24

REVISED LIST OF OPEN ELECTIVE SUBJECTS OFFERED BY MECHANICAL
ENGINEERING DEPARTMENT IN THE ODD SEMESTERS.

List of open Elective subjects was sent earlier by Ref. no. HMED/2120 dated 13/05/24. Some subjects of odd semesters were not added. So please kindly find below the revised list of Open Elective subjects

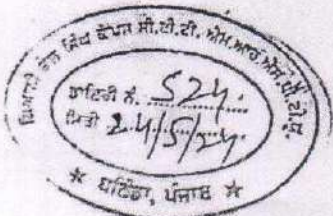
Sr.	Subject code	Subject	Semester
1	BMEE0-F97	Operation research	8 th
2	BMEE0-F91	Industrial Safety and Environment	7 th
3	BMEE0-F92	Refrigeration and Air Conditioning	7 th
4	BMEE0-F95	Robotics engineering	6 th
5	BMECO1-001	Power Plant Engineering	6 th
6	BMEE0-F96	Engineering Metrology	5 th
7	BMECO1-005	Automobile Engineering	5 th

campus Director

E-circulate to all HoDs

24/5/24

HOD Mechanical Engg.
GZSCCET, Bathinda.



24.5.24

University Business School

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY
(Estb. By Govt. of Punjab vide Act No. 8 (2015) and Act No. 2 (19) and 12 B of UGC Act, 1986)

Dabwali Road, Bathinda-151001

www.mrsptu.ac.in

Ref. No. UBS/24/2024



ਯੂਨੀਵਰਸਿਟੀ ਬਿਜ਼ਨੈਸ ਸਕੂਲ

ਮਹਾਰਾਜਾ ਰਾਜਗੋਬਿੰਦ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ
(ਸਥਾਪਿਤ ਸਰਕਾਰੀ ਆਕਟ ਨੰ. 8 (2015) ਅਤੇ 12 (ਬੀ) ਆਈ ਐਸ ਆਕਟ 1986)

ਡਾਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ-151001

mgthod@mrsptu.ac.in

Date: 19/08/24

Minutes of Meeting Faculty of Commerce & Business Management

A meeting of Faculty of Commerce and Business Management was held on 20/08/2024.

The following members were present

1. Dr. A.S. Chawla (Chairperson)
2. Dr. Veerpaul Kaur Maan (Member)
3. Dr. Pritpal Singh Bhullar (Member)
4. Dr Damanpreet Kaur (Member)
5. Dr. Monika Sharma (Member)

The following decisions were taken in Board of Studies

1. We will implement National Education Policy (NEP) – 2020 on the guidelines of National Skill Qualifications Framework (NSQF) and National Higher Education Qualifications Framework (NHEQF) from academic session 2024-25 onwards. The existing syllabus, structure and course nomenclature of BBA-MBA (Integrated Five Years), B.Com-M.Com (Integrated Five Years) has been revised for first semester for academic semester 2024-25. The following structure of course has been proposed as per National Education Policy-2020.
2. The name of Integrated/Dual degree BBA – MBA will be BBA-MBA (Integrated Five Years) from 2024 onwards. The following structure has been proposed:

S. No.	Year	Semester	Degree Awarded
1	First	I-II	Undergraduate Certificate in Business Administration
2	Second	I-IV	Undergraduate Diploma in Business Administration
2	Third	I-VI	BBA
3	Fourth	I-VIII (With Courses)	BBA (Honours)
4	Fourth	I-VIII (with project) *	BBA (Honours with Research)
5	Fifth	I-X	BBA-MBA (Integrated Five Years)

*Students must have minimum 75% marks or equivalent CGPA in BBA degree up to sixth semester.

3. The name of Integrated/Dual degree B. Com – M. Com will be B. Com-M. Com (Integrated Five Years) from 2024 onwards. The following structure has been proposed:

S. No.	Year	Semester	Degree Awarded
1	First	I-II	Undergraduate Certificate in Commerce
2	Second	I-IV	Undergraduate Diploma in Commerce
2	Third	I-VI	B.Com
3	Fourth	I-VIII (With Courses)	B.Com (Honours)
4	Fourth	I-VIII (with project) *	B.Com (Honours with Research)
5	Fifth	I-X	B.Com-M.Com (Integrated Five Years)

* Students must have minimum 75% marks or equivalent CGPA in B.Com degree upto sixth semester.



4. MBA programme will be of two years. If student leave after completing first year, then students will be awarded with Post Graduate Diploma in Management (PGDM).
5. The syllabus of the following programmes was approved in the meeting:
- B. Com (E-Commerce) – Semester III – Semester VI
 - Integrated/Dual Degree B. Com-M. Com (Semester VII – Semester X), Batch 2021.
 - BMS (Semester I- Semester II)
 - B. Com (Semester I – Semester II)
6. The eligibility criteria of MBA (HA) has been updated. The following qualifications should be considered for taking admission in MBA (HA) from academic session 2024-25. Seats are to be proposed 15 as per recommendation of AIIMS Athourities.
- MBBS and BDS
 - BAMS, BHMS, BPT, B. Pharmay, Biotechnology, Pharm. D., Bsc. Nursing and other medical Qualifications recognized from their respective councils) with 60% marks
 - Any graduation (recognized by UGC/AICTE) with 60% marks along with 2 years experience in Health sector or three years experience in any of the industry.
7. MBA (IT) specialization will be quased from academic session 2024-25 onwards.

Dr. A.S. Chawla
(Chairperson & Dean Faculty of Commerce and Business Management Present Online)

online consent attached

Maan
Dr. Veerpaul Kaur Maan
(Member)

Bhullar
Dr. Pritpal Singh Bhullar
(Member)

Dr. Damanpreet Kaur
(Member, Present Online)

online consent attached

Dr. Monika Sharma
(Member, Present Online)

online consent attached

MRSPTU
Bathinda

University Business School <mgthod@mrsptu.ac.in>

Minutes of Meeting

Arvinder S Chawla <aschawla@mrsptu.ac.in>
To: University Business School <mgthod@mrsptu.ac.in>

Tue, Aug 20, 2024 at 2:49 PM

I endorse the minutes with addition of word NHEQF. Mention NSQF and NHEQF.

Regards

[Quoted text hidden]

AM

Maharaja Ranjit Singh Punjab Technical University, Bathinda (Punjab) Mail - Agenda for Faculty Meeting



MRSPTU
Bathinda

University Business School <mgthod@mrsptu.ac.in>

Agenda for Faculty Meeting

Monika Sharma <monika1980leo@gmail.com>
To: mgthod@mrsptu.ac.in

Tue, Aug 20, 2024 at 3:22 PM

Respected Ma'am

Greetings of the day

With due respect, I approve the minutes of the today's meeting.

Regards

Dr.Monika Sharma

Cordia Institute of business Management

----- Forwarded message -----

From: **University Business School** <mgthod@mrsptu.ac.in>

Date: Tue, 20 Aug 2024, 10:45

Subject: Re: Agenda for Faculty Meeting

To: Arvinder S Chawla (Arvinder) <aschawla@mrsptu.ac.in>, Veerpaul Management <mgtveerpaul@mrsptu.ac.in>, <reply.vikramsharma@gmail.com>, Amrish Dhawan <amrishdhawan@gmail.com>, Dr. AP Mehta <dr.apmehta@gmail.com>, <daman_preet802003@yahoo.com>, Pritpal Management <mgtprtipal@mrsptu.ac.in>, Monika Sharma <monika1980leo@gmail.com>, <sksharmapu@gmail.com>, <sidhups@gmail.com>, Pratibha Goyal <goyalpratibha95@yahoo.in>

[Quoted text hidden]

<https://mail.google.com/mail/u/0/?ik=bd343adc59&view=pt&search=all&permmsgid=msg-f:1807899756310076220&simpl=msg-f:1807899756310076220>

MRSPTU
Bathinda

University Business School <mgthod@mrsptu.ac.in>

Agenda for Faculty Meeting

Daman preet <daman_preet802003@yahoo.com>
To: University Business School <mgthod@mrsptu.ac.in>

Tue, Aug 20, 2024 at 3:19 PM

Dear concern

I approve the syllabuses and other agendas as discussed in the meeting.

Regards

Sent from Yahoo Mail for iPhone
[Quoted text hidden]

University Business School

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY
(Estb. By Govt. of Punjab Vide Act No. 5[2015] and u/s 2(F) and 12 B of UGC Act, 1956)

Dabwali Road, Bathinda-151001

www.mrsptu.ac.in

Ref. No. UBS/24/2177



ਯੂਨੀਵਰਸਿਟੀ ਬਿਜਨੈਸ ਸਕੂਲ

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ
(ਯੂ.ਜੀ.ਸੀ. ਏਕਟ 2(ਫੋਰ) ਅਤੇ 12(ਬੀ) ਅਧੀਨ ਮਨਤਾ ਪ੍ਰਾਪਤ)

ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ-151001

mgthod@mrsptu.ac.in

Date: 13/09/24

Minutes of Meeting

A meeting of Faculty of Commerce and Business Management was held on 10/09/2024.

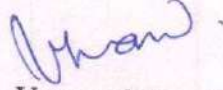
The following members were present

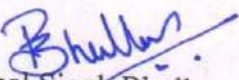
1. Dr. A.S. Chawla (Chairperson)
2. Dr. Veerpaul Kaur Maan (Member)
3. Dr. Pritpal Singh Bhullar (Member)
4. Dr Damanpreet Kaur (Member)
5. Dr. Davinderpal Singh Sidhu (Member)
6. Dr. Monika Sharma (Member)

The following decisions were taken in the meeting of Faculty of Commerce and Business Management:

1. The duration of the course of BMS will be 3 Years/ 6 Semesters and the following qualifications should be considered for taking admission in BMS from academic session 2024-25.
 - a) Passed 10+2 or its equivalent examination in any stream conducted by Board recognized or established by Central/State Government through a legislation. OR
 - b) Those candidates who have passed their Matriculation examination AND have also passed three year Diploma in any Trade from Punjab State Board of Technical Education & Industrial Training, Chandigarh or such Examination from any other recognized State Board of Technical Education, or Sant Longowal Institute of Engg.& Tech., Longowal
2. The scheme and syllabus of MBA (Aviation Management) has been approved.

Dr. A.S. Chawla
(Chairperson, Present Online)


Dr. Veerpaul Kaur Maan
(Member)


Dr. Pritpal Singh Bhullar
(Member)

Dr. Damanpreet Kaur
(Member, Present Online)

Dr. Davinderpal Singh Sidhu
(Member, Present Online)

Dr. Monika Sharma
(Member, Present Online)



MRSPTU
Bathinda

University Business School <mgthod@mrsptu.ac.in>

Regarding Approval of Syllabus of various courses

Arvinder S Chawla <aschawla@mrsptu.ac.in>

Tue, Sep 10, 2024 at 3:08 PM

To: University Business School <mgthod@mrsptu.ac.in>

Cc: "Dr. Veerpaul Kaur Maan" <mgtveerpaul@mrsptu.ac.in>, Pritpal Management <mgtpritpal@mrsptu.ac.in>, daman_preet802003@yahoo.com, Monika Sharma <monika1980leo@gmail.com>, sidhups@gmail.com

Approved.

[Quoted text hidden]



MRSPTU
Bathinda

University Business School <mgthod@mrsptu.ac.in>

Regarding Approval of Syllabus of various courses

Daman preet <daman_preet802003@yahoo.com>
To: University Business School <mgthod@mrsptu.ac.in>

Tue, Sep 10, 2024 at 3:26 PM

Dear concern

I give my consent for the approval as required.

Sent from Yahoo Mail for iPhone
[Quoted text hidden]



MRSPTU
Bathinda

University Business School <mgthod@mrsptu.ac.in>

Regarding Approval of Syllabus of various courses

Monika Sharma <monika1980leo@gmail.com>

Thu, Sep 12, 2024 at 1:41 PM

To: Arvinder S Chawla <aschawla@mrsptu.ac.in>

Cc: University Business School <mgthod@mrsptu.ac.in>, "Dr. Veerpaul Kaur Maan" <mgtveerpaul@mrsptu.ac.in>, Pritpal Management <mgtprtipal@mrsptu.ac.in>, daman_preet802003@yahoo.com, sidhups@gmail.com

Respected Sir/Ma'am

Greetings

Approved

Regards

Dr. Monika Sharma
Assistant Professor
CIBM

[Quoted text hidden]



Maharaja Ranjit Singh Punjab Technical University
Dabwali Road, Bathinda -151001

(Established by Govt. of Punjab vide Punjab Act No. 5 of 2015)

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ।

Ref. No.Arch/D/24/661

Date: 05/09/2024

MEETING OF FACULTY OF ARCHITECTURE & PLANNING
GZS-SAP, MRSPTU, BATHINDA

Minutes of the 3rd meeting of Faculty of Architecture & Planning, GZS School of Architecture & Planning, MRSPTU, Bathinda held on 02.09.2024 at 03.00 PM.

Following members were present (through offline/online mode).

1. Dr. Bhupinder Pal Singh Dhot Professor & Head, GZSSAP, MRSPTU, Bathinda
(Present offline)
2. Ar. Kapil Arora Assistant Professor, GZSSAP, MRSPTU, Bathinda
(Present offline)
3. Ar. Kajal HandaArshi Assistant Professor, GZSSAP, MRSPTU, Bathinda
(Present offline)
4. Ar. Jit Kumar Gupta Sr. Town Planner (Retd.), Chandigarh
(Present online)
5. Dr. Karamjit Singh Chahal Professor, Deptt. of Architecture, GNDU, Amritsar
(Present online)
6. Ar. Sohan Lal Saharan Associate Professor, CCA, Chandigarh
(Present online)

At the outset, Dean, Faculty of Architecture & Planning, extended a warm welcome and thanked all the members present in the meeting, for sparing their valuable time, to make value addition to teaching-learning of various courses, run by the Department. Members were briefed that, syllabi of the three courses related to Bachelor of Design (Interior Design); BFA MFA (Applied Art) Integrated Degree and BFA (Applied Art), listed in the agenda for discussion and approval, have already been approved by the Board of Studies, in its meeting held on 30.8.24. Thereafter items listed in the, agenda were taken up for discussion. After detailed discussions and deliberations the faculty concluded and decided as under;

AGENDA 1: *Regarding approval of the syllabus of 2nd year of the existing courses,*

- a. *Bachelor of Design (Interior Design)*
- b. *BFA MFA (Applied Art) Integrated Degree*
- c. *BFA (Applied Art)*

a. Bachelor of Design (Interior Design):

Ar. Kapil Arora presented the syllabus of 2nd year (3rd and 4th sem), B.Design (Interior Design), as approved by the Board of Studies, in its meeting held on 30.8.24, and explained that input and suggestions received from the members of Board of Studies, regarding the syllabi, have been duly incorporated in the scheme being presented. After detailed and in-depth deliberation on the intent, contents and scope of the syllabus, faculty approved the syllabus with follow additions:

1. To make teaching learning more qualitative and to give students exposure to state of art professional

[Handwritten signatures]

- practices; Syllabus must include visits to Chandigarh and other important places, to have a firsthand experience of the interior spaces of various iconic buildings in the Capital Complex, Museums, Art galleries etc.
2. Main focus of contents of course have to remain on the Interior spaces and to make these spaces more qualitative, livable productive, sustainable, eco-friendly and user friendly.
 3. Universal design guidelines, related to issues faced by physically challenged and options to resolve them, will be part of the course.
 4. Department have to conduct dedicated workshop/training sessions on latest soft-wares available ,for empowering the students, by upgrading their knowledge and skill related to planning and designing of interior spaces.

b. & c. BFA MFA (Applied Art) Integrated Degree and BFA (Applied Art)

Ms. Amninder Kaur and Mr. Hardarshan Singh Sohal presented the syllabi and Scheme of BFA MFA (Applied Art) Integrated Degree 2023 Batch (3rd and 4th semester), as approved by the Board of Studies, in its meeting held on 30.8.24. After detailed discussions, Members **approved** the syllabus, with following additions;

1. Visits to Chandigarh and other important sites including Arts College, Rock Garden, Capital Complex, Museum, Art Museum of Guru Nanak Dev University, Amritsar & Punjab Agricultural University, Ludhiana Art galleries and other iconic buildings in the state , to give students first hand exposure related to application of Applied Arts in the built environment.
2. Members also recommended that MRSPTU must have a dedicated museum of its own showcasing the legacy, glory, achievements and culture of Maharaja Ranjit Singh.

AGENDA 2: Regarding open elective for the scheme of BFA- MFA

Considering the current situation, members **approved** the running of only those open electives, which are being offered by the university.

AGENDA 3: To discuss and approve the lateral entry (2nd year) in B.Design (Interior Design)


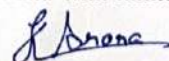
Members considered the issue at length along with its academic and professional implications and decided that lateral entry to the 2nd year of the B.Design (Interior Design) Course should be permitted from the next session (2025) to the students having qualified three year diploma in Architectural Assistantship or three year Diploma in Interior design from any state Board of Technical education.

AGENDA 4: Regarding introducing the course on 'Drug Abuse': - in various Departments of University

Considering the mandate given, members **approved** the introduction of the course on 'Drug Abuse' in various streams run by the Department, on the pattern issued by the University.

AGENDA 5: Regarding the duties of faculty of GZS-SAP for scrutiny and physical inspection of colleges/institutions affiliated/ to be affiliated with the University assigned by College Development Cell, MRSPTU, Bathinda.

Dean Faculty explained the background of the agenda and also briefed about the BOS decision to all the members of Faculty. The issue was discussed at length and it was felt that, considering the fact that numbers of additional courses have been recently introduced in the department and with limited availability of manpower



with architectural background, putting faculty on such duties frequently, and that too on working day, is causing loss to the quality of teaching learning. Members concurred with the decision of the BOS taken in the meeting held on 30-8-2024.

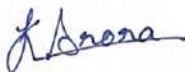
AGENDA 6; Any Other Item

External Members, expressed concern regarding the non- availability of Regular teaching Faculty, in Bachelor of Design (Interior Design) and Bachelor of Fine Arts (Applied Arts). Members also suggested that University must, on priority, induct faculty, in order to maintain and enhance the quality of teaching-learning imparted in these domains. Dean Faculty, however, clarified that issue of faculty has already been brought into the notice of university authorities. However, Department will again put forward the concern of the members to the University, regarding inducting adequate number of Regular teaching Faculty, in Bachelor of Design (Interior Design) and Bachelor of Fine Arts (Applied Arts). .

Meeting ended with a vote of thanks to the Chair.



Dr. Bhupinder Pal Singh
Dean,
Faculty of Architecture & Planning



Ar. Kapil Arora
Member
(Assistant Professor)



Ar. Kajal Handa Arshi
Member
(Assistant Professor)

Dr. Karamjit Singh Chahal
Member
Deptt. of Architecture,
GNDU, Amritsar

Ar. Sohan Lal Saharan
Member
CCA, Chandigarh

Ar. Jit Kumar Gupta
Member
Sr. Town Planner Rtd.



FACULTY OF PHARMACY MINUTES OF MEETING

With reference to email notification dated 22.09.2023, an online meeting was held at department as well as through google meet with a code <https://meet.google.com/dgq-rfvn-kmv>, dated 27.09.2023. Following members were present in the meeting:

Sr. No.	Name	Member
1	Dr. Ashish Baldi	Chairman
2	Dr. Amit Bhatia	Member
3	Dr. Varinder Singh	Member
4	Dr. Navjot Kanwar	Member
5	Dr. Shruti Chopra	Member
6	Dr. Rakesh Kumar Garg	Member (Joined online)
7	Dr. Anu Goyal	Member (Joined online)
8	Dr. Balbir Singh	Member (Joined online)
9	Dr. HC Patil	Member (Joined online)

Chairman Faculty of Pharmacy welcomed all the member of Faculty of Pharmacy, by appreciating their contributions and timely support in examining and suggesting required changes in the schemes and the syllabus of various courses.


Schemes and syllabi for the following were presented before the committee:

Sr. No.	Course Name	Duration
1	Bachelor of Physiotherapy	4 years & 6 months / 9 Sem.
2	B.Sc. Medical Technology (Anesthesia & Operation Theatre Technology)	4 Years/ 8 Sem.
3	M. Sc Cardiac Care Technology	2 years/ 4 Sem.
4	M. Sc Dialysis Technology	2 years/ 4 Sem.
5	M. Sc Medical Laboratory Technology	2 years/ 4 Sem.
6	M. Sc Clinical Embryology	2 years/ 4 Sem.
7	M. Optometry	2 years/ 4 Sem.
8	Diploma in Nursing Assistant	2 years/ 4 Sem.
9	Certificate course in Nursing Assistant	1 Year/ 2 Sem.
10	PG Diploma in Intellectual Property Rights	1 Year/ 2 Sem.
11	PG Diploma in Pharmacovigilance	1 Year/ 2 Sem.

The scheme and syllabi the courses were approved. The approval of the members who joined online was taken through email, which is attached as Annexures 01 to 04.

The meeting was ended with vote of thanks to Chair.


Prof. (Dr.) Ashish Baldi
Chairman


Prof. (Dr.) Amit Bhatia
Member


Dr. Varinder Singh
Member


Dr. Navjot Kanwar
Member


Dr. Shruti Chopra
Member



MRSPTU
Bathinda

Annexure - 01

Head of Department - Pharmacy <hodpharmacy@mrsptu.ac.in>

Approval for MoM for Faculty of Pharmacy meeting

Rakesh Garg <grakeshgogi@gmail.com>
To: HoD Pharmacy <hodpharmacy@mrsptu.ac.in>

Sat, Sep 30, 2023 at 10:42 AM

Respected Sir,

Greetings of the day!

I Rakesh Kumar Garg, Vice-Principal of S.D. College of Pharmacy, Barnala hereby approve the items/points discussed in the Faculty of Pharmacy meeting held on 27.09.2023 through online mode.

Attachments:

- 1. Honorarium Form

Thanks & Regards

Rakesh Kumar Garg

Vice-Principal

S.D. College of Pharmacy, Barnala

Mob No. 94174-93032

[Quoted text hidden]



Honorarium Form.jpg
163K



MRSPTU
Bathinda

Head of Department - Pharmacy <hodpharmacy@mrsptu.ac.in>

Annexure-02

Approval for MoM for Faculty of Pharmacy meeting

anugoyal98@yahoo.co.in <anugoyal98@yahoo.co.in>
To: "hodpharmacy@mrsptu.ac.in" <hodpharmacy@mrsptu.ac.in>

Sat, Sep 30, 2023 at 10:26 AM

Dear sir,
Greetings of the Day!

As per the discussion in the Faculty of Pharmacy meeting held on 27.09.2023 through online mode, I approve the agendas discussed in the meeting.

Thanks & Regards
Anu Goyal
Associate professor
S. D. College of Pharmacy Barnala
8146493900

Please find attached the Honorarium form:



IMG_20230930_100740.jpg
3643K

10/5/23, 10:25 AM

Maharaja Ranjit Singh Punjab Technical University, Bathinda (Punjab) Mail - Approval for MoM for Faculty of Pharmacy meeting



MRSPTU
Bathinda

Head of Department - Pharmacy <hodpharmacy@mrsptu.ac.in>

Annexure - 03

Approval for MoM for Faculty of Pharmacy meeting

H C Patil <hcpatil@gmail.com>

Tue, Oct 3, 2023 at 3:37 PM

Reply-To: hcpatil@gmail.com

To: HoD Pharmacy <hodpharmacy@mrsptu.ac.in>

Cc: Rakesh Garg <grakeshgogi@gmail.com>, anu goyal <anugoyal98@yahoo.co.in>, balbir.pharma@gndu.ac.in

Respected Sir,

Fine from my end sir.

Regards

Prof. H C Patil

[Quoted text hidden]

10/5/23, 11:17 AM

Maharaja Ranjit Singh Punjab Technical University, Bathinda (Punjab) Mail - Approval for MoM for Faculty of Pharmacy meeting



**MRSPTU
Bathinda**

Head of Department - Pharmacy <hodpharmacy@mrsptu.ac.in>

Annexure - 04

Approval for MoM for Faculty of Pharmacy meeting

Dr. Balbir Singh <balbir.pharma@gndu.ac.in>
To: HoD Pharmacy <hodpharmacy@mrsptu.ac.in>

Thu, Oct 5, 2023 at 11:12 AM

I approve the minutes of meeting

[Quoted text hidden]



ਰਵਾਲਾ ਨੰ: ਮ:ਰ:ਸ:ਪੀ:ਟੀ:ਯੂ: ਫਾਰਮਾ
Ref. No: MRSPTU/PHARM

900

ਮਿਤੀ 27-9-24
Date

FACULTY OF PHARMACY Minutes of Meeting

With reference to the email notification date 02-09-2024, an online meeting was held on 06-09-2024 at 10.30 am in HoD Office and online through google link: <https://meet.google.com/iae-ccsi-pmx>.

Following members were present in the meeting:

- | | | |
|-----|--------------------------|-------------|
| 1. | Dr. Amit Bhatia | Chairperson |
| 2. | Dr. Ashish Baldi | Member |
| 3. | Dr. Raj Kumar | Member |
| 4. | Dr. Rakesh Garg | Member |
| 5. | Dr. Balbir Singh | Member |
| 6. | Dr. HC Patil | Member |
| 7. | Dr. Harmail Singh Chahal | Member |
| 8. | Dr. Anu Goyal | Member |
| 9. | Dr. Varinder Singh | Member |
| 10. | Dr. Shruti Chopra | Member |

Chairman Faculty of Pharmacy welcomed all the member of FoP and appreciating their contribution and timely support. Following agenda points were discussed and were unanimously approved by all members:

- Issue was discussed regarding total years for different B.Sc. programme running under Faculty of Pharmacy, whether to keep 3 years or 4 years. The matter was discussed and it was concluded that: B.Sc. programme may be offered for 4 years with an exit option at 3rd year with B.Sc. degree and on completion of 4 years with B.Sc. (Hons). (Page no. 6)
- Approval of eligibility of two diploma programme was discussed i.e., Diploma in Radio Medical Imaging Technology and Diploma in Medical Lab Technology. All the members approved the eligibility the same is attached as annexure 1.
- Scheme and syllabi for PG Diploma in Intellectual Property Rights was approved. The approved document is attached as annexure 2. This important to mention that this has already been approved by Academic Council of Central University of Punjab.
- All the members of Faculty of Pharmacy has unanimously appreciate and approved the start of two new M.Pharm. Programme (in Pharmacognosy and Pharmaceutical Analysis) at MRSPTU. The scheme and syllabi are already approved and available at university website.

Dr. Amit Bhatia
Chairperson

Dr. Ashish Baldi
Member

- Online -
Dr. Raj Kumar
Member

- Online -
Dr. Rakesh Garg
Member

- Online -
Dr. Balbir Singh
Member

- Online -
Dr. HC Patil
Member

- Online -
Dr. HS Chahal
Member

- Online -
Prof. Anu Goyal
Member

Dr. Varinder Singh
Member

Dr. Shruti Chopra
Member



MRSPTU
Bathinda

Head of Department - Pharmacy <hodpharmacy@mrsptu.ac.in>

MoM of the Faculty of Pharmacy (Online at 06-09-2024)

H C Patil <hcpatil@gmail.com>
Reply-To: hcpatil@gmail.com
To: HoD Pharmacy <hodpharmacy@mrsptu.ac.in>

Thu, Sep 19, 2024 at 10:39 AM

Dear Sir,

This is w.r.t above cited subject.
I give my consent of recommendation & approval as discussed in the meeting.

Regards

Prof. (Dr.) H C Patil, ✓
Contact: +91-9780132143 (Mob)

[Quoted text hidden]



MRSP TU
Bathinda

Head of Department - Pharmacy <hodpharmacy@mrsptu.ac.in>

MoM of the Faculty of Pharmacy (Online at 06-09-2024)

Raj Kumar <raj.khunger@gmail.com>

Thu, Sep 19, 2024 at 10:41 AM

To: HoD Pharmacy <hodpharmacy@mrsptu.ac.in>

Cc: Rakesh Garg <grakeshgogi@gmail.com>, anu goyal <anugoyal98@yahoo.co.in>, harmel chahal <chahalharmel@yahoo.co.in>, balbir.pharma@gndu.ac.in, Hanumanthrao C Patil <hcpatil@gmail.com>

Approved.

[Quoted text hidden]



**MRSPTU
Bathinda**

Head of Department - Pharmacy <hodpharmacy@mrsptu.ac.in>

MoM of the Faculty of Pharmacy (Online at 06-09-2024)

Dr. Balbir Singh <balbir.pharma@gndu.ac.in>
To: HoD Pharmacy <hodpharmacy@mrsptu.ac.in>

Thu, Sep 19, 2024 at 12:32 PM

I approve the attached minutes of meeting
[Quoted text hidden]

--

Dr. Balbir Singh
Professor
Department of Pharmaceutical Sciences,
Guru Nanak Dev University
(University with Potential for Excellence recognized by UGC),
Amritsar, Punjab, India*
Mob. 9501114592



MRSPTU
Bathinda

Head of Department - Pharmacy <hodpharmacy@mrsptu.ac.in>

Approval of agendas in meeting of faculty of pharmacy

Anu Goyal <anugoyal98@yahoo.in>
To: Hod Pharmacy <hodpharmacy@mrsptu.ac.in>

Thu, Sep 19, 2024 at 3:22 PM

Respected sir,
I hereby approve the agenda discussed in an
online meeting of faculty of pharmacy held on 06-09-2024 .

Thanks and regards
Anu Goyal
Associate Professor
M. No. 8146493900
Sent from Yahoo Mail for iPhone



MRSPTU
Bathinda

Head of Department - Pharmacy <hodpharmacy@mrsptu.ac.in>

MoM of the Faculty of Pharmacy (Online at 06-09-2024)

harmel chahal <chahalharmel@yahoo.co.in>
Reply-To: harmel chahal <chahalharmel@yahoo.co.in>
To: hodpharmacy@mrsptu.ac.in

Fri, Sep 20, 2024 at 10:42 AM

Dear sir
Minutes of the meeting are approved from my side
Dr.Harmel Singh Chahal
HOD Pharmacy
Govt polytechnic college patiala

Yahoo Mail: Search, organise, conquer
[Quoted text hidden]

Duration of courses of B.Sc. Programme

Following B.Sc. programme running under faculty of pharmacy especially in various Paramedical Sciences following:

Sr. No.	Course Name	Current Duration (Years)	Proposed Duration (Years)	Exit option (after year)
1	B.Sc. (Operation Theater Technology)	3	4	3
2	B.Sc. (Radio Medical Imaging Technology)	3	4	3
3	B.Sc. (Dialysis Technology)	4	4	3
4	B.Sc. (Medical Laboratory Sciences)	3	4	3
5	B. Sc. (Optometry)	4	4	3
6	B.Sc. (Cardiac Care Technology)	4	4	3
7	B.Sc. (Respiratory Care Technology)	4	4	3
8	B.Sc. (Anesthesia Technology)	4	4	3
9	B.Sc. Medical Technology (Anesthesia & Operation Theatre Technology)	4	4	3

Note: B.Sc. (Hons). programme may be offered for 4 years with an exit option after 3rd year with B.Sc. degree as mentioned above.

Eligibility for Diploma

Course Name	Year	Eligibility Criteria
Diploma in Radio Medical Imaging Technology	2	10+2 (Medical) passed with Physics, Chemistry and Biology or any other equivalent examination from a recognized Board/University as a regular student.
Diploma in Medical Lab Technology	2	



**CENTRAL
UNIVERSITY OF
PUNJAB &
MAHARAJA RANJIT
SINGH PUNJAB
TECHNICAL
UNIVERSITY,
BATHINDA**

**Post-Graduate
Diploma
in
Intellectual
Property Rights**

**PG Diploma in Intellectual Property Rights (1 year)
Scheme**

SEMESTER 1 st		Contact Hrs./wk			Credits
Subject Code	Subject Name	L	T	P	
PGDIP 101	Introduction to Intellectual Property Rights	3	1	0	4
PGDIP 102	Patent Law	3	1	0	4
PGDIP 103	Industrial, Layout Design Law, and Trademark Law	3	1	0	4
PGDIP 104	Law of Copyright and Allied Rights	3	1	0	4
PGDIP 105	Protection of Traditional Knowledge, Plant Varieties, Geographical Indications	3	0	0	3
PGDIP 106	Intellectual Property Rights Practical I	0	0	2	1
	TOTAL	15	5	0	20

SEMESTER 2 nd		Contact Hrs./wk			Credits
Subject Code	Subject Name	L	T	P	
PGDIP 201	Trade Secrets and Competition Law	3	0	0	3
PGDIP 202	Management of IPRs, Technology Transfer/licensing	3	0	0	3
PGDIP 203	Intellectual Property Rights Practical II	0	0	4	2
PGDIP 204	Case studies/Technology landscape/ Dissertation/Empirical Research/ Apprenticeship or Internship or Training in any one of the following: Patent Information centers, Patent Facilitation center, Law firms, IPR cell in academic institute or industry, Technology transfer office/Incubation Centre or any other institution/organization	0	0	24	12
	TOTAL	6	0	28	20



Page No. 5197

Date 17/09/2024

Minutes of Meeting

Sub: Minutes of Board of Studies (BOS) Meeting of Deptt. of Computer Science & Engg., GZSCCET, Bathinda held on 17.09.2024.

The Board of Studies (BOS) meeting of Deptt. of Computer Science & Engg. was held on 17.09.2024 at 11:00 am in the committee room adjoining office of Campus Director GZSCCET MRSPTU, Bathinda.

The following members were present in the meeting.

1. Er. Jyoti Rani, Associate Professor & Head, Deptt. of CSE, GZSCCET, Bathinda (Chairperson BOS)
2. Dr. Paramjoet Singh, Professor, Deptt. of CSE, GZSCCET, Bathinda (Member BOS)
3. Dr. Shaveta Rani, Professor, Deptt. of CSE, GZSCCET, Bathinda (Member BOS)
4. Dr. Jaswinder Singh, Professor, Pbi. Uni. Patiala (Member BOS)
5. Dr. Major Singh Goraya, Professor, SLIET, Longowal (Member BOS)
6. Dr. Gurpreet Singh, Professor, PIT, Rajpura (Member BOS)
7. Dr. Karamvir Singh Duggal, Addl. SE, PSPCL (Member BOS)
8. Er. Rahul Garg, Programmer, GZSCCET (Member BOS)
9. Dr. Swati, Assistant Professor & Academic Incharge, Deptt. of CSE, GZSCCET, Bathinda (Special Invitee)
10. Er. Simard eep Kaur, Assistant Professor & Academic Incharge Deptt. of CSE, GZSCCET, Bathinda (Special Invitee)

Following members were could not attend the meeting:

- | | |
|-------------------------------------|----------|
| 1. Dr. Naresh Kumar Garg, Professor | On Leave |
| 2. Dr. Dimesh Kumar, Professor | On Leave |
| 3. Dr. Abhilasha, Professor | On Leave |

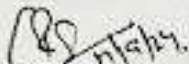
The decisions taken in the meeting are as follows:

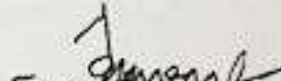
1. The Syllabus and Study Scheme of B.Tech CSE (AI & ML) of 5th semester is same as proposed in the meeting of Faculty of Engineering held on 12.09.2024.
2. In 6th semester of B.Tech CSE AI & ML, Department Elective-III, the subject of parallel processing has been replaced with subject Human Computers Interaction in the basket of four subjects.
3. The Study Scheme and Syllabus of 7th and 8th semester was proposed and finalized.

SSingh 20/9/24



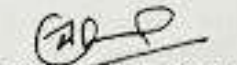
4. The Study Scheme & the Syllabus of B.Tech CSE (IOT and Cyber Security including Block Chain Technology) 3rd and 4th semester was deliberated and some minor changes in the syllabus of Introduction to Cyber Security were proposed by BOS members.

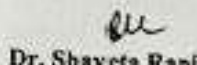

 Er. Rahul Garg
 Member (BOS)

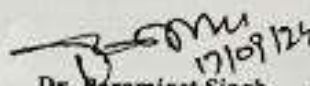

 Er. Karamvir S. Duggal
 Member (BOS)

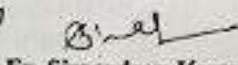

 Dr. Gurpreet Singh
 Member (BOS)


 Dr. Major S. Goraya
 Member (BOS)

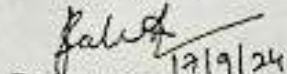

 Dr. Jaswinder Singh
 Member (BOS)


 Dr. Shaveta Rani
 Member (BOS)


 Dr. Paramjeet Singh
 Member (BOS)

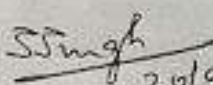

 Er. Simardeep Kaur
 Academic Incharge
 Special Invitee


 Dr. Swati
 Academic Incharge
 Special Invitee


 Er. Jyoti Rani
 Chairperson (BOS)

In the meeting of Faculty of Engineering held on 12.09.2024, it was decided that the full meeting of the Board of Studies in Computer Science & Engineering be called with specially invited outside faculty experts in the specialized subjects of AI & ML and Cyber Security Including Block Chain Technology and then put up before the Dean of Faculty for approval as decided in the meeting.

The approved minutes of the Board of Studies in CSE are APPROVED as authorized by the Faculty of Engineering.


 20/9/24
 (Prof. Sundar Singh)
 Dean
 Faculty of Engineering
 MRSPTU, Bathinda

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF PHARMACY

SYLLABUS

FOR

BACHELOR OF PHYSIOTHERAPY

(4.5 YEARS PROGRAMME)

2023 BATCH ONWARDS

Note: (i) Copy rights are reserved.

Nobody is allowed to print it in any form.

Defaulters will be prosecuted.

(ii) Subject to change in the syllabi at any time.

Please visit the University website time to time.

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

SCHEME

1 st Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
BPHTS1-101	Human Anatomy-1	3	1	0	40	60	100	4
BPHTS1-102	Human Physiology -1	3	1	0	40	60	100	4
BPHTS1-103	Biochemistry	3	0	0	40	60	100	3
BPHTS1-104	Sociology	2	0	0	50	0	50	2
BPHTS1-105	Human Anatomy-1 Practical	0	0	6	60	40	100	3
BPHTS1-106	Human Physiology -1 Practical	0	0	2	60	40	100	1
Foundation Course - Internal Examination								
BPHTS1-107	Introduction to Healthcare Delivery System in India	2	0	0	50	0	50	2
BPHTS1-108	Basic computer and information science	1	0	0	50	0	50	1
BPHTS1-109	Basic computer and information science Practical	0	0	2	50	0	50	1
BPHTS1-110	English, Communication and soft skills	1	0	0	50	0	50	1
BPHTS1-111	English, Communication and soft skills Practical	0	0	2	50	0	50	1
BPHTS1-112	Introduction to Yoga- Basic theory, science and techniques	1	0	0	50	0	50	1
BPHTS1-113	Introduction to Yoga- Basic theory, science and techniques Practical	0	0	2	50	0	50	1
BPHTS1-114	PBL/Assignment/ICT learning	0	0	4	0	50	50	2
BPHTS1-115	Community orientation and clinical visit	0	0	2	0	50	50	1
Total		16	2	17	640	360	1000	28

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

2 nd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
BPHTS1-201	Human Anatomy-2 (Including Applied Anatomy)	3	1	0	40	60	100	4
BPHTS1-202	Human Physiology -2 (Including Applied Physiology)	3	1	0	40	60	100	4
BPHTS1-203	General and Clinical Psychology	2	1	0	40	60	100	3
BPHTS1-204	Basic principles of Biomechanics	2	1	0	40	60	100	3
BPHTS1-205	Human Anatomy-2 (Including Applied Anatomy) – Practical	0	0	6	60	40	100	3
BPHTS1-206	Human Physiology -2 (Including Applied Physiology– Practical	0	0	4	60	40	100	2
BPHTS1-207	General and Clinical Psychology – Practical	0	0	2	30	20	50	1
BPHTS1-208	Basic principles of Biomechanics – Practical	0	0	2	30	20	50	1
Foundation Course - Internal Examination								
BPHTS1-209	Medical terminology and record keeping	2	0	0	50	-	50	2
BPHTS1-210	PBL/Assignment/ICT learning/Integrated seminar	0	0	4	50	-	50	2
BPHTS1-211	Clinical observation	0	0	6	-	100	100	3
Total		12	4	24	440	460	900	28

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

3 rd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
BPHTS1-301	Pathology	3	0	0	40	60	100	3
BPHTS1-302	Microbiology	3	0	0	40	60	100	3
BPHTS1-303	Pharmacology	3	0	0	40	60	100	3
BPHTS1-304	Biomechanics and kinesiology	4	1	0	40	60	100	5
BPHTS1-305	Foundation of Exercise Therapy and therapeutic massage	3	0	0	40	60	100	3
BPHTS1-306	Pathology- Practical	0	0	2	30	20	50	1
BPHTS1-307	Microbiology- Practical	0	0	4	30	20	50	2
BPHTS1-308	Biomechanics and kinesiology - Practical	0	0	6	60	40	100	3
BPHTS1-309	Foundation of Exercise Therapy and therapeutic massage- Practical	0	0	4	60	40	100	2
Foundation Course - Internal Examination								
BPHTS1-310	Introduction to quality and patient safety (Including Emergency care, BLS, Biomedical waste management, Infection prevention and control, etc.)	1	0	0	50	-	50	1
BPHTS1-311	Introduction to quality and patient safety (Including Emergency care, BLS, Biomedical waste management, Infection prevention and control, etc.)- Practical	0	0	2	50	-	50	1
BPHTS1-312	Clinical observation	0	0	6	-	100	100	3
Total		17	1	24	480	520	1000	30

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

4 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
BPHTS1-401	Exercise Therapy	4	1	0	40	60	100	5
BPHTS1-402	Bio physics	1	0	0	40	60	100	1
BPHTS1-403	Electrotherapy (LMHF & Equipment care)	4	1	0	40	60	100	5
BPHTS1-404	Exercise Therapy -Practical	0	0	8	60	40	100	4
BPHTS1-405	Bio physics -Practical	0	0	2	60	40	100	1
BPHTS1-406	Electrotherapy (LMHF & Equipment care) -Practical	0	0	8	60	40	100	4
Foundation Course - Internal Examination								
BPHTS1-407	Medical/ Physiotherapy Law and Ethics	2	0	0	50	-	50	2
BPHTS1-408	Clinical Education	0	0	6	-	100	100	3
Total		11	2	24	350	400	750	25

FIRST SEMESTER

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

HUMAN ANATOMY-1

Subject Code: BPHTS1-101

**L T P C
3 1 0 4**

Duration: 60 (Hrs.)

Course Objectives:

- Students will be able to learn the terminology of the subject and basic knowledge of cells, tissues, blood and to understand anatomy and physiology of human body.

Course Outcomes:

- Describe the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.
- Explain the gross morphology, structure and functions of various organs of the human body.
- To study the gross morphology, structure and functions of nervous, respiratory, urinary and reproductive systems in the human body.
- To know about detail anatomical knowledge and outline of muscular anatomy system

Unit-1 (10 Hours)

Histology : General Histology, study of the basic tissues of the body; Microscope, Cell, Epithelium, Connective Tissue, Cartilage, Bone, Muscular tissue, Nerve Tissue – TS & LS, Circulatory system – large sized artery, medium sized artery, large sized vein, lymphoid tissue, Skin and its appendages.

Unit-2 (15 Hours)

Embryology

- Ovum, Spermatozoa, fertilization and formation of the Germ layers and their derivations.
- Development of skin, Fascia, blood vessels, lymphatic,
- Development of bones, axial and appendicular skeleton and muscles,
- Neural tube, brain vessels and spinal cord,
- Development of brain and brain stem structures

Unit-3 (20 Hours)

Regional Anatomy

Thorax:

- **Cardio – Vascular System Mediastinum:** Divisions and contents Pericardium: Thoracic Wall: position, shape and parts of the heart; conducting System; blood Supply and nerve supply of the heart; names of the blood vessels and their distribution in the body – region wise.
- **Respiratory system** - Outline of respiratory passages: Pleura and lungs: position, parts, relations, blood supply and nerve supply; Lungs – emphasize on bronchopulmonary segments.
- **Diaphragm:** Origin, insertion, nerve supply and action, openings in the diaphragm.
- **Intercostal muscles and Accessory muscles of respiration:** Origin, insertion, nerve supply and action.

Abdomen:

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- **Peritoneum:** Parietal peritoneum, visceral peritoneum, folds of peritoneum, functions of peritoneum.
- Large blood vessels of the gut.
- Location, size, shape, features, blood supply, nerve supply and functions of the following: stomach, liver, spleen, pancreas, kidney, urinary bladder, intestines, gall bladder.

Unit-4 (15 Hours)

- **Pelvis:** Position, shape, size, features, blood supply and nerve supply of the male and female reproductive system.
- **Endocrine glands:** Position, shape, size, function, blood supply and nerve supply of the following glands: Hypothalamus and pituitary gland, thyroid glands, parathyroid glands, Adrenal glands, pancreatic islets, ovaries and testes, pineal glands, thymus.

Recommended Text Books / Reference Books:

- 1. Ross and Wilson, 'Anatomy & Physiology.'
- 2. Clark, 'Anatomy and Physiology: Understanding the Human Body'.
- 3. Pearce, 'Human Anatomy for Nurses.'

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SYLLABUS 2023 BATCH ONWARDS**

HUMAN ANATOMY – I (PRACTICAL)

Subject Code: BPHTS1-105

L T P C

Duration: 90 (Hrs.)

0 0 6 3

Course Objectives:

Students will be able to learn the terminology of the subject and basic knowledge of cells, tissues, blood and to understand anatomy and physiology of human body.

Course Outcomes:

- Describe the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.
- Explain the gross morphology, structure and functions of various organs of the human body.
- To study the gross morphology, structure and functions of nervous, respiratory, urinary and reproductive systems in the human body.
- To know about detail anatomical knowledge and outline of muscular anatomy system

Experiment

- Demonstration of various parts of body
- Demonstration of cell and tissues of body
- Demonstration of parts of brain
- Demonstration of various parts of appendicular skeleton system
- Demonstration of various parts of Axial skeleton system
- Demonstration of structural differences between skeletal, smooth and cardiac muscles
- Demonstration of various bones and joints.
- To study circulatory system from charts and transverse section (TS) of artery and vein.
- Demonstration of various parts of Human heart.
- To study the various endocrine gland
- To study the anatomical of peritoneum

HUMAN PHYSIOLOGY-1

Subject Code: BPHTS1-102

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objective:

The course in Physiology over the first year is designed to give the student an in-depth knowledge of fundamental reactions of living organisms, particularly in the human body. The major topics covered include the following: the cell; primary tissue; connective tissue; skin; muscle; nervous tissue; blood; lymphoid tissues; respiration; blood vessels; circulation; cardiac cycle; systemic circulation; gastrointestinal tract; kidneys; uterus; urinary tract; pregnancy; endocrine system.

Course Outcome:

CO-1 General Physiology: Understand the basis of normal human physiology with special emphasis on the functioning of the cardiovascular, musculo-skeletal and nervous systems & its application in practice of physiotherapy.

CO-2 Nerve Physiology & Muscles Physiology: To know about detail anatomical knowledge of nervous system and outline of muscular anatomy system & its application in practice of physiotherapy.

CO-3 Bloods: Detail knowledge of different type and function of blood cells. Brief outline of cardiovascular and respiratory system & its application in practice of physiotherapy.

CO-4 Respiration: To learn and understand the skills of assessment of Breath sound, Blood pressure, Respiratory rate, Heart rate and Pulmonary Function Tests, & its application in practice of physiotherapy.

CO-5 Cardiovascular System & Exercise Physiology: How the activities of organs are integrated for maximum efficiency in Physical Activity and exercise & its application in practice of physiotherapy

CO-6 GIT: To learn and understand the skill of assessment of breath sound, blood pressure, respiratory rate, heart rate and pulmonary function test and its application in practice of physiotherapy

Unit 1 (15 Hours)

General Physiology

- Cell: Morphology. Organelles: their structure and functions
- Transport Mechanisms across the cell membrane
- Body fluids: Distribution, composition.

Blood

- Introduction: Composition and functions of blood.
- Plasma: Composition, formation, functions. Plasma proteins.
- RBC: count and its variations. Erythropoiesis- stages, factors regulating. Reticuloendothelial system (in brief) Haemoglobin –structure, function and derivatives Anemia (in detail), types of Jaundice. Blood indices, PCV, ESR.
- WBC: Classification. Morphology, functions, count, its variation of each. Immunity
- Platelets: Morphology, functions, count, its variations

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- Hemostatic mechanisms: Blood coagulation–factors, mechanisms. Their disorders. Anticoagulants.
- Blood Groups: Landsteiner’s law. Types, significance, determination, Erythroblastosis foetalis.
- Blood Transfusion: Cross matching. Indications and complications.
- Lymph: Composition, formation, circulation and functions.

Unit 2 (15 Hours)

Nerve Muscle Physiology

- Introduction: Resting membrane potential. Action potential – ionic basis and properties.
- Nerve: Structure and functions of neurons. Classification, Properties and impulse transmission of nerve fibers. Nerve injury – degeneration and regeneration.
- Neuroglia: Types and functions.
- Muscle: Classification. Skeletal muscle: Structure. Neuromuscular junction: Structure. Neuromuscular transmission, myasthenia gravis. Excitation- Contraction coupling. Rigomortis.

Cardiovascular System

- Introduction: Physiological anatomy and nerve supply of the heart and blood vessels. Organisation of CVS. Cardiac muscles: Structure. Ionic basis of action potential and pacemaker potential. Properties.
- Conducting system: Components. Impulse conduction Cardiac Cycle: Definition. Phases of cardiac cycle. Pressure and volume curves. Heart sounds – causes, character. ECG: Definition. Different types of leads. Waves and their causes. P-R interval. Heart block.
- Cardiac Output: Definition. Normal value. Determinants. Stroke volume and its regulation. Heart rate and its regulation. Their variations
- Arterial Blood Pressure: Definition. Normal values and its variations. Determinants.
- Peripheral resistance. Regulation of BP.
- Arterial pulse.
- Shock – Definition. Classification–causes and features
- Regional Circulation: Coronary, Cerebral and Cutaneous circulation.
- Cardiovascular changes during exercise.

Unit 3 (15 Hours)

Respiratory System -

- Introduction: Physiological anatomy – Pleura, tracheo-bronchial tree, alveolus, respiratory membrane and their nerve supply. Functions of respiratory system. Respiratory muscles.
- Mechanics of breathing: Intrapleural and Intrapulmonary pressure changes during respiration. Chest expansion. Lung compliance: Normal value, pressure-volume curve, factors affecting compliance and its variations. Surfactant – Composition, production, functions. RDS
- Spirometry: Lung volumes and capacities. Timed vital capacity and its clinical significance. Maximum ventilation volume. Respiratory minute volume.
- Dead Space: Types and their definition.

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- Pulmonary Circulation. Ventilation-perfusion ratio and its importance.
- Transport of respiratory gases: Diffusion across the respiratory membrane. Oxygen transport – Different forms, oxygen-haemoglobin dissociation curve. Factors affecting it. P50, Haldane and Bohr effect. Carbon dioxide transport: Different forms, chloride shift.
- Regulation of Respiration: Neural Regulation. Hering-breuer's reflex. Voluntary control. Chemical Regulation.
- Hypoxia: Effects of hypoxia. Types of hypoxia. Hyperbaric oxygen therapy. Acclimatization Hypercapnoea. Asphyxia. Cyanosis – types and features. Dysbarism
- Disorders of Respiration: Dyspnoea. Orthopnoea. Hyperpnoea, hyperventilation, apnoea, tachypnoea. periodic breathing – types Artificial respiration
- Respiratory changes during exercise.

Digestive System -

- Introduction: Physiological anatomy and nerve supply of alimentary canal. Enteric nervous system
- Salivary Secretion: Saliva: Composition. Functions. Regulation. Mastication (in brief)
- Swallowing: Definition. Different stages. Function.
- Stomach: Functions. Gastric juice: Gland, composition, function, regulation. Gastrin: Production, function and regulation. Peptic ulcer. Gastric motility. Gastric emptying. Vomiting.
- Pancreatic Secretion: Composition, production, function. Regulation.
- Liver: Functions of liver. Bile secretion: Composition, functions and regulation. Gall bladder: Functions.
- Intestine: Succus entericus: Composition, function and regulation of secretion. Intestinal motility and its function and regulation.
- Mechanism of Defecation.

Unit 4 (15 Hours)

Endocrine System -

- Introduction: Major endocrine glands. Hormone: classification, mechanism of action. Functions of hormones
- Pituitary Gland: Anterior Pituitary and Posterior Pituitary hormones: Secretory cells, action on target cells, regulation of secretion of each hormone. Disorders: Gigantism, Acromegaly, Dwarfism, Diabetes insipidus. Physiology of growth and development: hormonal and other influences.
- Pituitary-Hypothalamic Relationship.
- Thyroid Gland: Thyroid hormone and calcitonin: secretory cells, synthesis, storage, action and regulation of secretion. Disorders: Myxedema, Cretinism, Grave's disease.
- Parathyroid hormones: secretory cell, action, regulation of secretion. Disorders: Hypoparathyroidism. Hyperthyroidism. Calcium metabolism and its regulation.
- Adrenal Gland: Adrenal Cortex: Secretory cells, synthesis, action, regulation of secretion of Aldosterone, Cortisol, and Androgens. Disorders: Addison's disease, Cushing's syndrome, Conn's syndrome, Adrenogenital syndrome.

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- Adrenal Medulla: Secretory cells, action, regulation of secretion of adrenaline and noradrenaline. Disorders: Pheochromocytoma.
- Endocrine Pancreas: Secretory cells, action, regulation of secretion of insulin and glucagon. Glucose metabolism and its regulation. Disorder: Diabetes mellitus.
- Calcitriol, Thymus and Pineal gland (very brief).
- Local Hormones. (Briefly).

Recommended Text Books / Reference Books:

- Physiological basis of Medical Practice-Best and Taylor. Williams & Wilkins Co, Riverview, MI USA
- Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
- Human Physiology (vol 1 and 2) by Dr. C.C. Chatterjee, Academic Publishers Kolkata
- Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
- Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.
- Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

HUMAN PHYSIOLOGY – I (PRACTICAL)

Subject Code: BPHTS1-106

L T P C

Duration: 30 (Hrs.)

0 0 2 1

Course Objective:

- The course in Physiology over the first year is designed to give the student an in-depth knowledge of fundamental reactions of living organisms, particularly in the human body. The major topics covered include the following: the cell; primary tissue; connective tissue; skin; muscle; nervous tissue; blood; lymphoid tissues; respiration; blood vessels; circulation; cardiac cycle; systemic circulation; gastrointestinal tract; kidneys; uterus; urinary tract; pregnancy; endocrine system.

Course Outcome:

- Practical classes include hematology experiments, clinical examinations, amphibian chart, and recommended demonstrations.

Experiment

- Hematology: To be done by the students
 - a. Study of Microscope and its uses
 - b. Determination of RBC count
 - c. Determination of WBC count
 - d. Differential leukocyte count
 - e. Estimation of hemoglobin
 - f. Calculation of blood indices
 - g. Determination of blood groups
 - h. Determination of bleeding time
 - i. Determination of clotting time
- Demonstrations only
 - j. Determination of ESR
 - k. Determination of PCV
- Amphibian Experiments – Demonstration and Dry charts Explanation. Instruments used for frog experiments. Kymograph, heart liver, Muscle trough, stimulator.
 - a. Simple muscle curve.
 - b. Effect of increasing the strength of the stimuli
 - c. Effect of temperature on muscle contraction
 - d. Effect of two successive stimuli.
 - e. Effect of Fatigue.
 - f. Effect of load on muscle contraction
 - g. Genesis of tetanus and clones.
 - h. Velocity of impulse transmission.

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

BIOCHEMISTRY

Subject Code: BPHTS1-103

L T P C

Duration: 45 (Hrs.)

3 0 0 3

Course Objectives:

Students will be able to learn the terminology of the subject and basic knowledge of basic chemistry and biochemistry involved in physiology of human body. They will be able to understand the reports generated by laboratory and shall be able to convey the surgeon about any critical alert.

Course Outcomes:

CO-1 Cell & Chemistry of Bimolecules: Demonstrate comprehensive understanding of biochemistry. Acquire the knowledge in biochemistry that is required to be practiced in community and at all levels of health care system.

CO-2 Carbohydrate: To Understand the carbohydrate, protein and lipid metabolism.

CO-3 Nucleic Acid: Understand relevant Nucleic Acid which will help to know about the important medical conditions.

CO-4 Vitamins (Fat & Water Soluble) & Enzymes & Hormones: Demonstrate empathy and have a human approach towards patients & respect their sensibilities.

CO-5 Nutrition & Special Topics: Understand relevant investigations which will help to know about the important medical conditions

Unit- 1 (5 Hours)

- Nutrition –
 - a. Introduction, Importance of nutrition Calorific values, Respiratory quotient – Definition, and its significance Energy requirement of a person - Basal metabolic rate: Definition, Normal values, factor affecting BMR Special dynamic action of food.
 - b. Physical activities - Energy expenditure for various activities. Calculation of energy requirement of a person
 - c. Balanced diet
 - i. Recommended dietary allowances
 - ii. Role of carbohydrates in diet: Digestible carbohydrates and dietary fibers
 - iii. Role of lipids in diet iv. Role of proteins in diet: Quality of proteins - Biological value, net protein utilization, Nutritional aspects of proteins-essential and non-essential amino acids. Nitrogen balance
 - iv. Nutritional disorders.
- Carbohydrate Chemistry –
 - a. Definition, general classification with examples, Glycosidic bond
 - b. Structures, composition, sources, properties and functions of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides.
 - c. Glycosaminoglycan (mucopolysaccharides)

Unit- 2 (10 Hours)

- Lipid Chemistry –
 - a. Definition, general classification
 - b. Definition, classification, properties and functions of Fatty acids, Triacylglycerol,

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- Phospholipids, Cholesterol
- c. Essential fatty acids and their importance
- d. Lipoproteins: Definition, classification, properties, Sources and function Ketone bodies
- Amino-acid Chemistry –
 - a. Amino acid chemistry: Definition, Classification, Peptide bonds
 - b. Peptides: Definition, Biologically important peptides
 - c. Protein chemistry: Definition, Classification, Functions of proteins,
- Enzymes –

Definition, Active site, Cofactor (Coenzyme, Activator), Proenzyme. Classification with examples, Factors effecting enzyme activity, Enzyme inhibition and significance, Isoenzymes, Diagnostic enzymology (clinical significance of enzymes)
- Nucleotide and Nucleic acid Chemistry -
 - a. Nucleotide chemistry: Nucleotide composition, functions of free nucleotides in body.
 - b. Nucleic acid (DNA and RNA) chemistry: Difference between DNA and RNA, Structure of DNA (Watson and Crick model), Functions of DNA. Structure and functions of tRNA, rRNA, mRNA.
- Digestion and Absorption -

General characteristics of digestion and absorption, Digestion and absorption of carbohydrates, proteins and lipids. Disorders of digestion and absorption – Lactose intolerance.
- Carbohydrate Metabolism -
 - a. Introduction, Glycolysis – Aerobic, Anaerobic Citric acid cycle, Substrate level phosphorylation.
 - b. Glycogen metabolism – Glycogenesis, Glycogenolysis, Metabolic disorders glycogen, Gluconeogenesis, Cori cycle
 - c. Hormonal regulation of glucose, Glycosuria, Diabetes mellitus.

Unit 3 (15 Hours)

- Lipid Metabolism -
 - a. Introduction to lipid metabolism, Lipolysis, Oxidation of fatty acids -oxidation of fatty acids,
 - b. Lipogenesis - Denovo synthesis of fatty acids, chain elongation, desaturation, triacylglycerol synthesis, fat metabolism in adipose tissues
 - c. Ketone body metabolism: Ketone body formation (ketogenesis), utilization (ketolysis), ketosis, Rothera's test.
 - d. Cholesterol metabolism: synthesis, degradation, cholesterol transport
 - e. Hypercholesterolemia and its effects (atherosclerosis and coronary heart diseases) Hypocholesterolemic agents, Common hyperlipoproteinemia, Fatty liver
- Amino acid and Protein Metabolism -
 - a. Catabolism of amino acids - Introduction, transamination, deamination, Fate of ammonia, transport of ammonia, Urea cycle

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- b. Specialized products formed from amino acids - from glycine, arginine, methionine, phenylalanine and tyrosine.
- Vitamins -
 - a. Definition, classification according to solubility,
 - b. Individual vitamins - Sources, Coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity.
- Mineral Metabolism-
Definition, Sources, RDA, Digestion, absorption, transport, excretion, functions, disorder of Individual minerals - Calcium, phosphate, iron, Magnesium, fluoride, selenium, molybdenum, copper. Phosphate, calcium and iron in detail.
- Cell Biology -

Unit 4 (15 Hours)

Introduction, Cell structure, Cell membrane structure and function, various types of absorption. Intracellular organelles and their functions, briefly on cytoskeleton.

- Muscle Contraction -
Contractile elements in muscle, briefly on the process of muscle contraction, Energy for muscle contraction.
- Biochemistry of Connective tissue -
Introduction, various connective tissue proteins: Collagen, elastin - Structure and associated disorders. Glycoproteins, Proteoglycans.
- Hormone Action -
Definition, classification, Mechanism of hormone action. Receptors, signal transduction, second messengers and cell function.
- Acid-Base balance -
Acids, bases and buffers, pH. Buffer systems of the body, bicarbonate buffer system Role of lungs and kidneys in acid base balance, Acid base imbalance.
- Water balance -
Water distribution in the body, Body water, water turnover, Regulation of water balance: role of ADH and thirst centre.
- Electrolyte balance -
 - a. Osmolarity. Distribution of electrolytes.
 - b. Electrolyte balance: Role of aldosterone, rennin angiotensin system and ANF.
- Clinical Biochemistry -
Normal levels of blood and urine constituents, Relevance of blood and urine levels of Glucose, Urea, Uric acid, Creatinine, Calcium, Phosphates, pH and Bicarbonate. Liver function tests, Renal function tests.

Recommended Text Books / Reference Books:

1. Applied Biochemistry Professional Publications; First Edition
2. Fundamentals Of Applied Biochemistry Auris Publishing

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

SOCIOLOGY

Subject Code: BPHTS1-104

L T P C

Duration: 30 (Hrs.)

2 0 0 2

Course Objective: Sociology will introduce student to the basic sociology concepts, principles and social process, social institutions in relation to the individual, family and community and the various social factors affecting the family in rural and urban communities in India will be studied.

Course Outcome:

- Sociology & Health – Social factors affecting Health Status, Social Consciousness & Perception of Illness, Decision Making in taking Treatment
- Socialization – Definition, Influence, of Social Factors, on Personality, Socialization in the Hospital & Rehabilitation of the patients.
- Community Role of Rural & Urban communities in Public Health, Role of community in determining Beliefs, Practices & Home Remedies in Treatment.
- Social Change, Organization: Student learns and critically evaluate the explanation of human behaviour social phenomena and social process locally and globally.
- Social Problems of the Disabled: Understanding the social problem and learning outcome of those prevailing problems affecting health care sector.

Unit- 1 (7 Hours)

Introduction:

- a. Meaning- Definition and scope of sociology
- b. Its relation to Anthropology, Psychology, Social Psychology.
- c. Methods of Sociological investigations- Case study, social survey, questionnaire, Interview and opinion poll methods.
- d. Importance of its study with special reference to Health Care Professionals.

Social Factors in Health and disease situations:

- a. Meaning of social factors
- b. Role of social factors in health and illness

Socialization:

- a. Meaning and nature of socialization.
- b. Primary, Secondary and Anticipatory socialization.
- c. Agencies of socialization.

Unit- 2 (8 Hours)

Social Groups:

Concepts of social groups, influence of formal and informal groups on health and sickness. The role of primary groups and secondary groups in the hospital and rehabilitation setup.

Family:

- a. The family, meaning and definitions.
- b. Functions of types of family
- c. Changing family patterns
- d. Influence of family on the individuals health, family and nutrition, the effects of sickness in the family and psychosomatic disease and their importance to physiotherapy.

Community:

- e. Rural community: Meaning and features –Health hazards of ruralities, health hazards to tribal community.
- f. Urban community: Meaning and features- Health hazards of urbanities.

Unit- 3 (7 Hours)

Culture and Health:

- g. Concept of Health
- h. Concept of Culture
- i. Culture and Health
- j. Culture and Health Disorders

Social change:

- k. Meaning of social changes.
- l. Factors of social changes.
- m. Human adaptation and social change
- n. Social change and stress.
- o. Social change and deviance.
- p. Social change and health programme
- q. The role of social planning in the improvement of health and rehabilitation.

Unit 4 (8 Hours)

Social Problems of disabled: Consequences of the following social problems in relation to sickness and disability, remedies to prevent these problems.

- a. Population explosion
- b. Poverty and unemployment
- c. Beggary
- d. Juvenile delinquency
- e. Prostitution
- f. Alcoholism
- g. Problems of women in employment
- h. Geriatric problems
- i. Problems of underprivileged.

Social Security:

Social security and social legislation in relation to the disabled.

Social worker:

- a. Meaning of Social Work
- b. The role of a Medical Social Worker.

Recommended Text Books / Reference Books:

- Textbook of Sociology for Physiotherapy Students by KP Neeraja
- Sociology for Physiotherapists by Dibyendunarayan Bid

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

INTRODUCTION TO HEALTHCARE DELIVERY SYSTEM IN INDIA

Subject Code: BPHTS1-107

**L T P C
2 0 0 2**

Duration: 30 (Hrs.)

Course Objective: The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world.

Course Outcome:

- Describe the health systems of various Countries including India
- Discuss and learn public health care system in India
- Develop, implement and manage various public health programs
- Critically analyze the various components of health care delivery system in India
- Apply various principles of planning and management in implementing health projects and programmes.
- Recognize the various sections of healthcare legislations in India and initiate appropriate actions in public health practice
- Describe the principles, history and methods of epidemiological studies

Unit 1 (10 Hours)

- Introduction to healthcare delivery system
 - a. Healthcare delivery system in India at primary, secondary and tertiary care
 - b. Community participation in healthcare delivery system
 - c. Health system in developed countries.
 - d. Private Sector
 - e. National Health Mission
 - f. National Health Policy
 - g. Issues in Health Care Delivery System in India
- National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Health Programme.

Unit 2 (5 Hours)

- Introduction to AYUSH system of medicine
 - a. Introduction to Ayurveda.
 - b. Naturopathy
 - c. Unani
 - d. Siddha
 - e. Homeopathy
 - f. Need for integration of various system of medicine
- Health scenario of India- past, present and future

Unit 3 (10 Hours)

- Demography & Vital Statistics-
 - a. Demography – its concept
 - b. Vital events of life & its impact on demography
 - c. Significance and recording of vital statistics
 - d. Census & its impact on health policy

Unit 4 (5 Hours)

- Epidemiology
 - a. Principles of Epidemiology
 - b. Natural History of disease
 - c. Methods of Epidemiological studies
 - d. Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

Recommended Text Books / Reference Books:

Model Curriculum – General Duty Assistant. NSQF level 4, HSS/Q5101. Healthcare Sector Skill Council.

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**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

BASIC COMPUTER AND INFORMATION SCIENCE

Subject Code: BPHTS1-108

L T P C

Duration: 15 (Hrs.)

1 0 0 1

Course Objective: The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

Course Outcome:

Upon completion of the course the student shall be able to

- Know the various types of application of computers.
- Know the various types of databases
- Know the various applications of databases
- Knows the computer network

Unit 1 (2 Hours)

Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.

Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).

Processor and memory: The Central Processing Unit (CPU), main memory.

Unit 2 (3 Hours)

Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.

Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).

Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.

Unit 3 (5 Hours)

Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.

Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

Unit 4 (5 Hours)

Introduction of Operating System: introduction, operating system concepts, types of operating system.

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SYLLABUS 2023 BATCH ONWARDS**

Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.

Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet. Application of Computers in clinical settings.

Recommended Text Books / Reference Books:

- Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
- Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi - 110002

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

BASIC COMPUTER AND INFORMATION SCIENCE PRACTICAL

Subject Code: BPHTS1-109

L T P C

Duration: 30 (Hrs.)

0 0 2 1

Course Objective: The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

Course Outcome:

Upon completion of the course the student shall be able to

- Know the various types of application of computers.
- Know the various types of databases
- Know the various applications of databases

- Knows the computer network

Experiment

- Learning to use MS office: MS word, MS PowerPoint, MS Excel.
- To install different software.
- Data entry efficiency

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

ENGLISH, COMMUNICATION AND SOFT SKILLS

Subject Code: BPHTS1-110

L T P C

Duration: 15 (Hrs.)

1 0 0 1

Course Objective

- The students will be able to appreciate communication skills as these are important to everyone - those are how we give and receive information and convey our ideas and opinions with those around us.
- The topic shall also include the 'Soft skills' which is a term often associated with a person's "EQ" (Emotional Intelligence Quotient) which is an important part of their individual contribution to the success of an organization.

Course Outcome

- Projecting the first impression
- Use simple forms of polite expressions to establish basic social contact and to perform everyday functions including making requests and offers, conducting simple phone conversations, asking and telling time, giving simple directions, asking about price, ordering a meal, etc.
- Students learn to use general, social and professional language.
- Polishing manners to behave appropriately in social and professional circles.
- Handling difficulty situations with grace style and professionalism

UNIT-1 (3 Hrs)

Basic Language Skills: Grammar and Usage.

Business Communication Skills with focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.

UNIT-2 (2 Hrs)

Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization.

Basic concepts & principles of good communication

UNIT-3 (5 Hrs)

Special characteristics of health communication

Types & process of communication

Barriers of communication & how to overcome.

UNIT-4 (5 Hrs)

Soft Skills - with important sub-elements:

- i. Communication Styles
- ii. Team work
- iii. Leadership Skills
- iv. Effective & Excellent Customer Service
- v. Decision Making & Problem Solving
- vi. Managing Time and Pressures
- vii. Self-Management & Attitude.

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Recommended Text Books / Reference Books:

- Effective Communication and Soft Skills by Nitin Bhatnagar Pearson Education India, 2011
- Communication N Soft Skills Paperback – 2013 by Niraj Kumar, Chetan Srivastava

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SYLLABUS 2023 BATCH ONWARDS**

ENGLISH, COMMUNICATION AND SOFT SKILLS PRACTICAL

Subject Code: BPHTS1-111

L T P C

Duration: 30 (Hrs.)

0 0 2 1

Course Objective

- The students will be able to appreciate communication skills as these are important to everyone - those are how we give and receive information and convey our ideas and opinions with those around us.
- The topic shall also include the 'Soft skills' which is a term often associated with a person's "EQ" (Emotional Intelligence Quotient) which is an important part of their individual contribution to the success of an organization.

Course Outcome

- Projecting the first impression
- Use simple forms of polite expressions to establish basic social contact and to perform everyday functions including making requests and offers, conducting simple phone conversations, asking and telling time, giving simple directions, asking about price, ordering a meal, etc.
- Students learn to use general, social and professional language.
- Polishing manners to behave appropriately in social and professional circles.
Handling difficulty situations with grace style and professionalism

Experiment

1. Basic Language Skills: Grammar and Usage.
2. Business Communication Skills. With focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.
3. Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization.
4. Basic concepts & principles of good communication
5. Special characteristics of health communication
6. Types & process of communication – verbal, non-verbal and written communication. Upward, downward and lateral communication.
7. Therapeutic communication: empathy versus sympathy.
8. Communication methods for teaching and learning.
9. Communication methods for patient education.
10. Barriers of communication & how to overcome.

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SYLLABUS 2023 BATCH ONWARDS**

INTRODUCTION TO YOGA- BASIC THEORY, SCIENCE AND TECHNIQUES

Subject Code: BPHTS1-112

L T P C

Duration: 15 (Hrs.)

1 0 0 1

Course Objective:

Class incorporates yoga postures, gentle movement sequences, breath work, supported silent meditation, and guided relaxation to support increased awareness and mindfulness of the breath and body, and quieting of the nervous system.

Course Outcome:

- Knows the Yoga and its types,
- Know the yoga its physiological and Psycho-somatic effects
- Know the physiological effect of yoga practice
- To demonstrate standard yoga postures used by the beginners.

UNIT 1 (5 Hours)

Foundations of Yoga

- Introduction to Yoga and its philosophy
- Brief history, development of Yoga
- Philosophical foundations of Yoga
- Streams & types of Yoga

UNIT 2 (5 Hours)

Yoga and Health

- Concept of body in yoga – Panchakosha theory
- Concept of Health and Disease in yoga
- Stress management through yoga
- Disease prevention and promotion of positive health through yoga

UNIT 3 (5 Hours)

Physiological effects of Yoga practices

- Physiological effects of Shat kriyas
- Physiological effects of Asanas
- Physiological effects of Pranayamas
- Physiological effects of Relaxation techniques and Meditation

Recommended Text Books / Reference Books:

- The yoga sutras of patanjali by sri swami satchidananda
- Eastern body, western mind by anodea Judith

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

**INTRODUCTION TO YOGA- BASIC THEORY, SCIENCE AND TECHNIQUES
PRACTICAL**

Subject Code: BPHTS1-113

**L T P C
0 0 2 1**

Duration: 30 (Hrs.)

Course Objective:

Class incorporates yoga postures, gentle movement sequences, breath work, supported silent meditation, and guided relaxation to support increased awareness and mindfulness of the breath and body, and quieting of the nervous system.

Course Outcome:

- Knows the Yoga and its types,
- Know the yoga its physiological and Psycho-somatic effects
- Know the physiological effect of yoga practice
- To demonstrate standard yoga postures used by the beginners.

List of Practical / Demonstrations

- Sukshma Vyayama/ Sithilikarna Vyayama and Surya Namaskar)
- Loosening exercises of each part of the body particularly of the joints
- 12 step Surya namaskar with prayer and specific mantras

- Yogic kriyas [Observation/ demonstration only] (3 hours)
- Neti (Jala Neti, Sutra Neti)
- Dhauti (Vamana Dhauti, Vastra Dhauti)
- Trataka
- Shankaprakshalana (Laghu & Deergha)
- Yogasanas

- Standing postures
 - i. Tadasana (Upward stretch posture)
 - ii. Ardha Chakrasana (Half wheel posture)
 - iii. Ardha Katicakrasana (Half lumber wheel posture)
 - v. Utkatasana (Chair posture)
 - vi. Pada Hastasana (Hand to toes posture)
 - vii. Trikonasana (Triangle posture)
 - viii. Parshva Konasana (Side angle posture)
 - ix. Garudasana (Eagle posture)
 - x. Vrikshasana (Tree posture)

- Prone positions
 - i. Makarasana (Crocodile posture)
 - ii. Bhujangasana (Cobra posture)
 - iii. Salabhasana (Locust posture)
 - iv. Dhanurasana (Bow posture)
 - v. Naukasana (Boat posture)
 - vi. Marjalasana (Cat posture)

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- Supine postures
 - i. Ardha halasana/ Uttana Padasana
 - ii. Sarvangasana (All limb posture)
 - iii. Pawana muktasana (Wind releasing posture)
 - iv. Matsyasana (Fish posture)
 - v. Halasana (Plough posture)
 - vi. Chakrasana (Wheel posture)
 - vii. Setu Bandhasana (Bridge posture)
 - viii. Shavasana (Corpse posture)

- Sitting postures
 - i. Parvatasana (Mountain posture)
 - ii. Bhadrasana (Gracious posture)
 - iii. Vajrasana (Adamantine posture)
 - iv. Paschimottanasana (Back stretching posture)
 - v. Janushirasana (Head to knee posture)
 - vi. Simhasana (Lion posture)
 - vii. Gomukhasana (Cow head posture)
 - viii. Ushtrasana (Camel posture)
 - ix. Ardha Matsyendrasana (Half matsyendra spine twist posture)
 - x. Vakrasana (Spinal twist posture)
 - xi. Kurmasana (Turtle posture)
 - xii. Shashankasana (Rabbit posture)
 - xiii. Mandukasana (Frog Posture)

- Meditative postures and Meditation techniques
 - i. Siddhasana (Accomplished pose)
 - ii. Padmasana (Lotus posture)
 - iii. Samasana
 - iv. Swastikasana (Auspicious posture)

- Pranayamas
 - i. The practice of correct breathing and Yogic deep breathing
 - ii. Kapalabhati
 - iii. Bhastrika
 - iv. Sitali
 - v. Sitkari
 - vi. Sadanta
 - vii. Ujjayi
 - viii. Surya Bhedana
 - ix. Chandra Bhedana
 - x. Anuloma-Viloma/Nadishodana
 - xi. Bhramari

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SYLLABUS 2023 BATCH ONWARDS**

- Relaxation Techniques (2 hours)
 - i. Shavasana
 - ii. Yoga Nidra

COMMUNITY ORIENTATION AND CLINICAL VISIT

Subject Code: BPHTS1-115

**L T P C
0 0 4 2**

Duration: 60 (Hrs.)

Course Objective:

The objective of this particular section of the foundation course is to sensitize potential learners with essential knowledge; this will lay a sound foundation for their learning across the under-graduate program and across their career. Innovative teaching methods should be used to ensure the attention of a student and make them more receptive such as group activities, interactive fora, role plays, and clinical bed-side demonstrations.

1. The community orientation and clinical visit will include visit to the entire chain of healthcare delivery system -Sub centre, PHC, CHC, SDH, DH and Medical College, private hospitals, dispensaries and clinics.
2. The student will also be briefed regarding governance at village level including interaction and group discussion with village panchayat and front line health workers.
3. Clinical visit to their respective professional department within the hospital.

SECOND SEMESTER

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

HUMAN ANATOMY-2 (INCLUDING APPLIED ANATOMY)

Subject Code: BPHTS1-201

**L T P C
3 1 0 4**

Duration: 60 (Hrs.)

Course Objective:

- Studies are concerned with the topographical and functional anatomy of the limbs and thorax. Particular attention is paid to the muscles, bones and joints of the regions. The head and neck and central nervous system (CNS) are studied with particular reference to topics of importance to physiotherapists. The study of the CNS includes detailed consideration of the control of motor function.

Course Outcome:

- Demonstrate knowledge of general overall anatomically principles associated with Musculo Skelton anatomy, lower extremity Neuro anatomy program region.

Unit 1 (15 Hours)

- Musculo Skeletal Anatomy - (All the topics to be taught in detail)
 - a. Anatomical positions of body, axes, planes, common anatomical terminologies (Groove, tuberosity, trochanters etc)
 - b. Connective tissue classification.
 - c. Bones- Composition & functions, classification and types according to morphology and development.
 - d. Joints-definition-classification, structure of fibrous, cartilaginous joints, blood supply and nerve supply of joints.
 - e. Muscles – origin, insertion, nerve supply and actions.
 - f. Upper Extremity
 - i. Osteology: Clavicles, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals, Phalanges.
 - ii. Soft parts: Breast, pectoral region, axilla, front of arm, back of arm, cubital fossa, front of fore arm, back of fore arm, palm, dorsum of hand, muscles, nerves, blood vessels and lymphatic drainage of upper extremity.
 - iii. Joints: Shoulder girdle, shoulder joint, elbow joints, radio ulnar joint, wrist joint and joints of the hand.
 - iv. Arches of hand, skin of the palm and dorsum of hand.

Unit 2 (15 Hours)

- Lower Extremity
 - i. Osteology: Hip bone, femur, tibia, fibula, patella, tarsals, metatarsals and phalanges.
 - ii. Soft parts: Gluteal region, front and back of the thigh (Femoral triangle, femoral canal and inguinal canal), medial side of the thigh (Adductor canal), lateral side of the thigh, popliteal fossa, anterior and posterior compartment of leg, sole of the foot, lymphatic drainage of lower limb, venous drainage of the lower limb, arterial supply of the lower limb, arches of foot, skin of foot.
 - iii. Joints: Hip Joint, Knee joint, Ankle joint, joints of the foot.

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- Trunk & Pelvis:
- Osteology: Cervical, thoracic, lumbar, sacral and coccygeal vertebrae and ribs.
 - i. Soft tissue: Pre and Para vertebral muscles, intercostals muscles, anterior abdominal wall muscles, Inter-vertebral disc.
 - ii. Pelvic girdle and muscles of the pelvic floor.
- Head and Neck:
 - i. Osteology: Mandible and bones of the skull.
 - ii. Soft parts: Muscles of the face and neck and their nerve and blood supply-extra ocular muscles, triangles of the neck.
 - iii. Gross anatomy of eyeball, nose, ears and tongue.

Unit 3 (15 Hours)

- Neuro Anatomy - Organization of Central Nervous system - Spinal nerves and autonomic nervous system mainly pertaining to cardiovascular, respiratory and urogenital system
 - i. Cranial nerves
 - ii. Peripheral nervous system
 - iii. Peripheral nerve
 - iv. Neuromuscular junction
 - v. Sensory end organs
 - vi. Central Nervous System
 - vii. Spinal segments and areas
 - viii. Brain Stem

Unit 4 (15 Hours)

- i. Cerebellum
- ii. Inferior colliculi
- iii. Superior Colliculi
- iv. Thalamus
- v. Hypothalamus
- vi. Corpus striatum
- vii. Cerebral hemisphere
- viii. Lateral ventricles
- ix. Blood supply to brain
- x. Basal Ganglia
- xi. The pyramidal system
- xii. Pons, medulla, extra pyramidal systems
- xiii. Anatomical integration

Recommended Text Books / Reference Books:

- Ross and Wilson, 'Anatomy & Physiology.
- Clark, 'Anatomy and Physiology: Understanding the Human Body'.
- Pearce, 'Human Anatomy for Nurses.

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SYLLABUS 2023 BATCH ONWARDS**

HUMAN ANATOMY-2 (INCLUDING APPLIED ANATOMY) - PRACTICAL

Subject Code: BPHTS1-205

L T P C
0 0 6 3

Duration: 90 (Hrs.)

List of Practical / Demonstrations

- Upper extremity including surface Anatomy.
- Lower extremity including surface Anatomy.
- Head & Spinal cord and Neck and Brain including surface Anatomy.
- Thorax including surface anatomy, abdominal muscles.
- Histology-Elementary tissue including surface Anatomy.
- Embryology-models, charts & X-rays.

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HUMAN PHYSIOLOGY-2 (INCLUDING APPLIED PHYSIOLOGY)

Subject Code: BPHTS1-202

**L T P C
3 1 0 4**

Duration: 60 (Hrs.)

Course Objective:

- The course in Physiology over the first year is designed to give the student an in-depth knowledge of fundamental reactions of living organisms, particularly in the human body.
- The major topics covered include the following the cell; primary tissue; connective tissue; skin; muscle; nervous tissue; blood; lymphoid tissues; respiration; blood vessels; circulation; cardiac cycle; systemic circulation; gastrointestinal tract; kidneys; uterus; urinary tract; pregnancy; endocrine system.

Course Outcome:

- Describe the physiological & Therapeutic uses, merits /demerits of various exercise modes.
- Demonstrate various therapeutic exercises on self & acquire the application skill on models.
- Acquire the skill of assessment of isolated & group muscle strength, & Range of motion of the joints subjectively & objectively.
- Describe the pattern of normal and abnormal movements of various joints and activities

UNIT 1 (20 Hours)

- Special Senses -
 - a. Vision: Introduction: Functional anatomy of eye ball. Functions of cornea, iris, pupil, aqueous humor – glaucoma, lens – cataract, vitreous humor, rods and cones. Photopic vision. Scotopic vision.
 - b. Visual Pathway and the effects of lesions.
 - c. Refractive Errors: myopia, hypermetropia, presbyopia and astigmatism.
 - d. Visual Reflexes: Accommodation, Pupillary and Light. Visual acuity and Visual field. Light adaptation. Dark adaptation.
 - e. Color vision – color blindness. Nyctalopia.
 - f. Audition: Physiological anatomy of the ear. Functions of external ear, middle ear and inner ear. Structure of Cochlea and organ of corti. Auditory pathway. Types of Deafness. Tests for hearing. Audiometry.
 - g. Taste: Taste buds. Primary tastes. Gustatory pathway.
 - h. Smell: Olfactory membrane. Olfactory pathway.
 - i. Vestibular Apparatus: Crista ampullaris and macula. Functions. Disorders
- Nervous System -
 - a. Introduction: Organisation of CNS – central and peripheral nervous system. Functions of nervous system. Synapse: Functional anatomy, classification, Synaptic transmission. Properties.
 - b. Sensory Mechanism: Sensory receptors: function, classification and properties. Sensory pathway: The ascending tracts – Posterior column tracts, lateral

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- spinothalamic tract and the anterior spinothalamic tract – their origin, course, termination and functions. The trigeminal pathway. Sensory cortex. Somatic sensations: crude touch, fine touch, tactile localization, tactile discrimination, stereognosis, vibration sense, kinesthetic sensations. Pain sensation: mechanism of pain. Cutaneous pain –slow and fast pain, hyperalgesia. Deep pain. Visceral pain – referred pain. Gate control theory of pain. tabes dorsalis, sensory ataxia.
- c. Motor Mechanism: Motor Cortex. Motor pathway: The descending tracts – pyramidal tracts, extrapyramidal tracts – origin, course, termination and functions. Upper motor neuron and lower motor neuron. Paralysis, monoplegia, paraplegia, hemiplegia and quadriplegia.
 - d. Reflex Action: components, Bell-Magendie law, classification and Properties. Monosynaptic and polysynaptic reflexes, superficial reflexes, deep reflexes. Stretch reflex– structure of muscle spindle, pathway, higher control and functions. Inverse stretch reflex. Muscle tone – definition, and properties hypotonia, atonia and hypertonia. UMNL and LMNL
 - e. Spinal cord Lesions: Complete transection and Hemisection of the spinal cord.
 - f. Cerebellum: Functions, Cerebellar ataxia.
 - g. Posture and Equilibrium: Postural reflexes – spinal, medullary, midbrain and cerebral reflexes.
 - h. Thalamus and Hypothalamus: Nuclei. Functions. Thalamic syndrome
 - i. Reticular Formation and Limbic System: Components and Functions.
 - j. Basal Ganglia: Structures included and functions. Parkinson's disease.
 - k. Cerebral Cortex: Lobes. Brodmann's areas and their functions. Higher functions of cerebral cortex – learning, memory and speech.
 - l. EEG: Waves and features. Sleep: REM and NREM sleep.
 - m. CSF: Formation, composition, circulation and functions. Lumbar puncture and its significance. Blood brain barrier. Hydrocephalus.
 - n. ANS: Features and actions of parasympathetic and sympathetic nervous system.

UNIT 2 (20 Hours)

- Renal System -
 - a. Introduction: Physiological anatomy. Nephrons – cortical and juxtamedullary. Juxtaglomerular apparatus. Glomerular membrane. Renal blood flow and its regulation. Functions of kidneys.
 - b. Mechanism of Urine Formation: Glomerular Filtration: Mechanism of glomerular filtration. GFR – normal value and factors affecting. Renal clearance. Inulin clearance. Creatinine clearance.
 - c. Tubular Reabsorption: Reabsorption of Na⁺, glucose, HCO₃⁻, urea and water. Filtered load. Renal tubular transport maximum. Glucose clearance: T_{mG}. Renal threshold for glucose.
 - d. Tubular Secretion: Secretion of H⁺ and K⁺. PAH clearance.

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- e. Mechanism of concentrating and diluting the Urine: Counter-current mechanism. Regulation of water excretion. Diuresis. Diuretics.
- f. Micturition: Mechanism of micturition. Cystometrogram. Atonic bladder, automatic bladder.
- g. Acid-Base balance (very brief)
- h. Artificial Kidney: Principle of hemodialysis.
- i. Skin and temperature regulation.
- Reproductive System -
 - a. Introduction: Physiological anatomy reproductive organs. Sex determination. Sex differentiation. Disorder
 - b. Male Reproductive System: Functions of testes. Pubertal changes in males. Spermatogenesis. Testosterone: action. Regulation of secretion. Semen.
 - c. Female Reproductive System: Functions of ovaries and uterus. Pubertal changes in females. Oogenesis. Hormones: estrogen and progesterone-action. Regulation of secretion. Mentrual Cycle: Phases. Ovarian cycle. Uterine cycle. Hormonal basis. Menarche. Menopause. Pregnancy: Pregnancy tests. Physiological changes during pregnancy. Functions of placenta. Lactation. Contraception methods
- Physiology of exercise –
 - a. Effects of acute and chronic exercise on
 - i. O₂ transport
 - ii. Muscle strength/power/endurance
 - iii. B.M.R. /R.Q.
 - iv. Hormonal and metabolic effect
 - v. Cardiovascular system
 - vi. Respiratory system
 - vii. Body fluids and electrolyte
 - b. Effect of gravity / altitude /acceleration / pressure on physical parameters
 - c. Physiology of Age
- Applied Physiology -

More detailed study of the physiology and practical applications of the following selected topics with emphasis on aspects, which should help in understanding the nature and treatment of common clinical situations of interest in Physiotherapy.

UNIT 3 (10 Hours)

- Pulmonary Functions
 - a. Properties of gases, Mechanics of respiration, Diffusion capacity, special features of pulmonary circulation and their application.
 - b. Respiratory adjustments in exercises.
 - c. Artificial respiration
 - d. Breath sounds.

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- Cardio vascular Functions
 - a. Blood flow through arteries, arterioles, capillaries, veins and venuoles.
 - b. Circulation of Lymph, Oedema
 - c. Factors affecting cardiac output.
 - d. Circulatory adjustment in exercise and in postural and gravitational changes,
 - e. Pathophysiology of fainting and heart failure.

UNIT 4 (10 Hours)

- Muscles and Nervous System Functions
 - a. Peripheral nervous system, neuromuscular transmission, Types of nerve fibers.
 - b. Action potential, Strength-duration curve, ECG, EMG, VEP, NCV
 - c. Degeneration and regeneration of nerve, Reactions of denervations.
 - d. Synaptic transmission, Stretch reflex- Mechanism and factors affecting it.
 - e. Posture, Balance and Equilibrium/Coordination of voluntary movement.
 - f. Voluntary motor action, clonus, Rigidity, incoordination.
 - g. Special senses- Vision, taste, hearing, vestibular, Olfaction
 - h. Sympathetic and Parasympathetic regulation, Thermoregulation.
- Blood functions
 - a. Thalassemia Syndrome, Hemophilia, VWF
 - b. Anemia, Leukocytosis
 - c. Bone marrow transplant
- Metabolic Functions
 - a. Diabetes Mellitus, Physiological basis of Peptic Ulcer, Jaundice, GIT disorders and Dietary fiber, Thyroid functions, Vitamins deficiency.

Recommended Text Books / Reference Books:

- Physiological basis of Medical Practice-Best and Taylor. Williams & Wilkins Co, Riverview, MI USA
- Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
- Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje ,Academic Publishers Kolkata
- Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
- Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.
- Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

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SYLLABUS 2023 BATCH ONWARDS**

HUMAN PHYSIOLOGY-2 (INCLUDING APPLIED PHYSIOLOGY) - PRACTICAL

Subject Code: BPHTS1-206

**L T P C
0 0 4 2**

Duration: 60 (Hrs.)

Clinical Examination

- Examination of Radial pulse.
- Recording of blood pressure
- Examination of CVS
- Examination of Respiratory system
- Examination of Sensory system
- Examination of Motor System
- Examination of reflexes
- Examination of cranial nerves

Amphibian Experiments – Demonstration and Dry charts Explanation.

- Normal cardiogram of amphibian heart.
- Properties of Cardiac muscle
- Effect of temperature on cardiogram.

Recommended Demonstrations

- Spirometry
- Artificial Respiration
- ECG
- Perimetry
- Mosso's Ergometry

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

GENERAL AND CLINICAL PSYCHOLOGY

Subject Code: BPHTS1-203

**L T P C
2 1 0 3**

Duration: 45 (Hrs.)

Course Objective:

- Human Psychology involves the study of various behavioral patterns of individuals, theories of development, normal and abnormal aspects of motor, social, emotional and language development, communication and interaction skills appropriate to various age groups.

Course Outcome: The Course outcome is to know about the

- Psychosocial assessment of patients in various developmental stages.
- Explain the concept of stress and its relationship to health, sickness and one's profession.
- Identify ego defense mechanisms and learn counseling techniques to help those in need.
- Help them to understand the reason of non – compliance among patients and improve compliance behavior.
- Help them gain insight into the applications of psychology in the field of Physiotherapy

UNIT 1 (15 Hours)

- Introduction to Psychology
 - a. Schools: Structuralism, functionalism, behaviorism, Psychoanalysis.
 - b. Methods: Introspection, observation, inventory and experimental method.
 - c. Branches: pure psychology and applied psychology
 - d. Psychology and physiotherapy
- Growth and Development
 - a. Life span: Different stages of development (Infancy, childhood, adolescence, adulthood, middle age, old age).
 - b. Heredity and environment: role of heredity and environment in physical and psychological development, “Nature v/s Nurture controversy”.
- Sensation, attention and perception
 - a. Sensation: Vision, Hearing, Olfactory, Gustatory and Cutaneous sensation, movement, equilibrium and visceral sense.
 - b. Attention: Types of attention, Determinants of attention (subjective determinants and objective determinants).
 - c. Perception: Gestalt principles of organization of perception (principle of figure ground and principles of grouping), factors influencing perception (past experience and context).
 - d. Illusion and hallucination: different types.
- Motivation
 - a. Motivation cycle (need, drive, incentive, reward).
 - b. Classification of motives.
 - c. Abraham Maslow's theory of need hierarchy

UNIT 2 (15 Hours)

- Frustration and conflict
 - a. Frustration: sources of frustration.
 - b. Conflict: types of conflict.
 - c. Management of frustration and conflict
- Emotions
 - a. Three levels of analysis of emotion (physiological level, subjective state, and overt behavior).
 - b. Theories of emotion
 - c. Stress and management of stress.
- Intelligence
 - a. Theories of intelligence.
 - b. Distribution of intelligence.
 - c. Assessment of intelligence
- Thinking
 - a. Reasoning: deductive and inductive reasoning
 - b. Problem solving: rules in problem solving (algorithm and heuristic)
 - c. Creative thinking: steps in creative thinking, traits of creative people

UNIT 3 (15 Hours)

- Learning
 - a. Factors effecting learning.
 - b. Theories of learning: trial and error learning, classical conditioning, Operant conditioning, insight learning, social learning theory.
 - c. The effective ways to learn: Massed/Spaced, Whole/Part, Recitation/Reading, Serial/Free recall, Incidental/Intentional learning, Knowledge of results, association, organization, and mnemonic methods.
- Personality
 - a. Approaches to personality: type & trait, behavioristic, psychoanalytic and humanistic approach.
 - b. Personality assessment: observation, situational test, questionnaire, rating scale, interview, and projective techniques.
 - c. Defense Mechanisms: denial of reality, rationalization, projection, reaction formation, identification, repression, regression, intellectualization, undoing, introjection, acting out.
- Social psychology
 - a. Leadership: Different types of leaders. Different theoretical approaches to leadership.
 - b. Attitude: development of attitude. Change of attitude.
- Clinical psychology – Models of training, abnormal behavior assessment, clinical judgment, psychotherapy, self-management methods, physiotherapist patient interaction, aggression, self imaging, stress management, assertive training, Group therapy, Body awareness, Pediatric, child and geriatric clinical psychology.

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Recommended Text Books / Reference Books:

- Morgan & King, Introduction to Psychology, 3rd Ed, 1994
- Sachdeva D.R. & Bhushan. V, An introduction to Sociology, Kitab Mahal Limited, 1974.
- Clifford T. Morgan – Introduction to Psychology, ELBS, 2 Ed, 1990
- Hilgard & Atkinson - Introduction to Psychology, CBS, 3 Ed, 1994
- Madan. G.R. Indian Social Problems, Vol.1, Chennai Applied Publications, 1973.

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GENERAL AND CLINICAL PSYCHOLOGY - PRACTICAL

Subject Code: BPHTS1-207

**L T P C
0 0 2 1**

Duration: 30 (Hrs.)

Experiment

- Pain assessment
- Psychological approach to pain management
- Cognitive reconceptualising pain
- Relaxation Therapy
- Behavioural Therapy
- Electromyography (EMG)
- Thermal biofeedback
- Neurofeedback/ electroencephalography (EEG)
- Electrodermography (EDG)

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

BASIC PRINCIPLES OF BIOMECHANICS

Subject Code: BPHTS1-204

**L T P C
2 1 0 3**

Duration: 45 (Hrs.)

Course Objective:

- Biomechanics involves the study of basic concepts of human movement, and application of various biomechanical principles in the evaluation and treatment of disorders of musculoskeletal system. Students are taught to understand the various quantitative and qualitative methods of movement. Mechanical principles of various treatment methods are studied. Study of posture and gait are also included.

Course Outcome:

- Correctly apply fundamental human movement principles, from both natural and social science perspectives, to a variety of contexts and populations
- Demonstrate an applied understanding of the form and function of the human body
- Critically evaluate human movement research in order to design and implement activities to confirm/generate disciplinary knowledge

UNIT 1 (15 Hours)

- Basic Concepts in Biomechanics: Kinematics and Kinetics
 - a. Types of Motion
 - b. Location of Motion
 - c. Direction of Motion
 - d. Magnitude of Motion
 - e. Definition of Forces
 - f. Force of Gravity
 - g. Reaction forces
 - h. Equilibrium
 - i. Objects in Motion
 - j. Force of friction
 - k. Concurrent force systems
 - l. Parallel force system
 - m. Work
 - n. Moment arm of force
 - o. Force components
 - p. Equilibrium of levers

UNIT 2 (10 Hours)

- Joint structure and Function -
 - a. Joint design
 - b. Materials used in human joints
 - c. General properties of connective tissues
 - d. Human joint design
 - e. Joint function
 - f. Joint motion
 - g. General effects of disease, injury and immobilization.

UNIT 3 (10 Hours)

- Muscle structure and function -
 - a. Mobility and stability functions of muscles
 - b. Elements of muscle structure
 - c. Muscle function
 - d. Effects of immobilization, injury and aging

UNIT 4 (10 Hours)

- Biomechanics of the Thorax and Chest wall -
 - a. General structure and function
 - b. Rib cage and the muscles associated with the rib cage
 - c. Ventilatory motions: its coordination and integration
 - d. Developmental aspects of structure and function
 - e. Changes in normal structure and function I relation to pregnancy, scoliosis and COPD
- The Temporomandibular Joint-
 - a. General features, structure, function and dysfunction

Recommended Text Books / Reference Books:

- Basics Biomechanics, Susan J hall, 1st edition 1995
- A textbook of Biomechanics, singh arunjith, Singh pritpal 1st edition 2013

BASIC PRINCIPLES OF BIOMECHANICS - PRACTICAL

Subject Code: BPHTS1-208

**L T P C
0 0 2 1**

Duration: 30 (Hrs.)

Experiment

1. Goniometry – measurement of joint ROM
2. Identify Muscle work of various movements in body at different angle.
3. Identify normal and abnormal posture.
4. Normal gait with it parameters and identify abnormal gait with the problems in it.

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SYLLABUS 2023 BATCH ONWARDS**

MEDICAL TERMINOLOGY AND RECORD KEEPING

Subject Code: BPHTS1-209

L T P C
2 0 0 2

Duration: 30 (Hrs.)

Course Objective:

- This course introduces the elements of medical terminology. Emphasis is placed on building familiarity with medical words through knowledge of roots, prefixes, and suffixes.

Course Outcome: Upon completion of this course the student should be able to:

- Students origin, word building, abbreviations and symbols, terminology related to the human anatomy, reading medical orders and reports, and terminology specific to the student's field of study.
- Derivation of medical terms.

Topics

- Define word roots, prefixes, and suffixes.
- Conventions for combined morphemes and the formation of plurals.
- Basic medical terms in health care and physiotherapy.
- Form medical terms utilizing roots, suffixes, prefixes, and combining roots.
- Interpret basic medical abbreviations/symbols.
- Utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system.
- Interpret medical records/reports.

Recommended Text Books / Reference Books:

- Comprehensive medical terminology 3rd edition Bety Davis Jones, RN, MA, CMA

THIRD SEMESTER

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

PATHOLOGY

Subject Code: BPHTS1-301

L T P C

Duration: 45 (Hrs.)

3 0 0 3

Course Objectives:

- Acquire the knowledge of concepts of cell injury & changes produced thereby in different tissues & organs-; capacity of the body in healing process.
- Recall the Etiopathogenesis, the pathological effects & the clinic pathological correlation of common infections & non-infectious diseases.
- Acquire the knowledge of concepts of neoplasia with reference to the Etiology, gross & microscopic features, diagnosis, & prognosis in different tissues, & organs of the body.

Course Outcomes:

- Demonstrate an understanding of essential basic pathological processes including cell death and injury, inflammation, thrombosis and neoplasia
- Acquire the ability to relate these essential basic pathological processes to the pathogenesis of common and important diseases
- Demonstrate an understanding of the predisposing factors, causes, pathogenesis, morphology and potential complications of such diseases

UNIT -1 (15 Hrs.)

- **General Pathology-** Cell injury-causes, mechanism & toxic injuries with special reference to Physical, Chemical, & ionizing radiation
- **Reversible injury (degeneration)-** types, morphology, swelling, hyaline, fatty changes, Intra-cellular accumulation-hyaline mucin,
- **Irreversible cell injury-**types of necrosis, apoptosis, calcification, dystrophic & metastasis,
- **Extra-cellular accumulation-** amyloidosis, calcification, Pathogenesis, morphology.
- **Inflammation & Repair**
 - a) Acute inflammation – features, causes, vascular & cellular events,
 - b) Morphologic variations,
 - c) Inflammatory cells & mediators,
 - d) Chronic inflammation:- causes, types, non-specific & granulomatous
 - e) Wound healing by primary & secondary union factors promoting & delaying healing process.
 - f) Healing at various sites including-bones, nerve & muscle.

UNIT -2 (10 Hrs.)

- **Immuno – pathology –** (basic concepts)
 - a) Immune system:- organization-cells- antibodies- regulation of immune responses,
 - b) Hyper-sensitivity,
 - c) Secondary immuno-deficiency including HIV,
 - d) Organ transplantation
- **Circulatory disturbances**
 - a) Edema - pathogenesis - types - transudates / exudates
 - b) Chronic venous congestion- lung, liver, spleen,

- c) Thrombosis – formation – fate – effects,
- d) Embolism – types- clinical effects,
- e) Infarction – types – common sites
- f) Gangrenes – types – actiopathogenesis
- g) Shock – Pathogenesis, types, morphologic changes
- h) Deficiency disorders – Vitamins A, B, C, D,

UNIT -3 (10 Hrs.)

- **Growth Disturbance**

- a) Atrophy-malformation, agenesis, dysplasia,
- b) Neoplasia classification, histogenesis, biologic behaviour, difference between benign & malignant tumour
- c) Malignant neoplasms- grades-stages-local & distal spread,
- d) Carcinogenesis – environmental carcinogens,
- e) Chemical, Occupational, heredity, viral, f) precancerous lesions & ca in situ g) Tumor & host interactions – systemic effects-metastatic or direct spread of tumors affecting bones, spinal cord, leading to paraplegia, etc.

UNIT -4 (10 Hrs.)

- **Neuro Pathology**

- a)-Reaction of nervous tissue to injury – infection & ischaemia
- b)- Pyogenic meningitis, TBM, Viral,
- c)- Cerebro – vascular diseases – atherosclerosis – Thrombosis, embolism, aneurysm, hypoxia, infarction & hemorrhage.
- d)- effects of Hypotension on CNS e)- Coma f)- Polio myelitis- Leprosy- Demyelinating diseases – Parkinsonism – Cerebral palsy- metachromatic leucodystrophy – Dementia – Hemiplegia / paraplegia – Pathogenesis & pathology of Wilson's disease g

Recommended books:-

- **Rapid Review Pathology by Edward F. Goljan**
- Robbins and Cotran Review of Pathology by Klatt and Kumar
- Underwood's Pathology: A Clinical Approach by Simon Cross
- Pathology Illustrated by Fiona Roberts & Elaine MacDuff
- Robbins Basic Pathology by Kumar, Abbas & Aster

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

MICROBIOLOGY

Subject Code: BPHTS1-302

L T P C

Duration: 45 (Hrs.)

3 0 0 3

Course Objectives:

- To introduce to the students regarding various kinds of microbes in terms of their structure, growth etc. & collection of clinical samples their processing and identification.

Course Outcomes:

- Describe/explain the processes used by microorganisms for their replication, survival, and interaction with their environment, hosts, and host population.

Unit-1 (10 Hours)

• **Introduction and History of Microbiology**

- a. Classification-Prokaryotes, Eukaryotes, Viruses, Fungi.
- b. Morphology-size, shape, arrangement
- c. Special characteristics—spores, capsules, enzymes, mortality, reproduction
- d. Gram staining, ZN staining
- e. Different types of microscopes

Unit-2 (15 Hours)

- **Sterilization:** Definition and different methods of sterilization including – Gaseous sterilization Plasma sterilization, Advantage and disadvantage of various methods and their controls, Sterilization of different instruments used in patients, Preparation of materials for Autoclaving: packing, loading, holding time, unloading
- **Disinfection:** Definition and different type of methods including High level disinfectants, Disinfection of patient care unit and rooms (O.T., Wards, ICUs & Laboratories), Central supply department Areas and floor plan for instrument cleaning high level disinfection & sterilizing area.
- **Asepsis:** Universal Precautions, Use of aseptic precautions to prevent infection, Safety mechanisms including vaccination in prevention of blood borne infections

Unit-3 (10 Hours)

- **Culture media-** Liquid and Solid, Collection & transport of specimens for Microbiological Investigations.
- **Infection** - Source - Portals of entry - Spread of infection. Antimicrobial agents - Fundamental aspects - Antibiotic sensitivity testing.
- **Immunity** – Non-specific - Natural & Acquired - Allergy and Anaphylaxis Outline of common infections, diseases, etiology, treatment and prevention. - Skin and soft tissue infections - Respiratory tract infections - Meningitis - Enteric infections - Urinary tract infections - Ocular infections - Wound infections - PUO Hospital acquired infections - Catheter associated urinary tract infections (CAUTI) - Ventilator associated pneumonia (VAP) - Catheter related blood stream infections (CRBSI) - Surgical Site Infection Pathogenic yeasts and fungi.

Unit-4 (10 Hours)

- **Virology:** With special reference to hepatitis, poliomyelitis, HIV & Influenza, Viruses relevant in dialysis patients including their modes of transmission, Diseases communicable to healthcare workers in hospital set up and their prevention, Prevention measures to combat spread of these infections by monitoring and control.
- **Microbial surveillance and sampling:** Bacteriology of air, water and food, Hospital infection Control & Influenza, Viruses relevant in dialysis patients including their modes of transmission, Diseases communicable to healthcare workers in hospital set up and their prevention, Prevention measures to combat spread of these infections by monitoring and control. Microbial surveillance and sampling. Bacteriology of air, water and food, Hospital infection Control.

Recommended Text Books / Reference Books:

- M.J. Jr., Pelczar, E.C.S., Chan and R. Krieg, 'Microbiology', McGraw Hill.
- G.J. Tortora, B.R. Funke and C.L. Case, 'Microbiology-An Introduction', Benjamin Cummings.
- B.D. Davis, R. Dulbecco, H.N. Eisen and H.S. Ginsber, 'Microbiology', Harper & Row, Publishers.
- R.Y. Stainer, J.L. Ingraham, M.L. Wheelis and P.R. Palmer, 'General Microbiology', MacMilan Press Ltd.

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

PHARMACOLOGY

Subject Code: BPHTS1-303

L T P C

Duration: 45 (Hrs.)

3 0 0 3

Course Objectives:

- The goal of the study of pharmacological sciences is to understand the properties of drugs and the ways in which these properties react, according to The American Society for Pharmacology and Experimental Therapeutics.

Course Outcomes:

- Pharmacology is the study of how a drug works on the body, its side effects on the body, and the way the body uses the drug.

UNIT-1 (15 HOURS)

• **General Pharmacology:**

- a. Introduction, Definitions, Classification of drugs, Sources of drugs, Routes of drug administration,
- b. Distribution of drugs, Metabolism and Excretion of drugs, Pharmacokinetics, Pharmacodynamics,
- c. Factors modifying drug response.
- d. Elementary knowledge of drug toxicity, drug allergy, drug resistance, drug potency, efficacy & drug antagonism.

• **Autonomic Nervous system**

- a. General considerations – The Sympathetic and Parasympathetic Systems, Receptors, Somatic Nervous System
- b. Cholinergic and Anti-Cholinergic drugs, Adrenergic and Adrenergic blocking drugs, Peripheral muscle relaxants.

UNIT-2 (10 HOURS)

• **Cardiovascular Pharmacology (in brief) :**

- a. Drugs Used in the Treatment of Heart Failure: Digitalis, Diuretics, Vasodilators, ACE inhibitors
- b. Antihypertensive Drugs: Diuretics, Beta Blockers, Calcium Channel Blockers, ACE Inhibitors, Central Acting Alpha Agonists, Peripheral Alpha Antagonists, Direct acting Vasodilators

• **Antiarrhythmic Drugs**

- a. Drugs Used in the Treatment of Vascular Disease and Tissue Ischemia: Vascular Disease, Hemostasis Lipid-Lowering agents, Antithrombotics, Anticoagulants and Thrombolytics
- b. Ischemic Heart Disease – Nitrates, Beta-Blockers, Calcium Channel Blockers
- c. Cerebral Ischemia
- d. Peripheral Vascular Disease

UNIT-3 (10 HOURS)

• **Neuropharmacology (in brief) :**

- a. Sedative-Hypnotic Drugs: Barbiturates, Benzodiazepines
- b. Antianxiety Drugs: Benzodiazepines, Other Anxiolytics
- c. Drugs Used in Treatment of Mood Disorders: Monoamine Oxidase Inhibitors, Tricyclic Antidepressants, Atypical Antidepressants, Lithium
- d. Antipsychotic drugs

• **Disorders of Movement (in brief) :**

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- a. Drugs used in Treatment of Parkinson's Disease
- b. Antiepileptic Drugs
- c. Spasticity and Skeletal Muscle Relaxants
- **Inflammatory/Immune Diseases-**
 - a. Non-narcotic Analgesics and Nonsteroidal Anti-Inflammatory Drugs: Acetaminophen, NSAIDs, Aspirin, Nonaspirin NSAIDs, drug Interactions with NSAIDs
 - b. Glucocorticoids: Pharmacological Uses of Glucocorticoids, adverse effects, Physiologic Use of Glucocorticoids
 - c. Drugs Used in Treatment of Arthritic Diseases: Rheumatoid Arthritis, Osteoarthritis, Gout
 - d. Drugs Used in the Treatment of Neuromuscular Immune/Inflammatory Diseases: Myasthenia gravis, Idiopathic Inflammatory Myopathies, systemic lupus Erythmatosus, Scleroderma, Demyelinating Disease

UNIT-4 (10 HOURS)

- **Respiratory Pharmacology (in brief) :** Obstructive Airway Diseases, Drugs used in Treatment of Obstructive airway Diseases, Allergic Rhinitis
- **Digestion and Metabolism (in brief):**
Gastrointestinal Pharmacology: Peptic Ulcer Disease, Constipation, Diarrhea
Drugs Used in Treatment of Diabetes Mellitus: Insulin, Oral Hypoglycemics
- **Geriatrics:**
Pharmacology and the geriatric Population: Adverse effects of special concern in the Elderly, Dementia, Postural hypotension, urinary incontinence.

Recommended books:-

- Basic & Clinical Pharmacology By Bertram Katzung
- Rang & Dale's Pharmacology (Ninth Edition)
- Pharmacology Review – A Comprehensive Reference Guide for Medical, Nursing, and Paramedic Students

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

BIOMECHANICS AND KINESIOLOGY

Subject Code: BPHTS1-304

**L T P C
4 1 0 5**

Duration: 75 (Hrs.)

Course Objectives:

- Describe the kinematics of projectile motion and factors influencing projectile trajectory.
- Identify, analyze, and solve various biomechanical problems.
- Demonstrate an understanding of kinetic concepts including inertia, force, torque, and impulse.
- Identify the major factors involved in the angular kinematics of human movement
- Define Newton's laws of physics.
- Identify the steps involved in finding the center of gravity.

Course Outcomes:

- Correctly apply fundamental human movement principles, from both natural and social science perspectives, to a variety of contexts and populations;
- Demonstrate an applied understanding of the form and function of the human body;
- Critically evaluate human movement research in order to design and implement activities to confirm/generate disciplinary knowledge

Unit: 1 (20 Hrs.)

Biomechanics of the vertebral column -

- a. General structure and function
- b. Regional structure and function – Cervical region, thoracic region, lumbar region, sacral region
- c. Muscles of the vertebral column
- d. General effects of injury and aging

Unit: 1 (20 Hrs.)

Biomechanics of the peripheral joints -

- The shoulder complex: Structure and components of the shoulder complex and their integrated function
- The elbow complex: Structure and function of the elbow joint – humeroulnar and humeroradial articulations, superior and inferior radioulnar joints; mobility and stability of the elbow complex; the effects of immobilization and injury.
- The wrist and hand complex: Structural components and functions of the wrist complex; structure of the hand complex; functional position of the wrist and hand.

Unit: 3 (15 Hrs.)

- The hip complex: structure and function of the hip joint; hip joint pathology- arthrosis, fracture, bony abnormalities of the femur:
- The knee complex: structure and function of the knee joint – tibiofemoral joint and patellofemoral joint; effects of injury and disease.
- The ankle and foot complex.: structure and function of the ankle joint, subtalar joint, talocalcaneonavicular joint, transverse tarsal joint, tarsometatarsal joints,

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metatarsophalangeal joints, interphalangeal joints, structure and function of the plantar arches, muscles of the ankle and foot, deviations from normal structure and function – Pes Planus and Pes Cavus

Unit: 4 (20 Hrs.)

- **Analysis of Posture and Gait** – Static and dynamic posture, postural control, kinetics and kinematics of posture, ideal posture analysis of posture, effects of posture on age, pregnancy, occupation and recreation; general features of gait, gait initiation, kinematics and kinetics of gait, energy requirements, kinematics and kinetics of the trunk and upper extremities in relation to gait, stair case climbing and running, effects of age, gender, assistive devices, disease, muscle weakness, paralysis, asymmetries of the lower extremities, injuries and malalignments in gait
- **Movement Analysis** : ADL activities like sitting – to standing, lifting, various grips , pinches

Recommended books:-

- Cynthia Levangie - Joint Structure and Function - 5th Ed
- Daniel & Worthingham's-Manual of muscle testing
- Lynn Lippert - Clinical
- Brunstroms - Clinical Kinesiology
- "Kinesiology of the Musculoskeletal System" by Donald A. Neumann
- "Basic Biomechanics" by Susan J. Hall

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

FOUNDATION OF EXERCISE THERAPY AND THERAPEUTIC MESSAGE

Subject Code: BPHTS1-305

L T P C

Duration: 45 (Hrs.)

3 0 0 3

COURSE OBJECTIVE:

- The students will learn the principles and effects of exercise as a therapeutic modality and will learn the techniques in the restoration of physical functions.
- **The** students will be able to understand the concepts, different types and application of massage on patients during clinical practice.

COURSE OUTCOME

- Increased functional capacity and independence
- Decreased pain levels
- Improved joint mobility and muscle flexibility
- Enhanced muscle strength and endurance
- Better posture and body awareness
- Reduced inflammation and swelling
- Improved circulation and tissue healing
- Enhanced relaxation and stress reduction
- Improved sleep quality
- Better overall physical and mental well-being

Unit: 1 (15 Hrs.)

- **Introduction to Exercise Therapy** - The aims of Exercise Therapy, The techniques of Exercise Therapy, Approach to patient's problems, Assessment of patient's condition – Measurements of Vital parameters, Starting Positions – Fundamental positions & derived Positions, Planning of Treatment
- **Methods of Testing**
 - a. Functional tests
 - b. Measurement of Joint range: ROM-Definition, Normal ROM for all peripheral joints & spine, Goniometer-parts, types, principles, uses, Limitations of goniometry, Techniques for measurement of ROM for all peripheral joints
 - c. Tests for neuromuscular efficiency
 - i. Electrical tests
 - ii. Manual Muscle Testing: Introduction to MMT, Principles & Aims, Indications & Limitations, Techniques of MMT for group & individual: Techniques of MMT for upper limb / Techniques of MMT for lower limb / Techniques of MMT for spine.
 - iii. Anthropometric Measurements: Muscle girth – biceps, triceps, forearm, quadriceps, calf
 - iv. Static power Test
 - v. Dynamic power Test
 - vi. Endurance test
 - vii. Speed test
 - d. Tests for Co-ordination
 - e. Tests for sensation

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- f. Pulmonary Function tests
- g. Measurement of Limb Length: true limb length, apparent limb length, segmental limb length
- h. Measurement of the angle of Pelvic Inclination

Unit: 2 (20 Hrs.)

- **Relaxation**
 - a. Definitions: Muscle Tone, Postural tone, Voluntary Movement, Degrees of relaxation, Pathological tension in muscle, Stress mechanics, types of stresses, Effects of stress on the body mechanism, Indications of relaxation, Methods & techniques of relaxation Principles & uses: General, Local, Jacobson's, Mitchel's, additional methods.
- **Passive Movements**
 - a. Causes of immobility, Classification of Passive movements, Specific definitions related to passive movements, Principles of giving passive movements, Indications, contraindications, effects of uses, Techniques of giving passive movements.
- **Active Movements**
 - a. Definition of strength, power & work, endurance, muscle actions.
 - b. Physiology of muscle performance: structure of skeletal muscle, chemical & mechanical events during contraction & relaxation, muscle fiber type, motor unit, force gradation.
 - c. Causes of decreased muscle performance
 - d. Physiologic adaptation to training: Strength & Power, Endurance.
 - e. Types of active movements

Unit: 3 (5 Hrs.)

- **Free exercise:** Classification, principles, techniques, indications, contraindications, effects and uses
- **Active Assisted Exercise:** principles, techniques, indications, contraindications, effects and uses Assisted-Resisted Exercise: principles, techniques, indications, contraindications, effects and uses Resisted Exercise: Definition, principles, indications, contraindications, precautions & techniques, effects and uses
- **Types of resisted exercises:** Manual and Mechanical resistance exercise, Isometric exercise, Dynamic exercise: Concentric and Eccentric, Dynamic exercise: Constant versus variable resistance, Isokinetic exercise, Open-Chain and Closed-Chain exercise.

Unit: 4 (5 Hrs.)

- **THERAPEUTIC MASSAGE**
 - a. History and Classification of Massage Technique
 - b. Principles, Indications and Contraindications
 - c. Technique of Massage Manipulations
 - d. Physiological and Therapeutic Uses of Specific Manipulations

Recommended books:-

- "Therapeutic Exercise: Foundations and Techniques" by Carolyn Kisner and Lynn Allen Colby
- "Massage Therapy: Principles and Practice" by Susan G. Salvo
- "Orthopedic Physical Assessment" by David J. Magee
- "Therapeutic Modalities in Rehabilitation" by William E. Prentice
- "Trail Guide to the Body" by Andrew Biel
- "Clinical Massage Therapy: Understanding, Assessing and Treating over 70 Conditions" by Fiona Rattray and Linda Ludwig
- "Exercise Therapy: Prevention and Treatment of Disease" by John Gormley and Juliette Hussey
- "Foundations of Therapeutic Recreation" by Terry Robertson and Terry Long
- The Principles Of Exercise Therapy By M Dena Gardiner (S)

PATHOLOGY - PRACTICAL

Subject Code: BPHTS1-306

**L T P C
0 0 2 1**

1. Collection of blood and anticoagulants used.
2. Discussion about parts of microscope and different types of microscopes used in pathology.
3. Staining of slide by Leishman method.
4. Study of peripheral blood smear.
5. Estimation of hemoglobin by Sahli's method and discussion of other methods used.
6. ESR
7. Identification of various instruments in pathology lab & their uses (eg. Neubauer chamber, RBC, WBC, pipette etc.).
8. Bleeding Time, Clotting Time.

MICROBIOLOGY - PRACTICAL

Subject Code: BPHTS1-307

**L T P C
0 0 4 2**

1. Demonstration of Microscopes and its uses
2. Principles, uses and demonstration of common sterilization equipment
3. Demonstration of common culture media
4. Demonstration of motility by hanging drops method
5. Demonstration of Gram Stain, ZN Stain
6. Demonstration of Serological test: ELISA
7. Demonstration of Fungus

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BIOMECHANICS AND KINESIOLOGY - PRACTICAL

Subject Code: BPHTS1-308

**L T P C
0 0 6 3**

1. Goniometry – measurement of joint ROM
2. Identify Muscle work of various movements in body at different angle.
3. Identify normal and abnormal posture.
4. Normal gait with it parameters and identify abnormal gait with the problems in it.

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**FOUNDATION OF EXERCISE THERAPY AND THERAPEUTIC MASSAGE –
PRACTICAL**

Subject Code: BPHTS1-309

**L T P C
0 0 4 2**

1. Different test methods
2. Demonstrate relaxation techniques.
3. Demonstrate to apply the technique of passive movements
4. Demonstrate various techniques of Active movements
5. Demonstrate massage technique application according to body parts.

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SYLLABUS 2023 BATCH ONWARDS**

INTRODUCTION TO QUALITY AND PATIENT SAFETY

Subject Code: BPHTS1-310

L T P C

Duration: 15 (Hrs.)

1 0 0 1

COURSE OBJECTIVE:

- The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system.
- The student is also expected to learn about basic emergency care including first aid and triage.
- The objective will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes.
- The aim will be to help prevent harm to workers, property, the environment and the general public.
- The objective will be to provide knowledge on the principles of on-site disaster management

COURSE OUTCOME

- Ability to assess and improve healthcare quality and patient safety
- Skill in implementing quality improvement initiatives
- Understanding of how to reduce medical errors and adverse events
- Knowledge of best practices in patient safety
- Ability to use data for quality improvement decision-making
- Competence in applying regulatory and accreditation standards
- Skills in fostering teamwork and communication for patient safety
- Understanding of systems thinking in healthcare quality

Unit: 1 (3 HOURS)

- **Quality assurance and management -**
 - a. Concepts of Quality of Care
 - b. Quality Improvement Approaches
 - c. Standards and Norms
 - d. Quality Improvement Tools
 - e. Introduction to NABH guidelines

Unit: 2 (3 HOURS)

- **Basics of emergency care and life support skills -** Basic life support (BLS) is the foundation for saving lives following cardiac arrest. Fundamental aspects of BLS include immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system, early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED). Initial recognition and response to heart attack and stroke are also considered part of BLS. Topics to be covered under the subject are as follows:
 - a. Vital signs and primary assessment
 - b. Basic emergency care – first aid and triage

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- c. Ventilations including use of bag-valve-masks (BVMs)
- d. Choking, rescue breathing methods
- e. One- and Two-rescuer CPR
- f. Using an AED (Automated external defibrillator).
- g. Managing an emergency including moving a patient

Unit: 3 (4 HOURS)

- **Bio medical waste management and environment safety-** The aim of this section will be to help prevent harm to workers, property, the environment and the general public. Topics to be covered under the subject are as follows:
 - a. Definition of Biomedical Waste
 - b. Waste minimization
 - c. BMW – Segregation, collection, transportation, treatment and disposal (including color coding)
 - d. Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste
 - e. BMW Management & methods of disinfection
 - f. Modern technology for handling BMW
 - g. Use of Personal protective equipment (PPE)
 - h. Monitoring & controlling of cross infection (Protective devices)
- **Infection prevention and control** - The objective of this section will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes. Concepts taught should include –
 - a. Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],
 - b. Prevention & control of common healthcare associated infections,
 - c. Components of an effective infection control program, and
 - d. Guidelines (NABH and JCI) for Hospital Infection Control

Unit: 4 (5 HOURS)

- **Antibiotic Resistance-**
 - a. History of Antibiotics
 - b. How Resistance Happens and Spreads
 - c. Types of resistance- Intrinsic, Acquired, Passive
 - d. Trends in Drug Resistance
 - e. Actions to Fight Resistance
 - f. Bacterial persistence
 - g. Antibiotic sensitivity
 - h. Consequences of antibiotic resistance
 - i. Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals

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- **Disaster preparedness and management.** Concepts to be taught should include-
 - a. Fundamentals of emergency management,
 - b. Psychological impact management,
 - c. Resource management,
 - d. Preparedness and risk reduction,
 - e. Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms.

Recommended books:-

- Understanding Patient Safety" by Robert M. Wachter and Kiran Gupta
- "The Healthcare Quality Book: Vision, Strategy, and Tools" by Maulik S. Joshi, Elizabeth R. Ransom, David B. Nash, and Scott B. Ransom
- "Patient Safety: A Case-Based Comprehensive Guide" by Abha Agrawal
- "Fundamentals of Health Care Improvement: A Guide to Improving Your Patients' Care" by Gregory S. Ogrinc and Linda A. Headrick
- "To Err is Human: Building a Safer Health System" by Institute of Medicine (US) Committee on Quality of Health Care in America
- "Crossing the Quality Chasm: A New Health System for the 21st Century" by Institute of Medicine (US) Committee on Quality of Health Care in America
- "Quality and Safety in Nursing: A Competency Approach to Improving Outcomes" by Gwen

INTRODUCTION TO QUALITY AND PATIENT SAFETY - PRACTICAL

Subject Code: BPHTS1-311

**L T P C
0 0 2 1**

- Basic life support (BLS)
- Sudden cardiac arrest (SCA)
- Cardiopulmonary resuscitation (CPR),
- Rapid defibrillation with an automated external defibrillator (AED)
- Biomedical waste
- Infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)]

FOURTH SEMESTER

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

EXERCISE THERAPY

Subject Code: BPHTS1-401

L T P C

Duration: 75 (Hrs.)

4 1 0 5

Course Objectives:

- This course will include therapeutic exercise involving movement prescribed to correct impairments, restore muscular and skeletal function and/or maintain a state of well-being or prevent injuries and improve functional outcomes.

Course Outcomes:

- The goals of therapeutic exercises include the restoration of movement, improvement of function and strength, improvement in gait and balance, and the prevention and promotion of health, wellness, and fitness. Specific exercises are aimed at restoring strength, power and work, or endurance, or a combination.

Unit: 1 (20 Hours)

- Specific exercise regimens
 - a. Isotonic: de Lormes, Oxford, MacQueen, Circuit weight training
 - b. Isometric: BRIME (Brief Resisted Isometric Exercise), Multiple Angle
 - c. Isometrics Isokinetic regimens
- Proprioceptive Neuromuscular Facilitation
 - a. Definitions & goals
 - b. Basic neurophysiologic principles of PNF: Muscular activity, Diagonals patterns of movement: upper limb, lower limb
 - c. Procedure: components of PNF
 - d. Techniques of facilitation
 - e. Mobility: Contract relax, Hold relax, Rhythmic initiation
 - f. Strengthening: Slow reversals, repeated contractions, timing for emphasis, rhythmic stabilization Stability: Alternating isometric, rhythmic stabilization

Skill: timing for emphasis, resisted progression Endurance: slow reversals, agonist reversal

- Suspension Therapy
 - a. Definition, principles, equipments & accessories, Indications & contraindications, Benefits of suspension therapy
 - b. Types of suspension therapy: axial, vertical, pendular Techniques of suspension therapy for upper limb Techniques of suspension therapy for lower limb
- Functional Re-education
 - a. Lying to sitting: Activities on the Mat/Bed, Movement and stability at floor level; Sitting activities and gait; Lower limb and Upper limb activities.

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SYLLABUS 2023 BATCH ONWARDS**

Unit: 2 (20 Hours)

- Aerobic Exercise
 - Definition and key terms; Physiological response to aerobic exercise, Examination and evaluation of aerobic capacity – Exercise Testing, Determinants of an Exercise Program, The Exercise Program, Normal and abnormal response to acute aerobic exercise, Physiological changes that occur with training, Application of Principles of an Aerobic conditioning program for patients – types and phases of aerobic training.
- Stretching
 - Definition of terms related to stretching; Tissue response towards immobilization and elongation, Determinants of stretching exercise, Effects of stretching, Inhibition and relaxation procedures, Precautions and contraindications of stretching, Techniques of stretching.
- Manual Therapy & Peripheral Joint Mobilization
 - a. Schools of Manual Therapy, Principles, Grades, Indications and Contraindications, Effects and Uses – Maitland, Kaltenborn, Mulligan
 - b. Biomechanical basis for mobilization, Effects of joint mobilisation, Indications and contraindications, Grades of mobilization, Principles of mobilization, Techniques of mobilization for upper limb, lower limb, Precautions.

Unit: 3 (20 Hours)

- Balance - Definition
 - a. Physiology of balance: contributions of sensory systems, processing sensory information, generating motor output
 - b. Components of balance (sensory, musculoskeletal, biomechanical)
 - c. Causes of impaired balance, Examination & evaluation of impaired balance, Activities for treating impaired balance: mode, posture, movement, Precautions & contraindications, Types Balance retraining.
- Co-ordination Exercise
 - a. Anatomy & Physiology of cerebellum with its pathways Definitions: Co-ordination, Inco-ordination
 - b. Causes for Inco-ordination, Test for co-ordination: equilibrium test, non-equilibrium test Principles of co-ordination exercise.
 - c. Frenkel's Exercise: uses of Frenkel's exercise, technique of Frenkel's exercise, progression, home exercise.
- Posture
 - a. Definition, Active and Inactive Postures, Postural Mechanism, Patterns of Posture, Principles of re-education: corrective methods and techniques, Patient education.
- Walking Aids
 - a. Types: Crutches, Canes, Frames; Principles and training with walking aids

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Unit: 4 (15 Hours)

- Basics in Manual Therapy & Applications with Clinical reasoning
 - a. Examination of joint integrity
 - i. Contractile tissues
 - ii. Non contractile tissues
 - b. Mobility - assessment of accessory movement & End feel
 - c. Assessment of articular & extra-articular soft tissue status
 - i. Myofascial assessment
 - ii. Acute & Chronic muscle hold
 - iii. Tightness
 - iv. Pain-original & referred
 - d. Basic principles, Indications & Contra-Indications of mobilization skills for joints & soft tissues.
 - i. Maitland
 - ii. Mulligan
 - iii. Mckenzie
 - iv. Muscle Energy Technique
 - v. Myofascial stretching
 - vi. Cyriax
 - vii. Neuro Dynamic Testing
- Hydrotherapy
 - a. Definitions, Goals and Indications, Precautions and Contraindications, Properties of water, Use of special equipment, techniques, Effects and uses, merits and demerits
- Individual and Group Exercises
 - a. Advantages and Disadvantages, Organization of Group exercises, Recreational Activities and Sports

Recommended textbooks/reference books:

- McArdle WD, Katch FI, Katch VL. Essentials of exercise physiology. Lippincott Williams & Wilkins; 2006.
- Hale T. Exercise physiology: a thematic approach. John Wiley & Sons; 2004.
- Clarke D. Exercise physiology. Prentice-Hall.
- Wolinsky I, editor. Nutrition in exercise and sport. CRC press.
- Brooks GA, Fahey TD, White TP. Exercise physiology: human bioenergetics and its applications. Mayfield publishing company.

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

BIO PHYSICS

Subject Code: BPHTS1-402

L T P C

Duration: 15 (Hrs.)

1 0 0 1

Course Objective:

- Understand fundamental physical principles governing biological systems
- Apply quantitative methods to analyze biological phenomena
- Explore the structure and function of biomolecules from a physical perspective
- Learn about various biophysical techniques and their applications
- Develop critical thinking skills in interpreting biophysical data
- Understand the role of thermodynamics and kinetics in biological processes

Course Outcome:

- After completing this course, students should be able to:
- Apply physical laws and principles to biological systems
- Analyze biological processes using mathematical and physical models
- Interpret data from common biophysical techniques
- Understand the physical basis of biomolecular structure and function
- Critically evaluate biophysical research literature
- Apply biophysical concepts to solve biological problems

Unit 1 (5 Hours)

- Physical principles
 - a. Structure and properties of matter -solids, liquids and gases, adhesion, surface tension, viscosity, density and elasticity.
 - b. Structure of atom, molecules, elements and compound
 - c. Electricity: Definition and types. Therapeutic uses. Basic physics of construction. Working
 - d. Importance of currents in treatment.
 - e. Static Electricity: Production of electric charge. Characteristic of a charged body.
 - f. Characteristics of lines of forces. Potential energy and factors on which it depends. Potential difference and EMF.
 - g. Current Electricity: Units of Electricity: farad, Volt, Ampere, Coulomb, Watt
 - h. Condensers: Definition, principle, Types- construction and working, capacity & uses.
 - i. Magnetism: Definition. Properties of magnets. Electromagnetic induction. Transmission by contact. Magnetic field and magnetic forces. Magnetic effects of an electric field.
 - j. Conductors, Insulators, Potential difference, Resistance and intensity
 - k. Ohm's law and its application to DC and AC currents. Fuse: construction, working and application.
 - l. Transmission of electrical energy through solids, liquids, gases and vacuum.
 - m. Rectifying Devices-Thermionic valves, Semiconductors, Transistors, Amplifiers, transducer and Oscillator circuits.
 - n. Display devices and indicators-analogue and digital.
 - o. Transformer: Definition, Types, Principle, Construction, Eddy current, working uses
 - p. Chokes: Principle, Construction and working, Uses

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SYLLABUS 2023 BATCH ONWARDS**

Unit 2 (5 Hours)

- Effects of Current Electricity
 - a. Chemical effects-Ions and electrolytes, Ionisation, Production of an EMF by chemical actions.
 - b. Ionization: Principles, effects of various technique of medical ionization.
 - c. Electromagnetic Induction.
 - d. Electromagnetic spectrum.

Unit 3 (2 Hours)

- Electrical Supply
 - a. Brief outline of main supply of electric current
 - b. Dangers-short circuit, electric shocks: Micro/ Macro shocks
 - c. Precaution-safety devices, earthing, fuses etc.
 - d. First aid and initial management of electric shock
 - e. Burns: electrical & chemical burns, prevention and management

Unit 4 (3 Hours)

- Various agents
 - a. Thermal agents: Physical Principles of cold, Superficial and deep heat.
 - b. Ultrasound: Physical Principles of Sound
 - c. Electro- magnetic Radiation: Physical Principles and their Relevance to Physiotherapy Practice
 - d. Electric Currents: Physical Principles and their Relevance to Physiotherapy Practice.
- Section II – Therapeutic Electricity

Recommended textbooks/reference books:

- "Biophysics: Searching for Principles" by William Bialek
- "Physical Biology of the Cell" by Rob Phillips, Jane Kondev, and Julie Theriot
- "Molecular Driving Forces: Statistical Thermodynamics in Biology, Chemistry, Physics, and Nanoscience" by Ken A. Dill and Sarina Bromberg
- "Biophysical Chemistry" by Charles R. Cantor and Paul R. Schimmel
- "Biophysics: An Introduction" by Roland Glaser
- "Principles of Physical Biochemistry" by Kensal E. van Holde, W. Curtis Johnson, and P. Shing Ho
- "Introduction to Biological Physics for the Health and Life Sciences" by Kirsten Franklin, Paul Muir, Terry Scott, and Lara Wilcocks
- "Biophysics: Tools and Techniques" by Betty Karasek

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

ELECTROTHERAPY (LMHF & EQUIPMENT CARE)

Subject Code: BPHTS1-403

L T P C

Duration: 75 (Hrs.)

4 1 0 5

COURSE OBJECTIVE –

- The student will learn the Principles, Techniques, Effects, Indication, Contra-Indication and the dosage parameter for various indications of electro therapeutic modalities in the restoration of physical function.
- The student will be able to list the indications, contra indications, dosages of electro therapy modalities, demonstrates the different techniques, and describe their effects on various conditions.

COURSE OUTCOME:

- Understand the principles of low and medium high frequency electrotherapy
- Explain the physiological effects of various electrotherapy modalities
- Identify appropriate electrotherapy treatments for different conditions
- Describe the proper setup and application of electrotherapy equipment
- Understand safety considerations and contraindications for electrotherapy
- Demonstrate knowledge of equipment care, maintenance, and troubleshooting
- Explain the rationale for selecting specific electrotherapy parameters
- Understand the integration of electrotherapy in comprehensive treatment plans
- Critically evaluate research on electrotherapy effectiveness
- Demonstrate awareness of current trends and advances in electrotherapy

UNIT 1 (20 HOURS)

- Low frequency Currents
 1. Basic types of current
 - a. Direct Current: types, physiological & therapeutic effects.
 - b. Alternating Current
 2. Types of Current used in Therapeutics
 - a. Modified D.C
 - i. Faradic Current
 - ii. Galvanic Current
 - b. Modified A.C
 - i. Sinusoidal Current
 - ii. Diadynamic Current.
 3. Faradic Current: Definition, Modifications, Techniques of Application of Individual, Muscle and Group Muscle stimulation, Physiological & Therapeutic effects of Faradic Current, Precautions, Indications & Contra-Indications, Dangers.
 4. Galvanic Current: Definition, Modifications, Physiological & Therapeutic effects of Galvanic Current, Indications & Contra-Indications, Dangers, Effect of interrupted galvanic current on normally innervated and denervated muscles and partially denervated muscles.

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SYLLABUS 2023 BATCH ONWARDS**

5. Sinusoidal Current & Diadynamic Current in Brief.
6. HVPGS – Parameters & its uses
7. Ionization / Iontophoresis: Techniques of Application of Iontophoresis, Indications, Selection of Current, Commonly used Ions (Drugs) for pain, hyperhydrosis, wound healing.
8. Cathodal / Anodal galvanism.
9. Micro Current & Macro Current
10. Types of Electrical Stimulators
 - a. NMES- Construction component.
 - b. Neuro muscular diagnostic stimulator- construction component.
 - c. Components and working Principles
11. Principles of Application: Electrode tissue interface, Tissue Impedance, Types of Electrode, Size & Placement of Electrode – Waterbath, Unipolar, Bi-polar, Electrode coupling, Current flow in tissues, Lowering of Skin Resistance.
12. Nerve Muscle Physiology: Action Potential, Resting membrane potential, Propagation of Action Potential, Motor unit, synapse, Accommodation, Stimulation of Healthy Muscle, Stimulation of Denervated Muscle, and Stimulation for Tissue Repair.
13. TENS: Define TENS, Types of TENS, Conventional TENS, Acupuncture TENS, Burst TENS, Brief & Intense TENS, Modulated TENS. Types of Electrodes & Placement of Electrodes, Dosage parameters, Physiological & Therapeutic effects, Indications & Contraindications.
14. Pain: Define Pain, Theories of Pain (Outline only), Pain Gate Control theory in detail. [2 Hours]

UNIT 2 (20 HOURS)

Electro-diagnosis

1. FG Test
2. SD Curve: Methods of Plotting SD Curve, Apparatus selection, Characters of Normally innervated Muscle, Characters of Partially Denervated Muscle, Characters of Completely denervated Muscle, Chronaxie & Rheobase.
3. Nerve conduction velocity studies
4. EMG: Construction of EMG equipment.
4. Bio-feedback.

UNIT 3 (20 HOURS)

• **Medium Frequency**

1. Interferential Therapy: Define IFT, Principle of Production of IFT, Static Interference System, Dynamic Interference system, Dosage Parameters for IFT, Electrode placement in IFT, Physiological & Therapeutic effects, Indications & Contraindications.
2. Russian Current

3. Rebox type Current

• **Thermo & Actinotherapy (High Frequency Currents)**

1. Electro Magnetic Spectrum.
2. SWD: Define short wave, Frequency & Wavelength of SWD, Principle of Production of SWD, Circuit diagram & Production of SWD, Methods of Heat Production by SWD treatment, Types of SWD Electrode, Placement & Spacing of Electrodes, Tuning, Testing of SWD Apparatus, Physiological & Therapeutic effects, Indications & Contraindications, Dangers, Dosage parameters.
3. Pulsed Electro Magnetic Energy: Principles, Production & Parameters of PEME, Uses of PEME.
4. Micro Wave Diathermy: Define Microwave, Wave length & Frequency, Production of MW, Applicators, Dosage Parameters, Physiological & Therapeutic effects, Indications & Contraindications, Dangers of MWD.
5. Ultrasound: Define Ultrasound, Frequency, Piezo Electric effects: Direct, Reverse, Production of US, Treatment Dosage parameters: Continuous & Pulsed mode, Intensity, US Fields: Near field, Far field, Half value distance, Attenuation, Coupling Media, Thermal effects, Non-thermal effects, Principles & Application of US: Direct contact, Water bag, Water bath, Solid sterile gel pack method for wound. Uses of US, Indications & Contraindications, Dangers of Ultrasound. Phonophoresis: Define Phonophoresis, Methods of application, commonly used drugs, Uses. Dosages of US.
6. IRR: Define IRR, wavelength & parameters, Types of IR generators, Production of IR, Physiological & Therapeutic effects, Duration & frequency of treatment, Indication & Contraindication.
7. UVR: Define UVR, Types of UVR, UVR generators: High pressure mercury vapour lamp, Water cooled mercury vapour lamp, Kromayer lamp, Fluorescent tube, Theraktin tunnel, PUVA apparatus. Physiological & Therapeutic effects. Sensitizers & Filters. Test dosage calculation. Calculation of E1, E2, E3, E4 doses. Indications, contraindications. Dangers. Dosages for different therapeutic effects, Distance in UVR lamp
8. LASER: Define LASER. Types of LASER. Principles of Production. Production of LASER by various methods. Methods of application of LASER. Dosage of LASER. Physiological & Therapeutic effects of LASER. Safety precautions of LASER. Classifications of LASER. Energy density & power density

UNIT 4 (15 HOURS)

• **Superficial heating Modalities**

1. Wax Therapy: Principle of Wax Therapy application – latent Heat, Composition of Wax Bath Therapy unit, Methods of application of Wax, Physiological & Therapeutic effects, Indications & Contraindication, Dangers.
2. Contrast Bath: Methods of application, Therapeutic uses, Indications & Contraindications.

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3. Moist Heat Therapy: Hydro collator packs – in brief, Methods of applications, Therapeutic uses, Indications & Contraindications.
4. Cyclotherm: Principles of production, Therapeutic uses, Indications & Contraindications.
5. Fluidotherapy: Construction, Method of application, Therapeutic uses, Indications & Contraindications.
6. Whirl Pool Bath: Construction, Method of Application, Therapeutic Uses, Indications & Contraindications.
7. Magnetic Stimulation, Principles, Therapeutic uses, Indications & contraindication.
8. Cryotherapy: Define- Cryotherapy, Principle- Latent heat of fusion, Physiological & Therapeutics effects, Techniques of Applications, Indications & Contraindications, Dangers, Methods of application with dosages.

REFERANCE BOOK

- "Electrotherapy: Evidence-Based Practice" by Tim Watson
- "Electrotherapy Explained: Principles and Practice" by Val Robertson, Alex Ward, John Low, and Ann Reed
- "Clayton's Electrotherapy: Theory and Practice" by Sheila Kitchen
- "Therapeutic Modalities in Rehabilitation" by William E. Prentice
- "Physical Agents in Rehabilitation: From Research to Practice" by Michelle H. Cameron
- "Electrophysical Agents: Evidence-Based Practice" by Alain-Yvan Belanger
- "Electrical Stimulation in Clinical Practice" by Charles Jerzak and Mark Harlache
- "Principles and Practice of Electrotherapy" by Joseph Kahn
- "Electrotherapy: Clinical Procedures Manual" by Roger M. Nelson, Dean P. Currier, and Karen W. Hayes
- "Electrotherapy and Electrodiagnosis" by Stanley Licht

EXERCISE THERAPY - PRACTICAL

Subject Code: BPHTS1-404

**L T P C
0 0 8 4**

The students of exercise therapy are to be trained in Practical Laboratory work for all the topics discussed in theory. The student must be able to evaluate and apply judiciously the different methods of exercise therapy techniques on the patients. They must be able to:

1. Demonstrate the technique of measuring using goniometry
2. Demonstrate muscle strength using the principles and technique of MMT
3. Demonstrate the techniques for muscle strengthening based on MMT grading
4. Demonstrate the PNF techniques
5. Demonstrate exercises for training co-ordination – Frenkel’s exercise
6. Demonstrate the techniques of massage manipulations
7. Demonstrate techniques for functional re-education
8. Assess and train for using walking aids
9. Demonstrate mobilization of individual joint regions
10. Demonstrate to use the technique of suspension therapy for mobilizing and strengthening joints and muscles
11. Demonstrate the techniques for muscle stretching
12. Assess and evaluate posture and gait
13. Demonstrate techniques of strengthening muscles using resisted exercises
14. Demonstrate techniques for measuring limb length and body circumference.

BIO PHYSICS - PRACTICAL

Subject Code: BPHTS1-405

L T P C

0 0 2 1

- List, describe, draw various electrical components like diodes & triodes, rheostat, capacitor, potentiometer, switches, plugs and pulse generator
- Apply technique of testing of mains supply
- Draw free body diagrams, force vectors during walking and further applications

MRSPTU

ELECTROTHERAPY (LHMF & EQUIPMENT CARE) - PRACTICAL

Subject Code: BPHTS1-406

L T P C

0 0 8 4

- The student of Electrotherapy must be able to demonstrate the use of electrotherapy modalities applying the principles of electrotherapy with proper techniques, choice of dosage parameters and safety precautions.
 1. Demonstrate the technique for patient evaluation – receiving the patient and positioning the patient for treatment using electrotherapy.
 2. Collection of materials required for treatment using electrotherapy modalities and testing of the apparatus.
 3. Demonstrate placement of electrodes for various electrotherapy modalities
 4. Electrical stimulation for the muscles supplied by the peripheral nerves
 5. Faradism under Pressure for UL and LL
 6. Plotting of SD curve with chronaxie and rheobase
 7. Demonstrate FG test
 8. Application of Ultrasound for different regions-various methods of application
 9. Demonstrate treatment techniques using SWD, IRR and Microwave diathermy
 10. Demonstrate the technique of UVR exposure for various conditions – calculation of test dose
 11. Demonstrate treatment method using IFT for various regions
 12. Calculation of dosage and technique of application of LASER
 13. Technique of treatment and application of Hydrocollator packs, cryotherapy, contrast bath, wax therapy
 14. Demonstrate the treatment method using whirl pool bath
 15. Winding up procedure after any electrotherapy treatment method.

- **Equipment care -**
 1. Checking of equipments
 2. Arrangement of exercise therapy and electro therapy equipment.
 3. Calibration of equipment
 4. Purchase, billing, document of equipment.
 5. Safety handling of equipments.
 6. Research lab equipment maintenance.
 7. Stock register, movement register maintenance

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

MEDICAL/PHYSIOTHERAPY LAW AND ETHICS

Subject Code: BPHTS1-407

**L T P C
2 0 0 2**

Duration: 30 (Hrs.)

COURSE OBJECTIVE:

- The students understand the concept and basic principles to know electrotherapy equipment's is given under this topic.
- The student will be learn about physics related to electrotherapy and application on human body tissues

COURSE OUTCOME:

- Understand the moral values and meaning of ethics.
- Develop psychomotor skills for physiotherapist-patient relationship
- Develop bed side behavior, respect & maintain patients' confidentiality

Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.

Medical/ Physiotherapy ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice". Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum. Few of the important and relevant topics that need to focus on are as follows:

UNIT 1 (5 HOURS)

- Medical ethics versus medical law - Definition - Goal - Scope
- Introduction to Code of conduct
- Basic principles of medical ethics – Confidentiality
- Malpractice and negligence - Rational and irrational drug therapy

UNIT 2 (10 HOURS)

- Autonomy and informed consent - Right of patients
- Care of the terminally ill- Euthanasia
- Organ transplantation
- Medical diagnosis versus physiotherapy diagnosis.

UNIT 3 (10 HOURS)

- Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege

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communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.

- Professional Indemnity insurance policy
- Development of standardized protocol to avoid near miss or sentinel events

UNIT 4 (5 HOURS)

- Obtaining an informed consent.
- Biomedical ethical principles
- Code of ethics for physiotherapists
- Ethics documents for physiotherapists
- Laws affecting physiotherapy practice

REFERANCE BOOK

Physical agents in physiotherapy principles & Practice vol-1 Biophysics and therapeutic electricity by subin solomen, pravin aaron

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF PHARMACY

SYLLABUS

FOR

**B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND OPERATION THEATRE
TECHNOLOGY)**

(4 YEARS PROGRAMME)

2023 BATCH ONWARDS

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**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

SCHEME

1 st Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
BAOTS1-101	Anatomy and Physiology-I	3	1	0	40	60	100	4
BAOTS1-102	Microbiology -I	3	1	0	40	60	100	4
BAOTS1-103	Pathology-1	3	1	0	40	60	100	4
BAOTS1-104	Computer Science	2	0	0	20	30	50	2
BAOTS1-105	Anatomy and Physiology -Lab	0	0	4	60	40	100	2
BAOTS1-106	Microbiology -I Lab	0	0	4	60	40	100	2
BAOTS1-107	Pathology I -Lab	0	0	4	60	40	100	2
Total		11	03	12	320	330	650	20

2 nd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
BAOTS1-201	Anatomy and Physiology-II	3	1	0	40	60	100	4
BAOTS1-202	Microbiology -II	3	1	0	40	60	100	4
BAOTS1-203	Pathology -II	3	1	0	40	60	100	4
BAOTS1-204	Basics and Advanced Life support	2	0	0	20	30	50	2
BAOTS1-205	Anatomy and Physiology -II Lab	0	0	4	60	40	100	2
BAOTS1-206	Pathology II - Lab	0	0	4	60	40	100	2
BAOTS1-207	Microbiology -II Lab	0	0	4	60	40	100	2
Total		11	03	12	320	330	650	20

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

3 rd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
BAOTS1-301	Anatomy & Physiology related to Anesthesia Technology	3	1	0	40	60	100	4
BAOTS1-302	Applied Pharmacology and Microbiology	3	1	0	40	60	100	4
BAOTS1-303	Medical Ethics and Bio safety	3	1	0	40	60	100	4
BAOTS1-304	Psychology	3	1	0	40	60	100	4
BAOTS1-305	Anatomy & Physiology related to Anesthesia Technology Practical	0	0	4	60	40	100	2
BAOTS1-306	Applied Pharmacology and Microbiology Practical	0	0	4	60	40	100	2
Total		12	4	8	280	320	600	20

4 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
BAOTS1-401	Principles Of Anesthesia - I	3	1	0	40	60	100	4
BAOTS1-402	Principles Of Anesthesia - II	3	1	0	40	60	100	4
BAOTS1-403	Biochemistry-1	3	1	0	40	60	100	4
BAOTS1-404	Medical Sociology	2	0	0	20	30	50	2
BAOTS1-405	Principles Of Anesthesia - I Practical	0	0	4	60	40	100	2
BAOTS1-406	Principles Of Anesthesia -II Practical	0	0	4	60	40	100	2
BAOTS1-407	Biochemistry-1 Lab	0	0	4	60	40	100	2
Total		11	03	12	320	330	650	20

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

5 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
BAOTS1-501	Pharmacology	3	1	0	40	60	100	4
BAOTS1-502	Anesthesia Techniques Including Complications	3	1	0	40	60	100	4
BAOTS1-503	Biochemistry-II	3	1	0	40	60	100	4
BAOTS1-504	Environmental science and community medicine	2	0	0	20	30	50	2
BAOTS1-505	Pharmacology Lab	0	0	4	60	40	100	2
BAOTS1-506	Anesthesia Techniques Including Complications-Lab	0	0	4	60	40	100	2
BAOTS1-507	Biochemistry-II Lab	0	0	4	60	40	100	2
Total		11	03	12	320	330	650	20

6 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
BAOTS1-601	Anesthesia for specialties (including criticalcare assistance and ventilation) paper – I	3	1	0	40	60	100	4
BAOTS1-602	Anesthesia for specialties (including criticalcare assistance and ventilation) paper – II	3	1	0	40	60	100	4
BAOTS1-603	Principles Of Sterilization Techniques	3	1	0	40	60	100	4
BAOTS1-604	Healthcare and basic Principles	2	0	0	20	30	50	2
BAOTS1-605	Anesthesia for specialties (including critical care assistance and ventilation) paper – I Practical	0	0	4	60	40	100	2
BAOTS1-606	Anesthesia for specialties (including criticalcare assistance and ventilation) paper – II-Practical	0	0	4	60	40	100	2
BAOTS1-607	Principles Of Sterilization Techniques-Practical	0	0	4	60	40	100	2
Total		11	3	12	320	330	650	20

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7 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
BAOTS1-701	Project/ Dissertation	0	0	40	50	150	200	20
BAOTS1-702	Biostatistics and Research Methodology	2	0	0	20	30	50	2
Total		2	0	40	70	180	250	22

The candidates will supervise by the concern faculty & and the project report will be submitted following competitions. The Viva-Voce examination shall be conducted by external expert

8 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
BAOTS1-801	Internship	0	0	40	80	120	200	20
Total		0	0	40	80	120	200	20

The candidate can carry out Dissertation/Major Project working-house/internally or outside/externally and shall submit a report which will be evaluated by external expert at the end of academic year.

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Overall Marks / Credits

Semester	Marks	Credits
1 st	650	20
2 nd	650	20
3 rd	600	20
4 th	650	20
5 th	650	20
6 th	650	20
7 th	250	22
8 th	200	20
Total	4300	162

FIRST SEMESTER

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
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ANATOMY AND PHYSIOLOGY-I

Subject Code: BAOTS1-101

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Objective

- A study of the anatomical structure of the human body.
- Body structure will be studied by organ systems.
- Form-function relationships with emphasis on clinically relevant anatomy.
- The laboratory study will involve observing and learning from human skeletal collections and dissected cadavers and preserved specimens.

Course Outcome

At the end of the course the student should be able to:

- Describe the structure and functions of the organ systems of the human body.
- Describe how the organ systems function and interrelate.
- Learn basic technical terminology and language associated with anatomy.
- Develop a self-identity of what it means to be “human”.

UNIT I (12 Hrs)

Organization of the Human Body

Introduction to the human body

Definition and subdivisions of anatomy

Anatomical position and terminology

Regions and Systems of the body

Cavities of the body and their contents

Levels of organization of the body

Cell and Functions

Definition of a cell, shapes and sizes of cells

Parts of a cell – cell membranes cytoplasm, subcellular organelles and their main function

Cell Division – Definition and main events that occur in different stages of mitosis and meiosis.

UNIT II (12 Hrs)

Tissues and Functions

Tissues of the body

Definition and types of basic tissues

Characteristics, functions and locations of different types of tissues

General Physiology- Concept of Homeostasis, Cell structure and functions, Transport across membranes

Nerve and muscle- Nerve structure, classification of nerve fibres, Muscles- classification, structure, Neuro-Muscular junction (NMJ). Muscle contraction-mechanism, types.

Blood and body fluids- Body fluid volumes, compartments and composition, Blood composition and functions, Plasma proteins, Erythrocytes -Morphology and functions, Leucocytes-Morphology and functions, Platelets-Morphology and functions, Blood groups.

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UNIT III (12 Hrs)

Systems of Support and Movement

Skeletal system- Skeleton – Definition, axial and appendicular skeleton with names and number of bones, Types of bones. Parts of bones. Functions of bones. Name location and general features of the bones of the body. Joints – Definition and types of joints with examples. Axes and kind of movements possible. Name, location, type, bones forming, movements possible.

Muscular system- Parts of the skeletal muscle. Definition of origin and insertion. Name and location of the skeletal muscles of the body. Origin, insertion, nerve supply and action of large muscles like sternocleidomastoid, pectoralis major, deltoid, Biceps brachii, Triceps brachii, gluteus, gastrocnemius and diaphragm.

UNIT IV (12 Hrs)

Control Systems of the Body- Nervous system, Sub-divisions of the nervous system

Spinal cord – Location, extent, spinal segments, external features and internal structure.

Brain – Sub-divisions, location external features of medulla oblongata, pons, mid-brain, cerebellum and cerebrum. Meninges and spaces around them. Name and location of ventricles of brain and circulation of cerebrospinal fluid. Blood supply of the brain and spinal cord.

Cranial nerves - Name, number, location and general distribution.

Spinal nerves - Typical spinal nerve groups and number of spinal nerves. Name and location of cervical plexus and brachial plexus. Location and general distribution of the branches.

Autonomic Nervous system –definition and functions, Sense organs, Location and features of the nose, tongue, eye, ear and skin

UNIT V (12 Hrs)

Excretory system

Structure of Nephron and its blood supply, Juxtaglomerular Apparatus (JGA).

Formation of urine-Filtration, Reabsorption and secretion. Counter -Current mechanism Micturition.

Endocrine system- Names of the endocrine glands. Location and features of pituitary, thyroid, parathyroid, suprarenal, pancreas, ovaries and testes. Names of hormones produced by each gland.

Digestive system- Salivary glands -Nerve supply, functions of saliva. Gastric juice-composition & functions of gastric juice. Pancreatic juice-composition, functions and regulation of pancreatic juice. Bile- composition, functions of bile and bile salts. Succus entericus and small intestinal movements. Deglutition, vomiting, functions of large intestine

Reference Books

1. Rizzo DC. Fundamentals of Anatomy and Physiology (Book Only). Cengage Learning; 2009 Oct 1.
2. Waugh A, Grant A. Ross & Wilson Anatomy and physiology in health and illness E-book. Elsevier Health Sciences; 2014 Jun 25.
3. Remington LA, Goodwin D. Clinical Anatomy and Physiology of the Visual System: Clinical Anatomy and Physiology of the Visual System E-Book. Elsevier Health Sciences; 2021 Jun 25.

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
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MICROBIOLOGY-I

Subject Code: BAOTS1-102

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Objective:

- Concepts of sterilization and disinfection procedures and their applications.
- Basic principles of immunology.
- Knowledge about fundamental aspect of bacteria and study the common disease caused by them.

Course Outcome: At the end of the semester the students should be able to

- Know the concepts of sterilization and disinfection procedures and their applications.
- Understand the basic principles of immunology.
- Understand the basic fundamental aspect of bacteria and study the common disease caused by them.

UNIT-I (12 Hrs)

Introduction, history of microbiology, its branches, scope and its importance. Introduction to Prokaryotes and Eukaryotes Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count). Study of different types of phase contrast microscopy, dark field microscopy and electron microscopy

UNIT-II (12 Hrs)

General Microbiology-History and Introduction of Microbiology, Microscopy and Morphology of bacterial cell and their function, Growth and nutrition of Bacteria, Sterilization and Disinfection, Culture media, Culture methods and Identification of bacteria.

UNIT-III (12 Hrs)

Immunology-Basic concept about Infection (Source, Portal of entry and Spread), Immunity, Antigen, Antibody, Antigen-Antibody reaction, Hypersensitivity. Identification of bacteria using staining techniques (simple, Gram's & Acid fast staining) and biochemical tests (IMViC). Study of principle, procedure, merits, demerits and applications of physical, chemical gaseous, radiation and mechanical method of sterilization. Evaluation of the efficiency of sterilization methods. Equipments employed in large scale sterilization. Sterility indicators

UNIT-IV (12 Hrs)

Study of morphology, classification, reproduction/replication and cultivation of Fungi and Viruses. Classification and mode of action of disinfectants Factors influencing disinfection, antiseptics and their evaluation. For bacteriostatic and bactericidal actions Evaluation of bactericidal & Bacteriostatic. Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.

Systemic bacteriology- Disease caused and lab diagnosis of medically important bacteria (Staphylococcus, Streptococcus, Neisseria, Echerichia coli, Salmonella, Shigella, Vibrio, Mycobacteria, Spirochetes).

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UNIT-V (12 Hrs)

Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification. Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids. Assessment of a new antibiotic.

Reference Books

1. Marsh PD, Lewis MA, Williams D, Martin MV. Oral microbiology E-book. Elsevier health sciences; 2009 Apr 30.
2. Talaro KP, Talaro A, Delisle G, Tomalty L. Foundations in microbiology. Wm. C. Brown; 1996 Jan.
3. Parker N, Schneegurt M, Thi Tu AH, Foster BM, Lister P. Microbiology (OpenStax). OpenStax; 2016. Crueger W, Crueger A, Brock TD, Brock TD. Biotechnology: a textbook of industrial microbiology

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
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PATHOLOGY-I

Subject Code: BAOTS1-103

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Objective:

- To understand the fundamental mechanisms underlying diseases.
- To develop skills to recognize and diagnose diseases based on clinical and laboratory findings.
- To examine tissue and organ abnormalities through histological analysis.
- To recognize the vital role of pathology in healthcare and research.

Course Outcome:

- Develop the skills needed to diagnose and differentiate diseases.
- Gain the ability to analyze and interpret microscopic and macroscopic pathology findings.
- Comprehend the cellular and molecular processes underlying diseases.
- Apply pathology concepts to inform clinical decision-making and patient care.

UNIT I (12 Hrs)

Introduction to cell- Normal Cell Structure Function Cell injury and Adaptation: Types of cell injury, Adaptation, Necrosis, Apoptosis, Pathological calcification

UNIT II (12 Hrs)

Inflammation and Repair

Acute Inflammation
Chronic Inflammation
Wound Healing and Repair

Infectious Disease

TB
Leprosy

UNIT III (12 Hrs)

Hemodynamic Disorder

Edema
Thrombosis and Embolism
Shock

UNIT IV (12 Hrs)

Neoplasia

Classification
Nomenclature
Characteristics of Benign & Malignant neoplasm
Pathogenesis of cancer
Spread of Cancer

UNIT V (12 Hrs)

Genetic Disorders

Down syndrome

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SYLLABUS 2023 BATCH ONWARDS**

Klinefelter Syndrome

Turner Syndrome

Radiation

Biological Effect of Radiation

Reference Books

1. Kumar V, Abbas A, Aster JC, editors. Robbins basic pathology e-book. Elsevier Health Sciences; 2017 Mar 8.
2. Underwood JC, Cross SS. General and Systematic Pathology E-Book. Elsevier Health Sciences; 2009 May 11.
3. King T. Elsevier's integrated pathology E-book. Elsevier Health Sciences; 2006 Dec 4.
4. Thompson LD, Bishop JA. Head and neck pathology E-book: a volume in the series: foundations in diagnostic pathology. Elsevier Health Sciences; 2017 Dec 8.

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
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SYLLABUS 2023 BATCH ONWARDS**

COMPUTER SCIENCE

Subject Code: BAOTS1-104

**L T P C
2 0 0 2**

Duration: 30 Hrs.

Course Objective:

- Acquire the ability to apply computer science principles to solve pharmaceutical and healthcare-related problems.
- Analyze and interpret pharmaceutical data using computer-based methods, enhancing research and decision-making in the field.
- Gain proficiency in designing and implementing computer systems tailored to pharmaceutical and healthcare settings, improving efficiency and patient care.
- Foster collaboration between pharmacy and computer science disciplines to harness technology for optimizing pharmaceutical practices and research.

Course Outcome:

- Learn to apply computer science principles to solve pharmaceutical and healthcare-related problems.
- Learn to analyze and interpret pharmaceutical data using computer-based methods, enhancing research and decision-making in the field.
- Learn to design and implement computer systems tailored to pharmaceutical and healthcare settings, improving efficiency and patient care.

UNIT I (6 Hrs)

History of computers

Definition of computers
Input devices,
Output devices,
Storage devices,
Types of memory,
And units of measurement,
Range of computers,
Generations of computers,
Characteristics of computers

UNIT II (6 Hrs)

System

Hardware,
Software,
System definition,
Fundamentals of Networking,
Internet,
Performing searches and working with search engines,
Types of software and its applications

UNIT III (6 Hrs)

Office application suite

Word processor,
Spreadsheet,
Presentations,
Other utility tools,
Fundamentals of Linux / Windows operating system, functions, interfaces, basic commands, working with the shell and other standard utilities.

UNIT IV (6 Hrs)

Language

Comparison chart of conventional language,
Programming languages,
Generations of programming languages,
Compilers and interpreters,
Universal programming constructs based on SDLC,
Variable, constant, identifiers, functions, procedures, if while, do – while,
For and other Structures.

UNIT V (6 Hrs)

Programming in C language

Data types, identifiers, functions and its types, arrays, union, structures and pointers
Introduction to object oriented programming with C++: classes, objects, inheritance
Polymorphism and encapsulation. Introduction to databases, and query languages,
Introduction to Bioinformatics

Reference Books:

1. Huth M, Ryan M. Logic in Computer Science: Modelling and reasoning about systems. Cambridge university press; 2004 Aug 26.
2. Gallier JH. Logic for computer science: foundations of automatic theorem proving. Courier Dover Publications; 2015 Jun 18.
3. Kay J, Barg M, Fekete A, Greening T, Hollands O, Kingston JH, Crawford K. Problem-based learning for foundation computer science courses. Computer Science Education. 2000 Aug 1;10 (2):109-28.

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

ANATOMY AND PHYSIOLOGY-I LAB

Subject Code: BAOTS1-105

**L T P C
0 0 4 2**

Duration: 60 Hrs.

Course Objective:

- Gain practical experience in conducting physiological experiments to reinforce theoretical knowledge of body functions.
- Acquires hands-on proficiency in identifying and dissecting anatomical structures, enhancing and understanding of human anatomy.
- Observing anatomical structures and physiological processes while accurately documenting findings.

Course Outcome:

- Knowledge about conducting physiological experiments of body.
- Identifying and dissecting anatomical structures, enhancing and understanding of human anatomy.
- Enhance skills in observing anatomical structures and physiological processes while accurately documenting findings.

CONTENT

- 1. Histology – Epithelium**
- 2. Axial & Appendicular Skeleton** with Names & Number Of Bones
- 3. Muscles**
 1. Trapezius
 2. Lattisimusdorsi
 3. Biceps
 4. Triceps
 5. Deltoid
- 4. Nervous System**
 1. Cerebrum
 2. Cerebellum
 3. Brain Stem
 4. Spinal Cord
- 5. Special Senses**
 1. Tongue
 2. Ear
 3. Skin
 4. Eye

Reference Books

1. Rizzo DC. Fundamentals of Anatomy and Physiology (Book Only). Cengage Learning; 2009 Oct 1.
2. Waugh A, Grant A. Ross & Wilson Anatomy and physiology in health and illness E-book. Elsevier Health Sciences; 2014 Jun 25.
3. Remington LA, Goodwin D. Clinical Anatomy and Physiology of the Visual System: Clinical Anatomy and Physiology of the Visual System E-Book. Elsevier Health Sciences; 2021 Jun 25.

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
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SYLLABUS 2023 BATCH ONWARDS**

MICROBIOLOGY-I LAB

Subject Code: BAOTS1-106

L T P C

Duration: 60 Hrs.

0 0 4 2

Course Objective:

- Enable student to acquire essential microbiological laboratory skills and techniques.
- Facilitate the examination and identification of various microorganisms to understand their characteristics and roles.
- Teach students how to perform diagnostic tests emphasizing their clinical and research applications.
- Instill a strong commitment to laboratory safety and ethical conduct while working with microorganisms.

Course Outcome:

- Develop proficiency in aseptic techniques, culturing, and handling microorganisms, fundamental for microbiological research and applications.
- Learn to identify and classify various microorganisms using microscopy, staining and biochemical tests, expanding knowledge of microbial diversity.
- Acquire skills in conducting diagnostic tests, such as antibiotic sensitivity assays, critical for clinical and research settings. Promote a culture for safety by adhering to proper laboratory protocols and enhance the responsible handling of potentially hazardous microorganisms.

PRACTICALS

I. Gram staining

II. Spotters

Disposable syringe
Sterile cotton swab
Bacteriological loop
Sterile tube
McIntosh fildes Jar
Autoclave

III. Nutrient Agar plate

Mac Conkey agar plate
Mac conkey with LF
Mac conkey with NLF
Blood agar plate
L J Media
RCM
BHI broth
Antibiotics susceptibility
Gram positive Cocci in cluster
Gram negative bacilli
AFB
VDRL Slide
Microtiter plate

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Reference Books

1. Marsh PD, Lewis MA, Williams D, Martin MV. Oral microbiology E-book. Elsevier health sciences; 2009 Apr 30.
2. Talaro KP, Talaro A, Delisle G, Tomalty L. Foundations in microbiology. Wm. C. Brown; 1996 Jan.
3. Parker N, Schneegurt M, Thi Tu AH, Foster BM, Lister P. Microbiology (OpenStax). OpenStax; 2016. Crueger W, Crueger A, Brock TD, Brock TD. Biotechnology: a textbook of industrial microbiology

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PATHOLOGY-I LAB

Subject Code: BAOTS1-107

L T P C

Duration: 60 Hrs.

0 0 4 2

Course Objective:

- Enable students to acquire hands on skills in identifying and analyzing pathological specimens and tissues.
- Teach students to conduct laboratory tests and examination for the diagnosis and evaluation of disease.
- Improve student's ability to use microscopes for the examination of cellular and tissue level pathological changes.
- Promote a culture of safety and ethical conduct while handling pathological specimens and data in laboratory.

Course Outcome:

- Gain hands-on expertise in the examination and interpretation of pathological specimens and tissues.
- Demonstrate the ability to perform laboratory tests and investigation for disease diagnosis and monitoring.
- Improve proficiency in microscopy to identify and understand cellular and tissue level pathological changes.
- Foster a commitment to safety and ethical standards while handling and analyzing pathological specimens in the laboratory.

PRACTICALS

1. DIFFERENTIAL COUNT

Spotter

2. GROSS (SPOTTER)

Fatty liver

Lipoma

Dry gangrene foot

Wet gangrene bowel

CVC Spleen

Hydatid cyst

TB – Lung

3. INSTRUMENTS

Westergrens ESR tube

Sahlihemocytometer

Neubaur's chamber

Bone Marrow Needle

Reference Books

1. Kumar V, Abbas A, Aster JC, editors. Robbins basic pathology e-book. Elsevier Health Sciences; 2017 Mar 8.
2. Underwood JC, Cross SS. General and Systematic Pathology E-Book. Elsevier Health Sciences; 2009 May 11.
3. King T. Elsevier's integrated pathology E-book. Elsevier Health Sciences; 2006 Dec 4.
4. Thompson LD, Bishop JA. Head and neck pathology E-book: a volume in the series: foundations in diagnostic pathology. Elsevier Health Sciences; 2017 Dec 8.

SECOND SEMESTER

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
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SYLLABUS 2023 BATCH ONWARDS**

ANATOMY AND PHYSIOLOGY-II

Subject Code: BAOTS1-201

L T P C

Contact Hrs.: 60 Hrs.

3 1 0 4

Course objectives:

- Describe the structure and functions of the organ systems of the human body.
- Describe how the organ systems function and interrelate.
- Basic technical terminology and language associated with anatomy.
- Develop a self-identity of what it means to be “human”.

Course outcome: At the end of the course the student should be able to:

- Understand the structure and functions of the organ systems of the human body.
- Knowledge about the organ systems function and interrelate.
- Learn basic technical terminology and language associated with anatomy.
- Understand self-identity of what it means to be “human”.

Unit I (12 Hrs.)

Maintenance of the Human Body

Cardio-vascular system

- Types and general structure and function of blood vessels. Structure and types of arteries and veins. Structure of capillaries. Shape, size, location, coverings, external and internal features of heart. Structure of heart wall, conducting system of the heart.
- Blood supply of the heart. The systemic arteries and veins. Name, location, branches and main- distribution of principal arteries and veins.

Unit II (12 Hrs.)

Lymphatic system

- Lymph, lymphatic vessels, name, location and features and functions of the lymphatic organs.

Respiratory system

- Names of organs of respiration, Location and features of nose, pharynx, larynx, trachea, bronchi, lungs and pleura.

Unit- III (12 Hrs.)

Digestive system

- Names of organs of digestion. Parts of alimentary canal and accessory organs. Location and features of mouth, pharynx, esophagus, stomach, small and large intestines. Location and features of salivary glands, pancreas, liver and gall bladder.

Unit IV (12 Hrs.)

Urinary system

- Names of urinary organs, location and features of kidney, ureter, urinary bladder and urethra.

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Anatomical Regions

- Simple ideas about scalp, triangles of neck, axilla, cubital fossa, mediastinum, inguinal canal, femoral triangle, popliteal fossa.

Unit V (12 Hrs.)

- **Reproductive system** Names of male and female organs of reproduction. Location and features of scrotum, testis, epididymis, vas deferens, seminal vesicle, ejaculatory duct, prostate gland, penis and spermatic cord. Location and features of uterus and its supports, uterine tube, ovary vagina vulva and breast.

Reference Books

1. Rizzo DC. Fundamentals of Anatomy and Physiology (Book Only). Cengage Learning; 2009 Oct 1.
2. Waugh A, Grant A. Ross & Wilson Anatomy and physiology in health and illness E-book. Elsevier Health Sciences; 2014 Jun 25.
3. Remington LA, Goodwin D. Clinical Anatomy and Physiology of the Visual System: Clinical Anatomy and Physiology of the Visual System E-Book. Elsevier Health Sciences; 2021 Jun 25.

MICROBIOLOGY-II

Subject Code: BAOTS1-202

L T P C

Contact Hrs.: 60 Hrs

3 1 0 4

Course objective:

- Concepts of sterilization and disinfection procedures and their applications.
- Basic principles of immunology.
- Basic fundamental aspect of bacteria and study the common disease caused by them.

Course outcome:

At the end of the semester the students should be able to

- Know the concepts of sterilization and disinfection procedures and their applications.
- Understand the basic principles of immunology.
- Understand the basic fundamental aspect of bacteria and study the common disease caused by them

UNIT I (12 Hrs.)

Virology: Introduction to virology, List of medically important viruses and diseases(AIDS, Hepatitis, Rabies, Polio) and Lab diagnosis of viral infections

UNIT II (12 Hrs.)

Mycology: Introduction to Mycology, List of medically important fungi and diseases (Candidiasis, Cryptococcosis, Dermatophytes, Aspergillosis and Mucor mycosis) and Lab diagnosis of fungal infections.

UNIT III (12 Hrs.)

Parasitology: Introduction to Parasitology, List of medically important parasites and diseases (E.histolytica, Plasmodium, W. bancrofti, Ascaris, Ancylostoma) and Lab diagnosis of parasitic infections

UNIT IV (12 Hrs.)

Applied Microbiology-Collection and transport of clinical specimen, Sexually transmitted disease, Hospital acquired infection, Urinary tract infection, Skin and Soft tissue infection, Anaerobic infection, Respiratory tract infection and Bloodstream infection, Immunoprophylaxis, Biomedical Waste Management and standard precautions.

UNIT V (12 Hrs.)

Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage. Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations. Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures. Application of cell cultures in pharmaceutical industry and research.

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SYLLABUS 2023 BATCH ONWARDS**

Reference Books

1. Marsh PD, Lewis MA, Williams D, Martin MV. Oral microbiology E-book. Elsevier health sciences; 2009 Apr 30.
2. Talaro KP, Talaro A, Delisle G, Tomalty L. Foundations in microbiology. Wm. C. Brown; 1996 Jan.
3. Parker N, Schneegurt M, Thi Tu AH, Foster BM, Lister P. Microbiology (OpenStax). OpenStax; 2016. Crueger W, Crueger A, Brock TD, Brock TD. Biotechnology: a textbook of industrial microbiology

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**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
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PATHOLOGY-II

Subject Code: BAOTS1-203

**L T P C
3 1 0 4**

Contact Hrs.: 60 Hrs

Course objective:

- To understand the fundamental mechanisms underlying diseases.
- To develop skills to recognize and diagnose diseases based on clinical and laboratory findings.
- To examine tissue and organ abnormalities through histological analysis.
- To recognize the vital role of pathology in healthcare and research.

Course outcome:

- Develop the skills needed to diagnose and differentiate diseases.
- Gain the ability to analyze and interpret microscopic and macroscopic pathology findings.
- Comprehend the cellular and molecular processes underlying diseases.
- Apply pathology concepts to inform clinical decision-making and patient care.

Unit I (12 Hrs.)

- **CVS**
 - Atherosclerosis
 - Ischemic heart disease
 - Congenital heart disease
 - Valvular heart disease
- **RESPIRATORY SYSTEM**
 - Bronchial Asthma
 - Emphysema
 - Bronchiectasis

Unit II (12 Hrs.)

- **GIT**
 - Gastric ulcer
 - Tumors of GIT
- **HEPATOBIILIARY**
 - Hepatitis
 - Liver Abscess
 - Cirrhosis
 - Cholecystitis

Unit III (12 Hrs.)

- **KIDNEY AND URINARY TRACT**
 - Renal stones
 - UTI and Pyelonephritis
 - Renal cell carcinoma (RCC)
 - Renal Failure

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- **REPRODUCTIVE SYSTEM**

- Diseases of testis, uterus, cervix and ovary

Unit IV (12 Hrs.)

- **CNS**

- Infections

- **BONES and JOINTS**

- Septic Arthritis
- Osteomyelitis
- Rheumatoid Arthritis

Unit V (12 Hrs.)

- **ANEMIA**

- **AUTOIMMUNE DISEASES**

Reference Books

1. Kumar V, Abbas A, Aster JC, editors. Robbins basic pathology e-book. Elsevier Health Sciences; 2017 Mar 8.
2. Underwood JC, Cross SS. General and Systematic Pathology E-Book. Elsevier Health Sciences; 2009 May 11.
3. King T. Elsevier's integrated pathology E-book. Elsevier Health Sciences; 2006 Dec 4.
4. Thompson LD, Bishop JA. Head and neck pathology E-book: a volume in the series: foundations in diagnostic pathology. Elsevier Health Sciences; 2017 Dec 8.

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

BASIC AND ADVANCED LIFE SUPPORT

Subject Code: BAOTS1-204

L T P C

30 Hours

2 0 0 2

Course Objectives:

- Expected to have basic knowledge on basic medical sciences
- To develop in depth knowledge on concepts of pathological conditions.
- To develop exhaustive ideology of techniques in regional and general anesthesia

Course Outcome:

- Gain knowledge on history of anesthesia, pre and post - operative assessment.
- Learn the investigations and pre-anesthetic orders required for patient to be anesthetized.
- Gain knowledge on the management of complications and anesthetic considerations.

UNIT-I (6 Hours)

- BLS
- TRIAGE
- Primary Survey
- Secondary Survey
- Airway & Ventilatory management
- Shock
- Central & peripheral venous access
- Thoracic trauma – Tension pneumothorax
- Other thoracic injuries
- Abdominal trauma – Blunt injuries

UNIT-II (6 Hours)

- Abdominal trauma – Penetrating injuries
- Spine and spinal cord trauma
- Head trauma
- Musculoskeletal trauma
- Electrical injuries
- Thermal burns
- Cold injury
- Pediatric trauma
- Trauma in pregnant women
- Workshop BLS

UNIT-III (6 Hours)

- Workshop cervical spine immobilization
- Imaging studies in trauma
- The universal algorithm for adult ECC
- Ventricular fibrillation/Pulseless ventricular tachycardia algorithm
- Pulseless electrical activity (PEA) / asystole algorithm

UNIT-VI (6 Hours)

- Bradycardia treatment algorithm
- Tachycardia Treatment algorithm
- Hypotension / Shock
- Acute myocardial infarction
- Pediatrics Advanced life support

UNIT-V (6 Hours)

- Defibrillation
- Drugs used in ACLS
- Emergency cardiac pacing
- AED
- Techniques for oxygenation and ventilation

Reference books

1. Ferguson, J. "Advanced paediatric life support, 3rd edn: Advanced Life Support Group.(£ 25). BMJ Books, 2001. ISBN 0-7279-1554-1." (2002): 186-186.
2. Samuels, Martin, and Sue Wieteska, eds. *Advanced paediatric life support: a practical approach to emergencies*. John Wiley & Sons, 2016.

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

ANATOMY AND PHYSIOLOGY-II LAB

Subject Code: BAOTS1-205

L T P C

Contact Hrs.: 60 Hours

0 0 4 2

Course objectives:

- Describe the structure and functions of the organ systems of the human body.
- Describe how the organ systems function and interrelate.
- Basic technical terminology and language associated with anatomy.
- Develop a self-identity of what it means to be “human”.

Course outcome: At the end of the course the student should be able to:

- Understand the structure and functions of the organ systems of the human body.
- Knowledge about the organ systems function and interrelate.
- Learn basic technical terminology and language associated with anatomy.
- Understand self-identity of what it means to be “human”.

PRACTICALS

- **Endocrine System**
 - Pituitary gland
 - Pineal body
 - Thyroid & parathyroid gland
 - Adrenal
 - Pancreas
 - Gonads – Ovary & Testis
- **Cardio-Vascular System**
 - Heart
- **Lymphatic system**
 - Spleen
 - Respiratory System
 - Lungs
 - Larynx
 - Trachea
- **Digestive System**
 - Salivary glands
 - Esophagus
 - Pharynx
 - Stomach
 - Liver, Gall bladder
 - Duodenum
 - Small intestine
 - Large intestine
- **Urinary system**
 - Kidneys
 - Ureter
 - Urinary bladder

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• **Reproductive System**

- Saggital section – Male & Female pelvis
- Uterus & ligaments
- Ovary
- Prostate
- Seminal vesicals
- Vas deferens
- Testis

Reference Books

1. Rizzo DC. Fundamentals of Anatomy and Physiology (Book Only). Cengage Learning; 2009 Oct 1.
2. Waugh A, Grant A. Ross & Wilson Anatomy and physiology in health and illness E-book. Elsevier Health Sciences; 2014 Jun 25.
3. Remington LA, Goodwin D. Clinical Anatomy and Physiology of the Visual System: Clinical Anatomy and Physiology of the Visual System E-Book. Elsevier Health Sciences; 2021 Jun 25.

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
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SYLLABUS 2023 BATCH ONWARDS**

MICROBIOLOGY-II LAB

Subject Code: BAOTS1-207

**L T P C
0 0 4 2**

Contact Hrs.: 60 Hours

Course Objective:

- Concepts of sterilization and disinfection procedures and their applications.
- Basic principles of immunology.
- Basic fundamental aspect of bacteria and study the common disease caused by them.

Course outcome:

At the end of the semester the students should be able to

- Know the concepts of sterilization and disinfection procedures and their applications.
- Understand the basic principles of immunology.
- Understand the basic fundamental aspect of bacteria and study the common disease caused by them

PRACTICALS

I. SPOTTERS

1. Ascarislumbricoides
2. Taenia
3. Gram stained smears showing Candida
4. Universal container
5. Vaccine-OPV
6. BCG
7. Hepatitis
8. DPT
9. TT
10. MMR
11. Virology –Embryonated egg
12. Tissue culture
13. Rhabdovirus
14. Polio virus
15. HIV

II. Clinical case discussion with charts

1. Skin and soft tissue infections
2. Ring worm/ Tinea infections
3. Food poisoning
4. Gastroenteritis

Reference Books

1. Marsh PD, Lewis MA, Williams D, Martin MV. Oral microbiology E-book. Elsevier health sciences; 2009 Apr 30.

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

2. Talaro KP, Talaro A, Delisle G, Tomalty L. Foundations in microbiology. Wm. C. Brown; 1996 Jan.
3. Parker N, Schneegurt M, Thi Tu AH, Foster BM, Lister P. Microbiology (OpenStax). OpenStax; 2016. Crueger W, Crueger A, Brock TD, Brock TD. Biotechnology: a textbook of industrial microbiology

MRSPTU

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

PATHOLOGY-II LAB

Subject Code: BAOTS1-206

**L T P C
0 0 4 2**

Contact Hrs.: 60 Hours

Course objective:

- To understand the fundamental mechanisms underlying diseases.
- To develop skills to recognize and diagnose diseases based on clinical and laboratory findings.
- To examine tissue and organ abnormalities through histological analysis.
- To recognize the vital role of pathology in healthcare and research.

Course outcome:

- Develop the skills needed to diagnose and differentiate diseases.
- Gain the ability to analyze and interpret microscopic and macroscopic pathology findings.
- Comprehend the cellular and molecular processes underlying diseases.
- Apply pathology concepts to inform clinical decision-making and patient care.

PRACTICALS

INSTRUMENT TEST

- RBC Pipette
- WBC Pipette
- Sahli's Pipette
- Wintrobe's PCV tube
- Hb Estimation
- Blood grouping

SPECIMEN

- Chronic Pyelonephritis
- RCC
- SCC – Foot
- Leiomyoma – Fibroid uterus
- Gall stones
- Appendicitis
- Liver absces

Reference Books

1. Kumar V, Abbas A, Aster JC, editors. Robbins basic pathology e-book. Elsevier Health Sciences; 2017 Mar 8.
2. Underwood JC, Cross SS. General and Systematic Pathology E-Book. Elsevier Health Sciences; 2009 May 11.
3. King T. Elsevier's integrated pathology E-book. Elsevier Health Sciences; 2006 Dec
4. Thompson LD, Bishop JA. Head and neck pathology E-book: a volume in the series: foundations in diagnostic pathology. Elsevier Health Sciences; 2017 Dec 8.

THIRD SEMESTER

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

ANATOMY & PHYSIOLOGY RELATED TO ANESTHESIA TECHNOLOGY

Subject Code: BAOTS1-301

L T P C

Duration: 60 Hrs.

3 1 0 4

COURSE OBJECTIVES:

- Expected to have basic knowledge on human anatomy and physiology
- To develop in depth knowledge on anatomy of various organs and structures
- To develop exhaustive ideology of various functions of various structures.

COURSE OUTCOME:

- Will be able to explain anatomy of various organs with better knowledge on terminologies.
- Will be able to explain to physiological processes with understanding.
- Will be able to provide better support during surgery.

UNIT – I (12 Hours)

Respiratory System- Structure and function of the respiratory tract in relation to anaesthesia - Nose, Pharynx, Larynx, Trachea & Bronchial tree – vessels, nerve supply, respiratory tract. Respiratory Physiology-Respiratory muscles – diaphragm, intercostals, Lung volumes-dead space, vital capacity, FRC. Oxygen: properties, storage, supply, hypoxia

UNIT II (12 Hours)

Cardiovascular System - Anatomy – Chambers of the heart, circulation, ECG, Blood Pressure. How to measure? Hypotension & Hypertension

UNIT – III (12 Hours)

Fluids And Electrolytes/ Blood Transfusion-Body Fluids – Composition, I.V Fluids – composition & administration, I.V Cannulation, Blood grouping, Cross matching, Transfusion indications, hazards.

UNIT – IV (12 Hours)

Nervous System- Parts of Central & Peripheral Nervous System, Cerebro spinal fluid

UNIT – V (12 Hours)

Reproductive System: Physiological changes in pregnancy and labour

Text Books:

1. Human Anatomy, B.D. Chaurasia, Vol 1, 2, 3, Sixth edition, CBS Publishers & Distributors, 2013
2. Textbook of physiology : A.K. Jain, Fifth edition, Avichal Publishing Company , 2014

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

APPLIED PHARMACOLOGY AND MICROBIOLOGY

Subject Code: BAOTS1-302

L T P C

Duration: 60 Hrs.

3 1 0 4

COURSE OBJECTIVES:

- Expected to have basic knowledge on anatomy, physiology and pharmacology.
- To develop knowledge on various drugs and their mechanism of actions.
- To impart knowledge on the adverse effects on various drugs.

COURSE OUTCOME:

- Gain knowledge on the mechanism of actions of various drugs along with their adverse effects.
- Able to identify the drug to be used in emergency situations during a surgical procedure.
- Gain knowledge on various NSAIDs and anticoagulants.

UNIT-I (12 Hours)

- **ANTISIALAGOGUES**
- Atropine, Glycopyrrolate
- **SEDATIVES I ANXIOLYTICS**
- Diazepam, Midazolam, Phenergan, Lorazepam, Chlorpromazine, Trichlopho
- **NARCOTICS**
- Morphine, Pethidine, Fentanyl, Pentazozine
- **ANTIEMETICS**
- Metaoclopramide, Ondanseteron, Dexamethasone
- **ANTACIDS**
- Na citrate, Gelusil, Mucaine gel.

UNIT-II (12 Hours)

- **H2 BLOCKERS**
Cimetidine, Ranitidine, Famotidine
- **INDUCTION AGENT**
Thiopentone , Diazepam, Midazolam, Ketamine, Propofol, Etomidate.
- **MUSCLE RELAXANTS**
Depolarising - Suxamethonium,
Non depolarising -Pancuronium, Vecuronium, Atracurium, rocuranium

UNIT-III (12 Hours)

- **INHALATIONAL GASES**
Gases - O₂, N₂O, Air
Agents - Ether-, Halothane, Isoflurane, Saevoflurane, Desflurane
- **REVERSAL AGENTS**
Neostigmine, Glycopyrrolate, Atropine, Nalorphine, Naloxone, Flumazenil
(Diazepam)
- **LOCAL ANAESTHETICS**
Xylocaine, Preparation, Local – Bupivacaine

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
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SYLLABUS 2023 BATCH ONWARDS**

- Topical, Prilocaine-jelly, Emla - Ointment,
Etidocaine. Ropivacaine

UNIT-IV (12 Hours)

EMERGENCY DRUGS

- Adrenaline : Mode or administration, dilution, dosage,
- Effects, Isoprenaline
- Atropine, bicarbonate, calcium, ephedrine, xylocard,
- Ionotropes : dopamine, dobutamine, amidaron
- Aminophylline, hydrocortisone, antihistamines, potassium.
- Cardiovascular drugs
- Antihypertensives
- Antiarrhythmics
- Beta - Blockers
- Ca - Channel blockers.
- Vasodilators - nitroglycerin & sodium nitroprusside
- Respiratory system - Bronchodilators, respiratory stimulants Broncholytic agents
- Renal system - Diuretics, furosemide, mannitol
- Obstetrics - oxytocin, methergin
- Miscellaneous - Antibiotics NSAIDS Anticoagulants and Insulin

UNIT-V (12 Hours)

APPLIED MICROBIOLOGY

- Sterilization & decontamination-I Dry
- Filtration
- Wound Infection & Urinary Tract Infections
- Blood stream Infections
- Respiratory tract Infection
- S.Typhi, Salmonella Paratyphi 'A', Salmonella Typhimurium
- Catheter, IV associated Infections
- Hospital acquired infections & prevention of hospital acquired infections
- Hepatitis C, HBV, HIV
- Hyper sensitivity reaction – Type I, II, III, IV

Text Books:

1. Pharmacology for Dental and Allied Health Sciences, Padmaja
2. Udaykumar, Third Edition, Jaypee Brothers Medical Publishers, 2013

Reference Books:

1. Essentials of medical pharmacology, Tripathi, 7th edition, Jaypee Brothers Medical Publishers, 2013

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

MEDICAL ETHICS AND BIO SAFETY

Subject Code: BAOTS1-303

L T P C

Duration: 60 Hrs.

3 1 0 4

COURSE OBJECTIVES:

- Expected to have basic knowledge on Ethics
- To develop knowledge on various Ethical issues in applied medicine
- To impart knowledge on Genetic testing genetic screening

COURSE OUTCOME:

- Gain knowledge about ethics on general practice
- Gain knowledge about primary & Secondary Ethical principles
- Gain knowledge on Assisted reproduction and Ethics

UNIT-I (15 Hours)

- Definition & key terms – ethics Vs law
- Define Negligence, Malpractice & Liability
- Influence of Ethics on general practice
- Professional codes of Ethics

UNIT-II (15 Hours)

- Describe primary & Secondary Ethical principles
- Describe the Moral basis of Informed consent & advance directives
- Euthanasia and physician – assisted suicide

UNIT-III (15 Hours)

- Physicians, patients and other: autonomy, Truth Telling & Confidentiality
- Reproductive control: Assisted reproduction and Ethics
- Workers compensation

UNIT-IV (15 Hours)

- Ethical issues in applied medicine
- Fertility & Birth control
- Genetic testing genetic screening.
- Research Ethics

Reference books

1. Salerno, Reynolds M., and Jennifer Gaudio, eds. *Laboratory biorisk management: biosafety and biosecurity*. CRC Press, 2015.
2. Timms, Olinda. *Bio-Medical Ethics-E-Book*. Elsevier Health Sciences, 2016.

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

PSYCHOLOGY

Subject Code: BAOTS1-304

L T P C

Duration: 60 Hrs.

3 1 0 4

COURSE OBJECTIVES:

- Expected to have basic knowledge on Ethics
- To develop knowledge on various Ethical issues in applied medicine
- To impart knowledge on Genetic testing genetic screening

COURSE OUTCOME:

- Gain knowledge about ethics on general practice
- Gain knowledge about primary & Secondary Ethical principles
- Gain knowledge on Assisted reproduction and Ethics

UNIT I (12 Hours)

Basic Concepts of Psychology

Definition of Psychology, Origin of Psychology - Philosophical roots of psychology, Schools of Psychology–Structuralism – Gestalt – Functionalism – Behaviorism - Psychoanalysis – Humanistic. Fields of Psychology - Work of a psychologist – Applications of psychology.

Learning principles and methods

Definition of learning, Factors In The Process of Learning Classical conditioning - Operant Conditioning – The principle of reinforcement and Punishment. Theory of learning. Cognitive learning- Latent learning, Insight learning, and Imitation.

UNIT II (12 Hours)

Motivation, Emotion, Memory and forgetting

Motivation - Definition of motivation – Theories of motivation - Physiological basis of motivation – Motivational factors in aggression – Self-actualization motivation. Emotion – Emotional expression – Theories of emotions. Kinds of remembering – Retrieval processes – The nature of forgetting – Two process theories of memory – Improving memory –Language and thought – Symbols and concepts – Structure – Forms of thought - Thinking and reasoning – Concept formation.

UNIT III (12 Hours)

Development, Sensory Processes and Perception.

Erikson's stages of psychosocial development Lawrence Kohlberg's stages of moral development Freud's Stages of Psychosexual Development Physiological basis of behavior – The brain and nervous system –The sensory process , Some general characteristic of senses – Five senses ,Perception: Organization – The role of learning in perception – Perception and attention – Perceptual process.

UNIT IV (12 Hours)

Intelligence & Personality

Theories of intelligence – Measuring Intelligence – Kinds of intelligence tests – Ability – Formation of aptitude and attitude – Aptitude tests –Creativity and its tests. Personality –

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
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Definition of Personality – Theories of Personality – Assessment of Personality. Social Factors Influencing Personality.

Inter-Personal Relations. Inter-personal attraction – Love and Companionship. Prosocial-behavior. Modes of empathy: self – other differentiation and development of empathy. Social influence: attitude and conformity. Definition - Characteristics and Classification of Crowd. Leadership: Definition and characteristics, Defense Mechanisms, frustration and conflict, sources of frustration and conflict, types of conflicts. Aggression and Types of aggression.

UNIT V (12 Hours)

Health Psychology

Definition of Health Psychology -Relating Health Psychology to other fields Clinical Health Psychology, Public Health Psychology, Community Health Psychology, Critical Health Psychology

Abnormal Psychology: Concepts of normality and abnormality, causation of mental illness, neuroses, psychoses, psychosomatic disorders, measures to promote mental health.

Stress - Definitions- Models of Stress – Theories of Stress - Stress reactions – Coping and Stress Management techniques, Pain and its management - Psychological reactions of a patient to loss – Stages of Acceptance by Kubler-Ross.

REFERENCES:

1. Clifford T. Morgan, Richard a. King, John R. Weis and John Schopler, “**Introduction to Psychology**” –
2. **7th Edition.** Tata McGraw Hill Book Co. New Delhi, 1993.
3. Baron, R. A., & Byrne, D (2006), “**Social psychology**”, New Delhi: Prentice hall of India private limited.
4. Elliot Aronson, Timothy D. Wilson, Robin M. Akert, Samuel R. Sommers, “**Social psychology**” **9th edition** published by Pearson education, Inc.,2006

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

**ANATOMY & PHYSIOLOGY RELATED TO ANESTHESIA TECHNOLOGY
PRACTICAL**

Subject Code: BAOTS1-305

**L T P C
0 0 4 2**

Duration: 4 Hours/week

COURSE OBJECTIVES:

- Expected to have basic knowledge on human anatomy and physiology
- To develop in depth knowledge on anatomy of various organs and structures
- To develop exhaustive ideology of various functions of various structures.

COURSE OUTCOME:

- Will be able to explain anatomy of various organs with better knowledge on terminologies.
- Will be able to explain to physiological processes with understanding.
- Will be gaining hand on training in setting up things for IV cannulation.

PRACTICALS/ DEMONSTRATIONS

1. Model of respiratory tract
2. Spotters –pictures in anatomy and physiology of various systems
3. How to measure blood pressure
4. How to set up things for IV cannulation

Text Books:

1. Human Anatomy, B.D. Chaurasia, Vol 1, 2, 3, Sixth edition, CBS Publishers & Distributors,2013
2. Textbook of physiology : A.K. Jain, Fifth edition, Avichal Publishing Company, 2014

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
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SYLLABUS 2023 BATCH ONWARDS**

APPLIED PHARMACOLOGY AND MICROBIOLOGY PRACTICAL

Subject Code: BAOTS1-306

L T P C

Duration: 4 Hours/week

0 0 4 2

COURSE OBJECTIVES:

- Expected to have basic knowledge on anatomy, physiology and pharmacology.
- To develop knowledge on various drugs and their mechanism of actions.
- To impart knowledge on the adverse effects on various drugs.

COURSE OUTCOME:

- Gain knowledge on the mechanism of actions of various drugs along with their adverse effects.
- Able to identify the drug to be used in emergency situations during a surgical procedure.
- Gain knowledge on various NSAIDs and anticoagulants.

PRACTICALS/ DEMONSTRATIONS

- Spotters
- Charts
- Anesthetic induction agents
- Inhalation agents

Text Books:

1. Pharmacology for Dental and Allied Health Sciences, Padmaja Udaykumar, Third Edition, Jaypee Brothers Medical Publishers, 2013

Reference Books:

1. Essentials of medical pharmacology, Tripathi, 7th edition, Jaypee Brothers Medical Publishers, 2013

FOURTH SEMESTER

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

PRINCIPLES OF ANESTHESIA-I

Subject Code: BAOTS1-401

L T P C

Duration: 60 Hrs.

3 1 0 4

COURSE OBJECTIVES:

- Expected to have basic knowledge on basic medical sciences
- To develop ideology of various Equipment used in anesthesia technology.
- To develop knowledge on the principles involved in OT and OT techniques.

COURSE OUTCOME:

- Gain knowledge on various codes and safety devices.
- Learn the importance of endotracheal tubes and laryngoscopes in anesthesia.
- Learn about the machines and gain knowledge on OT and OT techniques.

UNIT-I (12 Hours)

MEDICAL GAS SUPPLY

- Compressed gas cylinders
- Colour coding
- Cylinder valves; pin index.
- Gas piping system
- Recommendations for piping system
- Alarms & safety devices.

UNIT-II (12 Hours)

ANAESTHESIA MACHINE

- Hanger and yoke system
- Cylinder pressure gauge
- Pressure regulator
- Flow meter assembly
- Vaporizers - types, hazards, maintenance, filling and draining, etc

UNIT-III (12 Hours)

BREATHING SYSTEM

- General considerations: humidity & heat
- Common components - connectors, adaptors, reservoir bags
- Pulse oximetry
- EtCO₂ & Capnography
- Methods of humidification.
- Classification of breathing system Mapleson system – a, b, c, d, e, f, Jackson Rees system, Bain circuit
- Non rebreathing valves - ambu valves
- The circle system Components Soda lime, indicators

UNIT-IV (12 Hours)

FACE MASKS & AIRWAY LARYNGOSCOPES

- Types, sizes
- Endotracheal tubes - Types, sizes.
- Cuff system
- Fixing, removing and inflating cuff, checking tube position complications.
- Bougie
- LMA

UNIT-V (12 Hours)

- Anesthesia Ventilators and Working Principles.

MONITORING

- ECG
- SpO₂
- Temperature
- IBP
- CVP
- PA Pressure
- LA Pressure
- Bio Medical engineering of Trouble sorting Management, care of cleaning

Text Books:

1. The Anesthesia Technician and Technologist's Manual, Glenn Woodworth, Jeffrey R. Kirsch, Shannon Sayers-Rana, 1st edition, Lippincott Williams & Wilkins, 2012

Reference Books:

1. Anesthesia Equipment, Principles and Applications (Expert Consult: Online and Print),
2. Anesthesia Equipment Clinical Key 2012.

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
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PRINCIPLES OF ANESTHESIA-II

Subject Code: BAOTS1-402

L T P C

Duration: 60 Hrs.

3 1 0 4

COURSE OBJECTIVES:

- Expected to have basic knowledge on basic medical sciences
- To develop in depth knowledge on concepts of pathological conditions.
- To develop exhaustive ideology of techniques in regional and general anesthesia

COURSE OUTCOME:

- Gain knowledge on history of anesthesia, pre and post – operative assessment.
- Learn the investigations and pre-anesthetic orders required for patient to be anesthetized.
- Gain knowledge on the management of complications and anesthetic considerations.

UNIT-I (12 Hours)

BASIC ANAESTHETIC TECHNIQUES INTRODUCTION TO ANAESTHESIA

- General Anesthesia * Regional Anesthesia * Local Anesthesia* Intravenous Anesthesia
- Minimum standard of anesthesia
- Who should give anesthesia?

UNIT-II (12 Hours)

PRE-OP PREPARATION:

- Pre anesthetic assessment~ History – , past history - disease / Surgery / and personal history -Smoking / alcohol
- General physical assessment, systemic examination – CVS, RS, CNS

UNIT-III (12 Hours)

INVESTIGATIONS

- Routine - Urine
 - Hematological - their significance
 - E.C.G.
 - Chest X – ray
 - Echocardiography
 - Angiography
 - Liver function test
 - Renal function test
 - Others
- Case acceptance: ASA grading - I, II, III, IV.

PRE - ANAESTHETIC ORDERS: Patient - Informed consent

- Npo guidelines
- Premedication - advantages, drugs used
- Special instructions - if any

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
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SYLLABUS 2023 BATCH ONWARDS**

- **Machine -Checking the machine02, N20, suction apparatus Laryngoscopes, et tubes, airways**
 - Things for IV accessibility
 - Other monitoring systems
 - Drug Emergency drugs Anesthetic drugs

UNIT-IV (12 Hours)

INTRAOPERATIVE MANAGEMENT

- Confirm the identification of the patient
- Monitoring - minimum
- Noninvasive & Invasive monitoring
- Induction - drugs used
- Endotracheal intubation
- Maintenance of anaesthesia
- Positioning of the patient
- Blood / fluid & electrolyte balance
- Reversal from anaesthesia - drugs used
- Transferring the patient
- Recovery room – set up and things needed

UNIT-V (12 Hours)

POST OPERATIVE COMPLICATIONS & MANAGEMENT

- Recovery and Delayed recovery
- Hypoxia and Oxygen Therapy
- PONV

Text Books:

1. The Anesthesia Technician and Technologist's Manual, Glenn Woodworth, Jeffrey R. Kirsch, Shannon Sayers-Rana, 1st edition, Lippincott Williams & Wilkins, 2012.

Reference Books:

Anesthesia Equipment, Principles and Applications (Expert Consult: Online and Print), AnesthesiaEquipment Clinical Key 2012.

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

BIOCHEMISTRY-I

Subject Code: BAOTS1-403

L T P C

Duration: 60 Hrs.

3 1 0 4

Course objectives:

- To have a knowledge about the chemistry and metabolism of various macromolecules-carbohydrate, protein and lipids
- To learn about enzymes, vitamins, minerals and nutrition
- To know the structure and function of Hemoglobins, Nucleic acids.
- To learn about the organ function tests like Liver Function Tests and Renal Function Tests.

Unit I (15 Hrs.)

CARBOHYDRATES

Carbohydrates: Classification of carbohydrates and their biological importance, reducing property of sugars.

Metabolism of Carbohydrates: Digestion and Absorption of carbohydrates, Steps of Glycolysis and energetics, Steps of TCA cycle and energetics, Steps of Glycogen synthesis and breakdown, Significance of HMP shunt pathway, Definition and steps of Gluconeogenesis, Galactose metabolism Galactosemia. Diabetes mellitus

Bioenergetics: Importance of ATP, Outline of respiratory chain.

Unit II (15 Hrs.)

LIPIDS

Lipids: Classification of lipids, Essential fatty acids, Functions of cholesterol, Triglycerides, Phospholipids

Metabolism of Lipids: Digestion and Absorption of lipids, Fatty acid synthesis & Steps of β oxidation of fatty acids, Types and functions of lipoprotein, Lipid profile, hypercholesterolemia

Unit III (15 Hrs.)

VITAMINS

Vitamins: Vitamins, its classification

Vitamin A

Vitamin D

Vitamin E & K

Vitamin B complex

Vitamin C

Unit IV (15 Hrs.)

ENZYMES

Enzymes: Definition, Classification, Coenzymes, Factors affecting enzyme activity, Types and examples of enzyme inhibition

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

MEDICAL SOCIOLOGY

Subject Code: BAOTS1-404

L T P C

Duration: 30 Hrs.

2 0 0 2

COURSE OBJECTIVES:

- Expected to have basic knowledge on basic medical sciences
- To develop in depth knowledge on concepts of pathological conditions.
- To develop exhaustive ideology of techniques in regional and general anesthesia

COURSE OUTCOME:

- Gain knowledge on history of anesthesia, pre and post - operative assessment.
- Learn the investigations and pre-anesthetic orders required for patient to be anesthetized.
- Gain knowledge on the management of complications and anesthetic considerations.

UNIT I (6 Hours)

NATURE AND SCOPE OF SOCIOLOGY

Definition, Historical background, subject matter of sociology, Nature and scope, Importance, Sociology of India, Relationship of sociology with other social sciences

UNIT-II (6 Hours)

FUNDAMENTAL CONCEPTS OF SOCIOLOGY

Society and Individual, Community, Social structure and functions of Institutions, Association, Organization, Social system, social order, Social control, social groups, Social Process, Social change

UNIT III (6 Hours)

CLASSICAL THINKERS AND THEIR CONTRIBUTIONS

Augustecomte, Emile Durkheim, Karl Marx, Max Weber, Herbert Spencer

UNIT-IV (6 Hours)

SOCIOLOGY OF INDIA

Characteristics of Indian society, Racial linguistic, Religious and demographic, Hindu social organization-ashramas, varnas, dharma and karma, purushartha, Caste system, Problems of SC&ST, Sanskritisation, Westernization and Modernization,

UNIT V (6 Hours)

ANTHROPOLOGY AND CULTURAL ANTHROPOLOGY

Definition of anthropology, Subfield of anthropology, Cultural Anthropology yesterday and today, Anthropological Perspectives, Early Anthropologist Environment and culture, Kinship, Clan Ethno methodology, Gender, Subsistence and Exchange, Social Organization and evolution of political system

Reference:

1. Bottomore. T.B., Sociology: A guide to problems and Literature, 1971, Random House
2. Gisbert P. Fundamentals of sociology, 3rd Edition, 2004, Orient Longman publications
3. Neil J. Smelser, Handbook of sociology, 1988 sage publication
4. Johnson R.M, Systematic Introduction to Sociology, 1960, Allied Publishers Cultural Anthropology, Barbara D. Miller, 2006 Pearson/Allyn and Bacon Co.

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

PRINCIPLES OF ANESTHESIA-I PRACTICAL

Subject Code: BAOTS1-405

L T P C

Duration: 4 Hours/week

0 0 4 2

COURSE OBJECTIVES:

- Expected to have basic knowledge on basic medical sciences
- To develop in depth knowledge on concepts of pathological conditions.
- To develop exhaustive ideology of techniques in regional and general anesthesia

COURSE OUTCOME:

- Gain knowledge on various codes and safety devices.
- Learn the importance of endotracheal tubes and laryngoscopes in anesthesia.
- Learn about the machines and gain knowledge on OT and OT techniques

PRACTICALS/ DEMONSTRATION:

1. Cylinders,
2. Suction apparatus,
3. Endotracheal tubes,
4. Laryngoscopes,
5. LMA,
6. Oropharyngeal airway, Nasopharyngeal airway
7. Anesthesia machine- description, parts, safety features

Text Books:

1. The Anesthesia Technician and Technologist's Manual, Glenn Woodworth, Jeffrey R. Kirsch, Shannon Sayers-Rana, 1st edition, Lippincott Williams & Wilkins, 2012

Reference Books:

Anesthesia Equipment, Principles and Applications (Expert Consult: Online and Print), Anesthesia Equipment Clinical Key 2012

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

PRINCIPLES OF ANESTHESIA-II PRACTICAL

Subject Code: BAOTS1-406

L T P C

Duration: 4 Hours/week

0 0 4 2

COURSE OBJECTIVES:

- Expected to have basic knowledge on basic medical Sciences
- To develop knowledge on the principles of sterilization.
- To impart the techniques involved in sterilization in relation to anesthesia

COURSE OUTCOME:

- Gain knowledge on various codes and safety devices.
- Learn the importance of endotracheal tubes and laryngoscopes in anesthesia.
- Learn about the machines and gain knowledge on OT and OT techniques

COURSE SYLLABUS

PRACTICALS/ DEMONSTRATIONS

1. Checking the machine
2. O₂, N₂O, suction apparatus
3. Laryngoscopes, Endotracheal tubes, airways
4. Things for IV accessibility
5. Other monitoring systems
6. Case acceptance: ASA grading - I, II, III, IV, V
7. Specific Learning Outcome (SLO).
8. Learn the preparation of OT based of the type of patients and methods of sterilization.
9. Gain knowledge on various positions in surgery.
10. Gain knowledge on disinfectants and their importance.

Text Books:

1. The Anesthesia Technician and Technologist's Manual, Glenn Woodworth, Jeffrey R. Kirsch, Shannon Sayers-Rana, 1st edition, Lippincott Williams & Wilkins, 2012

Reference Books:

Anesthesia Equipment, Principles and Applications (Expert Consult: Online and Print), Anesthesia Equipment Clinical Key 2012

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

BIOCHEMISTRY-I PRACTICAL

Subject Code: BAOTS1-407

L T P C

Duration: 4 Hours/week

0 0 4 2

PRACTICALS

- 1 Reactions of Glucose
- 2 Reactions of Fructose
- 3 Reactions of Maltose
- 4 Reactions of Lactose
- 5 Tests for Sucrose
- 6 Tests for Starch
- 7 Identification of unknown Carbohydrates
- 8 Spotters: The student must identify the spotter and write some important uses of the spotter.
 - i. CRYSTALS- Maltosazone, Lactosazone, Glucosazone/Fructosazone
 - ii. REAGENTS- Benedict's reagent, Barfoeds reagent, Foulgers reagent, Seliwanoff reagent, Fouchets reagent
 - iii. CHEMICALS- Sodium Acetate, Phenylhydrazine, α Naphthol
 - iv. STRUCTURES- Structure of Cholesterol, Structure of Glucose, Structure of Fructose
 - v. VITAMINS- Carrots, Rickets, Scurvy, Egg

FIFTH SEMESTER

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

PHARMACOLOGY

Subject Code: BAOTS1-501

L T P C

Duration: 60 Hrs.

3 1 0 4

Course objective:

1. To understand the terminologies and basic principles of pharmacokinetic and pharmacodynamic involved in the use of drugs.
2. To understand the pharmacological action and mechanism of action of common drugs used for different disease conditions.
3. To know the therapeutic uses and adverse effects of common drugs used for different disease conditions.

Unit I (12 Hrs.)

- Pharmacodynamics-Adverse drug effects
- Drugs acting on Autonomic Nervous System, Peripheral Nervous System and Drugs acting on Central Nervous system
- General considerations-Cholinergic system & drugs-Anticholinergic drugs
- Adrenergic drugs- antiadrenergic drugs-Drugs acting on autonomic ganglia.

Unit II (12 Hrs.)

- Skeletal muscle relaxants-Local anaesthetics, General anaesthetics-Ethyl & Methyl alcohol- Sedatives-Hypnotics-Antiepileptics-Antiparkinsonian drugs-Drugs used in mental illness- Opioid analgesics and Non opioid Analgesics-Nonsteroidal Antiinflammatory drugs

Unit III (12 Hrs.)

- Cardiovascular drugs , Drugs affecting Blood & Blood formation and Drugs on Respiratory system
- Cardiac glycosides, Antiarrhythmic drugs, Antianginal drugs, Antihypertensives and Diuretics, Haematinics, Erythropoietin, Drugs affecting-coagulation, Fibrinolytic and Antiplatelet drugs, Treatment of cough and antiasthmatic drugs.

Unit IV (12 Hrs.)

- Antimicrobial drugs
- General consideration- Antibiotics - Antibacterial agents - Antitubercular drugs - Antifungal- Antileprotic- Antiviral- Antimalarial- Antiamoebic- Antiprotozoal drugs- Cancer Chemotherapy, Antiseptic- Disinfectant-others.

Unit V (12 Hrs.)

- Hormones & related Drugs, Drugs used in Gastrointestinal diseases & Miscellaneous drugs
- Corticosteroids, Antithyroid drugs and Drugs for Diabetes Mellitus, Treatment of Vomiting, Constipation, Diarrhoea and Treatment of peptic ulcer
- Vitamins, Vaccines, Sera and chelating agents.

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

ANESTHESIA TECHNIQUES INCLUDING COMPLICATIONS

Subject Code: BAOTS1-502

L T P C

Duration: 60 Hrs.

3 1 0 4

COURSE OBJECTIVES:

- Expected to have basic knowledge on anatomy, physiology, pathology and pharmacology.
- To develop in depth knowledge on anesthesia techniques for various procedures.
- To develop exhaustive ideology of the complications associated with various anesthesia techniques.

COURSE OUTCOME:

- Gain knowledge on the setup of required Equipment for anesthesia.
- Gain knowledge on monitoring and diagnostic procedures for anesthesia.
- Learn the general idea on the care of patients for various procedures.

UNIT – I (12 Hours)

To setup the required equipment's for general anesthesia, spinal, epidural, nerve block.

UNIT II (12 Hours)

Monitoring during anesthesia and complications.

UNIT – III (12 Hours)

Monitoring and diagnostic procedures in ICU, Central venous access, ECG monitoring, Invasive hemodynamic monitoring

UNIT – IV (12 Hours)

General care of patient in ICU-Eye, GI tract, Bladder, skin, Case of mechanically ventilated patient, Tracheotomy, humidification, Vascular lines – arterial, venous line, Radiography, Physiotherapy – chest physiotherapy

UNIT – V (12 Hours)

Regional anesthesia-Introduction, Indication, Contraindication, Check list, Procedure, Complications, Management, Spinal, Epidural, Nerve Block 15.

Text Books:

1. **Regional Anesthesia And Pain Management:** Current Perspectives, Dureja, 3rd edition, ElsevierIndia, 2007

Reference Books

1. Clinical Anesthesia, Paul G. Barash, 6th edition, Lippincott Williams & Wilkins, 2009

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

BIOCHEMISTRY-II

Subject Code: BAOTS1-503

L T P C

Duration: 60 Hrs.

3 1 0 4

Course objective:

- To have a knowledge about the chemistry and metabolism of various macromolecules-carbohydrate, protein and lipids
- To learn about enzymes, vitamins, minerals and nutrition
- To know the structure and function of Hemoglobins, Nucleic acids.
- To learn about the organ function tests like Liver Function Tests and Renal Function Tests.

Unit I (15 Hrs.)

PROTEINS

- Classification of amino acids,
- Structure of proteins,
- Plasma proteins,
- Immunoglobulins.

Metabolism of Proteins:

- Digestion and absorption of proteins,
- Transamination,
- Deamination,
- Steps of urea cycle,
- Phenylketonuria,
- Alkaptonuria,
- Transmethylation,
- Products derived from Glycine and tyrosine

Unit II (15 Hrs.)

NUCLEIC ACIDS

- Structure & Function of DNA,
- Structure, Its types & Functions of RNA
- Nucleic Acid Metabolism

HAEMOGLOBIN

- Structure & Function of Haemoglobin
- Haemoglobin Metabolism

Unit III (15 Hrs.)

MINERALS

Minerals: Macro & Minor Minerals & Metabolism

NUTRITION

- BMR, SDA & Glycemic Index
- Dietary Fibers & Balanced Diet
- Protein Energy Malnutrition

Unit IV (15 Hrs.)

ORGAN FUNCTION TEST

- RFT

ACID BASE BALANCE

- pH Homeostasis
- Buffers
- Buffers
- Acidosis
- Alkalosis

MRSPTU

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

ENVIRONMENTAL SCIENCE AND COMMUNITY MEDICINE

Subject Code: BAOTS1-504

L T P C

Duration: 30 Hrs.

2 0 0 2

COURSE OBJECTIVES:

- Expected to have basic knowledge on **Natural Resources**
- To develop in depth knowledge on **Biodiversity and pollutions**
- To develop exhaustive ideology of the complications associated with **health & disease**

COURSE OUTCOME:

- Gain knowledge on the setup of Cycles in The Ecosystem
- Gain knowledge about the effect, control measures Learn the general idea on the care of patients for various procedures.

UNIT-I (6 Hours)

Natural Resources: Introduction, Multi-disciplinary nature of environmental studies, Earth Resources and Man, Renewable And Non-Renewable Resources, Water Resources, Mineral Resources: Food Resources: Effects of modern agriculture, Fertilizer/ pesticide problems, Water logging, and salinity, Energy Resources.

Ecosystems: Concept of an Ecosystem, Structure And Functions of an Ecosystem, Producers, Consumers and Decomposers, Cycles in The Ecosystem

UNIT-II (6 Hours)

Biodiversity: Introduction, Definition: Genetic, Species, Ecosystem Diversity, India as a Mega Diversity Nation, Hotspots of Biodiversity Threats to Biodiversity. Poaching of Wildlife, Man-Wildlife Conflicts, Endangered and Endemic

Pollution: Definition, Causes, Effects and Control Measures of Air Pollution, Water Pollution, Pollution, Marine Pollution, Noise Pollution, Thermal Pollution, Nuclear hazards, Solid Waste Management role of Individuals in Pollution Prevention.

UNIT-III (6 Hours)

Social Issues Human, Population and Environment: From Unsustainable to Sustainable Development, Urban Problems Related To Energy, Water Conservation, Rain Water Harvesting, global warming, acid rain, ozone layer depletion, nuclear accidents and nuclear holocaust.

Concept of health & disease: Concept of health, Definition of health, Philosophy of health- Dimension of health - Concept of wellbeing, Spectrum of health, Responsibility of health - Determinates of health & Indicators of health - Concepts of disease & Concepts of cessation –Natural history of Disease- Iceberg Phenomenon, Concept of control- Concept of Prevention- Modes of Intervention, Changing pattern of disease.

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

UNIT-IV (6 Hours)

Epidemiology: Definition & Explanation, Aims, Epidemiologic approach, Basic measurement in epidemiology & tools of measurement – of Mortality , Epidemiologic methods – Descriptive epidemiology – Analytical epidemiology -Cohort study – Experimental epidemiology – RCT- Association & Causation Uses of epidemiology (Criteria for judging causality) – Infection disease epidemiology Definitions Dynamic of disease transmission & Mode of Transmission – Disinfection – Definitions Types Agents used Recommended disinfection procedures – Investigation of an epidemic.

UNIT-V (6 Hours)

Environmental & health: Definition & Components (environment sanitation environmental sanitation) Water: Safe & Whole some water Requirements Uses source of water supply (sanitary well) – Purification (1).Large scale purification, (2). Small scale purification – Waterquality – Special treatment of water Air: Composition the air of occupied room discomfort. Air pollution & its effects. Prevention & Control of air pollution Ventilation: Definition Standards of ventilation Types of Ventilation. Light, Noise & Radiation, Meteorological environment, Housing, Disposal of waste Excreta disposal

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

PHARMACOLOGY LAB

Subject Code: BAOTS1-505

**L T P C
0 0 4 2**

Duration: 4 Hours/week

PRACTICALS

INSTRUMENTS:

- Needles: Intravenous, intrathecal, spinal, intra arterial
- Syringes: Tuberculin, insulin
- I.V cannula
- Vein set
- Inhalers
- Spacers
- Nebulizers
- Tablets- Enteric coated, sustained release, sub-lingual
- Topical preparation, ointment, lotion, powder, drops- eye/ear
- Charts- mechanism of action of drugs, adverse effects, toxicology
- Spotters- drugs

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

ANASTHESIA TECHNIQUES INCLUDING COMPLICATIONS LAB

Subject Code: BAOTS1-506

L T P C
0 0 4 2

Duration: 4 Hours/week

COURSE OBJECTIVES:

- Expected to have basic knowledge on anatomy, physiology, pathology and pharmacology.
- To develop in depth knowledge on anesthesia techniques for various procedures.
- To develop exhaustive ideology of the complications associated with various anesthesia techniques.

COURSE OUTCOME:

- Gain knowledge on the setup of required Equipment for anesthesia.
- Gain knowledge on monitoring and diagnostic procedures for anesthesia.
- Learn the general idea on the care of patients for various procedures.

PRACTICALS/ DEMONSTRATIONS

1. How to assist anesthetists?
2. Monitoring during anesthesia and post-operative period
3. General care of patient in ICU
4. How to assist anesthetist for central venous cannulation

Text Books:

1. **Regional Anesthesia And Pain Management:** Current Perspectives, Dureja, 3rd edition, ElsevierIndia, 2007

Reference Books

1. Clinical Anesthesia, Paul G. Barash, 6th edition, Lippincott Williams & Wilkins, 2009

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

BIOCHEMISTRY-II LAB

Subject Code: BAOTS1-507

**L T P C
0 0 4 2**

Duration: 4 Hours/week

PRACTICALS

- 1 Non- Protein Nitrogenous Substances
- 2 Analysis Constituents of normal urine
- 3 Analysis Constituents of abnormal urine
- 4 Identification of abnormal constituents in urine
- 5 Estimation of Glucose in blood
- 6 Estimation of Urea in blood.

Spotters

Spotters: The student must identify the spotter and write some important uses of the spotter.

1. Urinometer
2. Lactometer
3. Centrifuge
4. Spectroscope
5. Colorimeter
6. pH meter
7. Ryles's Tube
8. Chromatography apparatus
9. Electrophoresis apparatus
10. Micropipette
11. Fluorosis
12. Inborn Errors of Metabolism
13. Protein Energy Malnutrition
14. Benzidine powder
15. Sulphur powder
16. Fouchet's Reagent
17. Structure of t RNA
18. Egg White
19. Jaundice
20. Gout

SIXTH SEMESTER

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

**ANESTHESIA FOR SPECIALTIES (INCLUDING CRITICALCARE ASSISTANCE
AND VENTILATION) PAPER-I**

Subject Code: BAOTS1-601

L T P C

Duration: 60 Hrs.

3 1 0 4

COURSE OBJECTIVES:

- Expected to have basic knowledge on anesthesia techniques and principles
- To develop knowledge on anaesthetic techniques for cardiac and Neuroanesthesia.
- To develop knowledge on anaesthesia for shock and trauma.

COURSE OUTCOME:

- Gain knowledge on cardiac anesthesia including monitoring setup and management.
- Learn the signs of raised ICT and induction of patient and positioning for neuro Anesthesia.
- Gain knowledge on anesthetic management and rapid sequence induction for trauma and Shock.

UNIT – 1 (12 Hours)

Cardiac anesthesia –PART 1 NYHA classification, Arrhythmias, Angina, Dyspnoea-Premedication, Setting up of monitoring system, Monitoring – invasive and non-invasive,

UNIT II (12 Hours)

Cardiac anesthesia –PART 2 Getting ready for the case, Induction of cardiac patient,precautions to be taken, Transferring the patient to ICU, Care to be taken, ICU management.

UNIT – III (12 Hours)

Neuro Anesthesia- Glasgow coma scale, Signs of raised ICT, Premedication, Check list, Induction of a patient Positioning in neuro surgery, I.C.P monitoring , Air embolism, Transferring to I.C.U / ward

UNIT – IV (12 Hours)

Anaesthesia for Trauma & Shock Resuscitation, Pre-opinvestigation/assessment, Circulatory management, Management of anaesthesia, Rapid sequence induction, other problems.

UNIT – V (12 Hours)

CPR- BLS, ACLS

Reference

Text Books:

- 1 Nurse Anesthesia, John J. Nagelhout, Karen L. Plaus, 5th edition, Elsevier Health Sciences, 2014
- 2 Basics of Anesthesia, Ronald D. Miller, Manuel Pardo, 6th edition, Elsevier Health Sciences, 2011

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

**ANESTHESIA FOR SPECIALTIES (INCLUDING CRITICAL CARE ASSISTANCE
AND VENTILATION) PAPER-II**

Subject Code: BAOTS1-602

L T P C

Duration: 60 Hrs.

3 1 0 4

COURSE OBJECTIVES:

- Expected to have basic knowledge on anesthesia techniques and principles.
- To develop knowledge on anesthetic techniques for obstetric and pediatric anesthesia.
- To develop knowledge on an anesthesia outside the O.R.

COURSE OUTCOME:

- Gain knowledge on obstetric anesthesia including precautions, induction, reversal and emergencies.
- Learn the theatre setting, monitoring and pain management for pediatric anesthesia.
- Gain knowledge on situations, natural calamities and complications of anesthesia outside the OR.

UNIT-I (12 Hours)

Obstetric Anesthesia (Part 1) - Differences between a pregnant and a normal lady, Risks for anesthesia, Precautions to be taken, Check list, Regional vs general anesthesia, Induction / maintenance

UNIT-II (12 Hours)

Obstetric Anaesthesia (Part 2)- Resuscitation of the new born, APGAR score, Reversal and extubation, Emergencies – Manual removal of placenta, A.P.H,- P.P.H., Ruptured uterus, Ectopic pregnancy, Labour, Epidural analgesia

UNIT-III (12 Hours)

Paediatric Anaesthesia - Theatre setting ,Check list, Premedication ,Induction, Intubations-securing the ETT, Monitoring, Reversal & extubation – problems, Transferring / IC management, Pain management.

UNIT-IV (12 Hours)

Day Care Anaesthesia - Special features, Set up, Advantages, Disadvantages, Complications, Future

UNIT-V (12 Hours)

Anesthesia Outside the O.R- Situations, Cath lab, Radiology and Imaging Science Technology natural calamities, E.C.T, Features, Shortcomings, Complications

Text Books:

Nurse Anesthesia, John J. Nagelhout, Karen L. Plaus, 5th edition, Elsevier Health Sciences, 2014

Reference Books:

Basics of Anesthesia, Ronald D. Miller, Manuel Pardo, 6th edition, Elsevier Health Sciences, 2011

**MRSPTU B.S.C. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

PRINCIPLES OF STERILIZATION TECHNIQUES

Subject Code: BAOTS1-603

L T P C

Duration: 60 Hrs.

3 1 0 4

COURSE OBJECTIVES:

- Expected to have basic knowledge on basic medical Sciences
- To develop knowledge on the principles of sterilization.
- To impart the techniques involved in sterilization in relation to anaesthesia

COURSE OUTCOME:

- Gain knowledge on the design of operation theatres.
- Learn the preparation of OT based on the type of patients and methods of sterilization.
- Gain knowledge on the care and maintenance of operation records in OT.

UNIT – I (8 Hours)

Layout of OT and Lighting of OT

UNIT II (11 Hours)

Cleanliness and sterilization of OT and Anaesthesia- Carbolic acid, fumigation, principles of sterilization – autoclaving, pressure sterilization, boiling, dry heat, gas chemical sterilization, gamma rays' sterilization

UNIT – III (14 Hours)

OT preparation- Preparation of spinal /epidural/nerve block tray. Preparation of patients for various types of anaesthesia including laying out of trolleys, preparation of Boyle's apparatus for administration of anaesthesia, precaution to reduce antistatic friction hazards, preparation of sterile field, special precautions in handling patients with sepsis, blood borne infections – Hepatitis B, HCV, HIV, etc, Cleaning and Disinfection of articles and OT various positions during surgeries - lithotomy/kidney/beach chair/lateral/prone

UNIT – IV (12 Hours)

Electrical and fire hazards- Prevention of physical, electrical, chemical injuries and hazards to patients OT pollution and scavenging

UNIT – V (15 Hours)

Care and Maintenance of Operation records of OT- Maintenance of septic OT, Use and maintenance of defibrillator, cautery, OT light, suction, emergency light etc., Admission and transfer procedures

Text Books:

Principles and Methods of Sterilization in Health Sciences, John J. Perkins, 2nd edition, Charles C Thomas Pub Limited, 1983

Reference Books:

Fundamentals of Surgical Practice, Aljafri A. Majid, Andrew N. Kingsnorth, 1st edition, Cambridge University Press, 1998

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

HEALTHCARE AND BASIC PRINCIPLES

Subject Code: BAOTS1-604

**L T P C
2 0 0 2**

Duration: 30 Hrs.

COURSE OBJECTIVES:

- Expected to have basic knowledge on anaesthesia techniques and principles.
- To develop knowledge on anaesthetic techniques for obstetric and pediatric anesthesia.
- To develop knowledge on an aesthesia outside the O.R.

COURSE OUTCOME:

- Gain knowledge on obstetric anesthesia including precautions, induction, reversal and emergencies.
- Learn the theatre setting, monitoring and pain management for pediatric anesthesia.
- Gain knowledge on situations, natural calamities and complications of anesthesia outside the O.R.

Unit I (10 Hrs.)

Concept of Health Care and Health Policy

Health in Medical Care

Indigenous systems of Health Care & their relevance

Framework for Health Policy Development

Health Organization

Historical development of Health Care System in the third world & India

Organization & Structure of Health Administration in India

Type of Health Organization including International Organizations

Private & Voluntary Health care provider

Distribution of Health Care Services

Health Care System in Public Sector Organization

Health systems of Various Countries

Unit II (10 Hrs)

Health Policy and National Health Programme

National Health Policy

Drug Policy

National Health Programs (Malaria, T.B., Blindness, AIDS etc.)

Evaluation of Health Programs (Developing indicators for evaluation)

Medical Education & Health Manpower Development

Health Economics Fundamentals of Economics

Scope & Coverage

Demand for Health Services

Health as an Investment

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

Population, health of Economic Development

Unit III (10 Hrs.)

Methods & Techniques of Economic Evaluation of Health Program

Cost Benefit & Cost Effective Methods

Household & Health

Health Expenditure & Outcome

Rationale for Government action

Household capacity, income and schooling

Economics of Health

Population based health services

Economics of Communicable and Non Communicable diseases

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

**ANESTHESIA FOR SPECIALTIES (INCLUDING CRITICALCARE ASSISTANCE
AND VENTILATION) PAPER-I PRACTICAL**

Subject Code: BAOTS1-605

**L T P C
0 0 4 2**

Duration: 4 Hours/week

COURSE OBJECTIVES:

1. Expected to have basic knowledge on anaesthesia techniques and principles.
2. To develop knowledge on anaesthetic techniques for cardiac and Neuro anaesthesia.
3. To develop knowledge on anaesthesia for shock and trauma.

COURSE OUTCOME:

1. Gain knowledge on cardiac anaesthesia including monitoring setup and management.
2. Learn the signs of raised ICT and induction of patient and positioning for neuro-anaesthesia.
3. Gain knowledge on BLS chain of survival.

COURSE SYLLABUS:

PRACTICALS/ DEMONSTRATIONS

- Spotters –basic anaesthetic considerations in cardiac and neurosurgery
- Charts- BLS chain of survival
- Demonstration- transferring of post-operative patient to ICU

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

**ANESTHESIA FOR SPECIALTIES (INCLUDING CRITICALCARE ASSISTANCE
AND VENTILATION) PAPER-II PRACTICAL**

Subject Code: BAOTS1-606

L T P C

Duration: 4 Hours/week

0 0 4 2

COURSE OBJECTIVES:

1. Expected to have basic knowledge on anaesthesia techniques and principles.
2. To develop knowledge on anaesthetic techniques for obstetric and pediatric anesthesia.
3. To develop knowledge on anaesthesia outside the O.R.

COURSE OUTCOME:

1. Gain knowledge on obstetric anaesthesia including precautions, induction, reversal and emergencies.
2. Learn the theatre setting, monitoring and pain management for pediatric anesthesia.
3. Gain knowledge on situations, natural calamities and complications of anaesthesia outside the O.R.

COURSE SYLLABUS:

PRACTICALS/DEMONSTRATIONS

- 1) Spotters –common obstetric emergencies
- 2) Charts- situations requiring anesthesia outside operation theatre
- 3) Demonstration-how is pediatric anesthesia different from adult.

**MRSPTU B.S.C. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

PRINCIPLES OF STERILIZATION TECHNIQUES - PRACTICAL

Subject Code: BAOTS1-607

L T P C

Duration: 4 Hours/week

0 0 4 2

COURSE OBJECTIVES:

- Expected to have basic knowledge on basic medical Sciences
- To develop knowledge on the principles of sterilization. in relation to anesthesia
- To impart the techniques involved in sterilization.

COURSE OUTCOME:

- Learn the preparation of OT based of the type of patients and methods of sterilization.
- Gain knowledge on various positions in surgery.
- Gain knowledge on disinfectants and their importance

COURSE SYLLABUS:

PRACTICALS/ DEMONSTRATIONS

1. Disinfectants
2. Methods of sterilization
3. Various positions in surgery

Text Books:

Principles and Methods of Sterilization in Health Sciences, John J. Perkins, 2nd edition, Charles CThomas Pub Limited, 1983

Reference Books:

Fundamentals of Surgical Practice, Aljafri A. Majid, Andrew N. Kingsnorth, 1st edition, CambridgeUniversity Press, 1998

SEVENTH SEMESTER

**MRSPTU B.SC. MEDICAL TECHNOLOGY (ANESTHESIA AND
OPERATION THEATRE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

BIostatistics and Research Methodology

Subject Code: BAOTS1-702

L T P C

Duration: 30 Hrs.

2 0 0 2

COURSE OBJECTIVES:

- Expected to have basic knowledge on anaesthesia techniques and principles.
- To develop knowledge on anaesthetic techniques for obstetric and pediatric anesthesia.
- To develop knowledge on an anesthesia outside the O.R.

COURSE OUTCOME:

- Gain knowledge on obstetric anesthesia including precautions, induction, reversal and emergencies.
- Learn the theatre setting, monitoring and pain management for pediatric anesthesia.
- Gain knowledge on situations, natural calamities and complications of anesthesia outside the O.R.

Unit I (6 Hrs.)

- **What is statistics** – Importance of statistics in behavioural sciences – Descriptive statistics and inferential statistics – Usefulness of quantification in behavioural sciences.
- **Measurements** – Scales of measurements – Nominal, Ordinal, Interval and Ratio scales.

Unit II (6 Hrs.)

- **Data collection** – Classification of data – Class intervals – Continuous and discrete measurements – Drawing frequency polygon – types of frequency polygon – Histogram.
- **Cumulative frequency curve** – Ogives – Drawing inference from graph.

Unit III (6 Hrs.)

- **Measures of central tendency** – Need – types: Mean, Median, Mode – Working out these measures with illustrations.
- **Measures of variability** – Need – Types: Range, Quartile deviation, Average deviation, Standard deviation, Variance – Interpretation.

Unit IV (6 Hrs.)

- **Normal distribution** – General properties of normal distribution – Theory of probability – Illustration of normal distribution – area under the normal probability curve.
- **Variants from the normal distribution** – skewness – Quantitative measurement of skewness – kurtosis – measurement of kurtosis – factors contributing for non-normal distribution.

Unit V (6 Hrs.)

- **Correlation** – historical contribution – meaning of correlation – types: Product, moment, content correlation, variation of product, movement correlation, rank correlation, Regression analysis.
- **Tests of significance**- need for – significance of the mean – sampling error – significance of differences between means – interpretation of probability levels – small samples – large samples.

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF PHARMACY

SYLLABUS

FOR

M.SC. (CARDIAC CARE TECHNOLOGY)

(2 YEARS PROGRAMME)

2023 BATCH ONWARDS

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**MRSPTU M.SC. (CARDIAC CARE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

SCHEME

1 st Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MCCTS1-101	Introduction to Clinical Cardiology	4	0	0	40	60	100	4
MCCTS1-102	Fundamentals of cardiac Diagnostic Procedures and investigation	3	1	0	40	60	100	4
MCCTS1-103	Introduction to Pacing and Electrophysiology Study Techniques	3	1	0	40	60	100	4
MCCTS1-104	CCT Directed Clinical Education-I	-	-	8	100	-	100	4
MCCTS1-105	Introduction to Clinical Cardiology Practical	-	-	4	40	60	100	2
MCCTS1-106	Fundamentals of cardiac Diagnostic Procedures and investigation Practical	-	-	4	40	60	100	2
Total		10	2	16	300	300	600	20

2 nd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MCCTS1-201	Introduction to Non-Invasive Techniques in Cardiology	4	0	0	40	60	100	4
MCCTS1-202	Invasive Cardiology	3	1	0	40	60	100	4
MCCTS1-203	Research Methodology & Biostatistics	4	0	0	40	60	100	4
MCCTS1-204	Introduction to Non-Invasive Techniques in Cardiology- Practical	0	0	4	60	40	100	2
MCCTS1-205	Invasive Cardiology – Practical	0	0	4	60	40	100	2
MCCTS1-206	Research Methodology & Biostatistics - Practical	0	0	4	60	40	100	2
MCCTS1-207	Basics of Clinical Skill Learning	4	-	-	100	-	100	4
Total		14	1	12	400	300	700	22

**MRSPTU M.SC. (CARDIAC CARE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

3 rd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MCCTS1-301	Echocardiography- Advanced	4	0	0	60	40	100	4
MCCTS1-302	Development of cardiovascular system-fetal and neonatal	4	0	0	60	40	100	4
MCCTS1-303	CCT Directed Clinical Education-II	0	0	8	100	-	100	4
MCCTS1-304	Dissertation/ Project	0	0	8	100	-	100	4
MCCTS1-305	Echocardiography Advanced – Practical	0	0	4	40	60	100	2
Total		8	0	20	360	140	500	18

4 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MCCTS1-401	Internship and Dissertation	0	0	40	80	120	200	20
Total							200	20

For internship the candidate shall undergo internship in relevant department. The internship report shall be submitted to the parent institute & Viva-Voce examination shall be conducted by external expert.

For project/ dissertation the candidates will be supervised by the concerned faculty & the project report will be submitted to the institute. The Viva-Voce examination shall be conducted by external expert.

Overall Marks / Credits

Semester	Marks	Credits
1 st	600	20
2 nd	700	22
3 rd	500	18
4 th	200	20
Total	1700	80

FIRST SEMESTER

INTRODUCTION TO CLINICAL CARDIOLOGY

Subject Code: MCCTS1-101

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Outcomes: Students will get knowledge about

- The medical management of important conditions including hypertension, acute coronary syndromes, arrhythmias, valvular heart diseases and other cardiovascular disorders.
- The clinical skills required for medical management of patients admitted with various cardiovascular disease.
- The ultimate measure of quality of care in cardiology and there is no excuse to ignore them.
- The main outcomes in cardiology trials (mortality, hospitalization, myocardial infarction/re-infarction, and stroke) constitute the strongest reference for guideline recommendations.

Unit: 1 (16 hrs)

Basic Cardiology: Anatomy of the heart, Conduction system of the heart, Symptoms of the heart diseases, Examination of Cardiovascular diseases

Cardiac Auscultation: The stethoscope: components, working, uses, Heart sound – Types of heart sounds: normal and abnormal, Prosthetic heart sounds

Unit: 2 (14 hrs)

Physical Appearance: General appearance, Gestures and gait

Detailed Appearance: Face, Eyes—external and internal Mouth—external and internal Hands and feet, Skin, Muscles and tendons, Thorax, Abdomen

Unit: 3 (16 hrs)

Arterial pulse: Information derived from the arterial pulse, Sites of Arterial Pulse, Methods of measuring Arterial pressure, Physical determinants of Arterial pressure

The Jugular and Peripheral Veins: External and Internal Jugular Veins, Techniques of Examination for External and Internal Jugular Veins, Assessment of Jugular Venous Pressure, Anatomic-Hemodynamic Inferences, Electrophysiologic Inferences— Arrhythmias and Conduction Defects

Unit: 4 (14 hrs)

Heart failure & Cardiomyopathy: Heart failure, Cardiogenic shock, Pulmonary edema, Cardiomyopathy

Cardiovascular diseases: Hypertension, Ischemic Heart disease, Rheumatic heart disease, Arrhythmias, Pregnancy and heart diseases

Reference books:

- Physical Examination of the Heart and Circulation Fourth Edition, Joseph K. Perloff, M.D.
- Textbook of Anatomy (Vol.1,2,3): B.D. Chaurasia
- Ross and Wilson Anatomy & Physiology in Health and Illness, 12th Edition by Anne Waugh and
- Allison Grant
- Principles of Anatomy & Physiology ,12th Edition by Gerard J. Tortora& Bryan Derrickson
- Textbook of Physiology (Vol.1,2): Dr. A.K. Jain

**MRSPTU M.SC. (CARDIAC CARE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

INTRODUCTION TO CLINICAL CARDIOLOGY (PRACTICAL)

Subject Code: MCCTS1-105

**L T P C
0 0 4 2**

Duration: 60 (Hrs.)

Course Outcomes:

- The medical management of important conditions including hypertension, acute coronary syndromes, arrhythmias, valvular heart diseases and other cardiovascular disorders.
- The clinical skills required for medical management of patients admitted with various cardiovascular disease.
- Clinical outcomes are the ultimate measure of quality of care in cardiology and there is no excuse to ignore them.
- The main outcomes in cardiology trials (mortality, hospitalization, myocardial infarction/re-infarction, and stroke) constitute the strongest reference for guideline recommendations.

Experiments related to:

Cardiac Auscultation

Physical Examination in Cardiovascular diseases.

Chest roentgenogram

Electrocardiography

Reference books:

- Physical Examination of the Heart and Circulation Fourth Edition , Joseph K. Perloff, M.D.
- Textbook of Anatomy (Vol.1,2,3): B.D. Chaurasia
- Ross and Wilson Anatomy & Physiology in Health and Illness, 12th Edition by Anne Waugh and Allison Grant
- Principles of Anatomy & Physiology ,12th Edition by Gerard J. Tortora& Bryan Derrickson
- Textbook of Physiology (Vol.1,2): Dr. A.K. Jain

**MRSPTU M.SC. (CARDIAC CARE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

**FUNDAMENTALS OF CARDIAC DIAGNOSTIC PROCEDURES AND
INVESTIGATION**

Subject Code: MCCTS1-102

**L T P C
3 1 0 4**

Duration: 60 (Hrs.)

Course Outcomes:

- The students will develop a systematic and comprehensive understanding of, and skills in, cardiac investigations and diagnostic procedures.
- They will understand, interpret and commission basic and complex diagnostic cardiac investigations.
- They will know about various cardiac complications.
- They will get knowledge about how to treat emergency cardiac conditions.

Unit: 1 (12 hrs)

Cardiac Catheterization in detail: Types of procedures, Hardware used, vascular access, Conditions for Cardiac Catheterization

Unit: 2 (15 hrs)

Physics and Operation of Radiation equipment in Cardiac Cath Lab: X-RAY tube & its design, Image intensifier, Gantry, Exposure factors, Projections used in various procedures

Unit: 3 (15 hrs)

Diagnostic Procedures: Coronary Angiography, Peripheral Angiography, Renal Angiography, Cerebral Angiography

Unit: 4 (18 hrs)

HEMODYNAMICS: Introduction to Hemodynamics, Pressure Measurement System, Sources of Error and Artifacts: Fluid Artifacts, Electronic and Electrical Artifacts, Human Error: Leveling and Balancing, Slope calibration, Hemodynamic waveforms, Gradient, Valve Area Calculations, Cardiac output formulas- Fick, Ejection fraction
Emergencies in the Cardiac Catheterization Laboratory: Major and Minor complications in CCL, Basic Life support and ACLS algorithms in emergencies

Reference books:

Invasive Cardiology- A MANUAL FOR CATH LAB PERSONNEL, 3rd Edition by Sandy Watson

**FUNDAMENTALS OF CARDIAC DIAGNOSTIC PROCEDURES AND
INVESTIGATIONS PRACTICAL**

Subject Code: MCCTS1-106

**L T P C
0 0 4 2**

Duration: 60 (Hrs.)

Course Outcomes:

- This course provides a basis for the student to develop a systematic and comprehensive understanding of, and skills in, cardiac investigations and diagnostic procedures.
- To educate and train students to understand, interpret and commission basic and complex diagnostic cardiac investigations
- To educate the students about various cardiac conditions
- To provide knowledge about treatment of cardiac ailments

Experiments related to:

1. Cardiac Catheterization
2. Angiography & its types
3. Hemodynamic assessments
- 4 BLS & ACLS algorithm
5. Physics of Radiation Equipment
6. Hardware used in CCL

Reference Books

Invasive Cardiology- A MANUAL FOR CATH LAB PERSONNEL, 3rd Edition by Sandy Watson

**INTRODUCTION TO PACING AND ELECTROPHYSIOLOGY STUDY
TECHNIQUES**

Subject Code: MCCTS1-103

**L T P C
3 1 0 4**

Duration: 60 (Hrs.)

Course Objectives:

- To teach students about common pacemaker problems.
- Identify indications for ICD and biventricular pacemaker implantation based on international guidelines
- Identify indications for cardiac pacing based on international guidelines.
- Identify indications for electrophysiological studies with/ without ablation in cases of complex arrhythmias.

UNIT: 1 (15 Hrs)

Anatomy of conduction system: SA node, AV node, Intermodal and inter-atrial conduction, AV junctional and inter-ventricular conduction delay, The bundle of His, penetrating portion of the AV bundle, The bundle branches, The branching portion of the AV bundle, Terminal Purkinje fibres, Innervations of the AV node, His bundle & ventricular myocardium

UNIT: 2 (16 Hrs)

Nervous & hormonal control of heart: Anatomy of ANS, Various hormones involved in control of heart, Effect of vagal stimulation, Effect of sympathetic stimulation

Basics of Electrophysiology: History, Equipment used, Personnel, Procedure, Arrhythmias treated, Differences between Children and Adults for Electrophysiology

UNIT-3 (19 Hrs)

Radiofrequency ablation therapy: Procedure, Arrhythmias treated: Atrioventricular Nodal Reentrant Tachycardia (AVNRT), Atrial Fibrillation, Atrial Flutter and Ventricular Tachycardia
Introduction to Cardiac Pacing: Normal conduction, NBG codes for pacemaker, Indications for Temporary and Permanent Pacing, Pacemaker Components

UNIT-4 (10 Hrs)

Temporary Pacing (in detail): Myocardial conduction, Pacemaker therapy, Basic terminologies used in Temporary Pacing, Types of Temporary pacemaker, Complications associated

Reference books:

- Invasive Cardiology- A MANUAL FOR CATH LAB PERSONNEL, 3rd Edition by Sandy Watson
- Principles of Anatomy & Physiology ,12th Edition by Gerard J. Tortora& Bryan Derrickson

**MRSPTU M.SC. (CARDIAC CARE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

CCT DIRECTED CLINICAL EDUCATION-I

Subject Code: MCCTS1-104

L T P C

Duration: 150 (Hrs.)

0 0 8 4

Students will gain additional skills in interventional procedures, cardiac pharmacology and recent advancements. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist at a designated hospital or clinic. Students will be tested on intermediate pharmacological and invasive techniques.

The progress of students will be evaluated jointly at the department as well as at designated hospital or clinic. One faculty or staff member will be deputed for the student at both places.

MRSPTU

SECOND SEMESTER

INTRODUCTION TO NON-INVASIVE TECHNIQUES IN CARDIOLOGY

Subject Code: MCCTS1-201

L T P C

Duration: 60 (Hrs.)

4 0 0 4

Course Objectives: To teach students about common non-invasive techniques, investigations carried out with indications and complications.

Course Outcomes: Identify indications for non-invasive techniques based on international Guidelines. Identify indications for non-invasive techniques.

UNIT 1 (16 Hrs)

BASICS OF ELECTRODE PLACEMENT AND LEAD SELECTION AND AXIS DEVIATION: Basics of Electrodes and Leads, ECG deflections: Isoelectric, Upright, Negative and Biphasic, Types of ECG leads- Standard limb leads, Precordial leads and the Wilson central, Augmented limb leads, Unipolar V/S Bipolar leads, Placement of leads with universal color code, Hexa-axial reference frame and Electrical axis, X axis – time presentation, Y axis – voltage presentation, Right & Left axis in normal ECG, Einthoven's Triangle, Deviation of Axis.

STRESS TEST: Protocols, lead placement, instruction to the patient, rhythm analysis, Types of Exercise stress tests

UNIT II (15 Hrs)

ECG COMPONENTS-WAVES AND INTERVALS: ECG waveforms: Rate, Rhythm and Normal time intervals-The Normal Electrocardiogram, The Normal P wave & Atrial repolarization, Atrioventricular node conduction and the PR segment, Ventricular activation and the QRS complex, Genesis of QRS complex, Ventricular recovery and ST-T wave, Normal variants and Rotation of the heart, ECG PAPER, Rate measurement: Six second method, Large box method, Small box method

ECHOCARDIOGRAPHY TECHNIQUES: BASIC PRINCIPLES, INDICATIONS AND USES OF: 2D Transthoracic Echocardiography, M-mode, Echo windows and views used in Transthoracic echocardiography, Doppler echocardiography in detail: Pulsed, Continuous wave and Color flow mapping

UNIT III (15 Hrs)

KNOBOLOGY AND INSTRUMENTATION: Transducer: Basic principle and working, Types of Transducers, Piezoelectric crystals and its effect, various knobs used on Echo machine with its description and application

UNIT IV (14 Hrs)

BASICS OF TOE, STRESS ECHO & CONTRAST ECHO: Advantages & Disadvantages, Applications, Indications & Contraindications, Complications, Patient positioning and medications used

Textbooks:

1. ECG Made Easy –Atul Luthra
2. Reference by PGDCC – IGNOU Handbooks for ECG, ECHO and Stress Test
3. Echo Made Easy: Sam Kaddoura
4. Reference by PGDCC – IGNOU Handbooks for ECG, ECHO and Stress Test.
5. Feigen Baum's Echocardiography Tajik Jamil for Echocardiography.

**MRSPTU M.SC. (CARDIAC CARE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

INVASIVE CARDIOLOGY

Subject Code: MCCTS1-202

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives: To enable students, understand new techniques for procedures in and around the heart emerge that again need expert knowledge and manual dexterity. To understand such interventions which include diagnostic and therapeutic electrophysiology; implantation or exchange of complex pacemaker systems or percutaneous cardioverter defibrillator-pacers; percutaneous valve repairs or replacements etc.

Course Outcomes: To enable students to not only be a helping hand to those just starting out in the specialty but also to serve as a reference for those who have been working in Invasive field for some time.

Unit: 1 (15 Hrs)

CONTRAST MEDIA: Basics, Definition of Hydrophilicity, Osmolarity, and Viscosity, Contrast Agents used in the CCL, Uses, Complications, Contrast medium reactions: Mild, Moderate, Severe, Allergies: Anaphylactic and Anaphylactoid Reaction, Contrast-Induced Nephropathy (CIN)

IVUS: History, Angiography vs. IVUS, IVUS systems, Diagnostic Applications of IVUS, Complications of IVUS, Optical Coherence Tomography (OCT)

Unit: 2 (15 Hrs)

FUNCTIONAL ASSESSMENT OF CORONARY DISEASE: Intravascular Pressure Measurement: Coronary Pressures and Fractional Flow Reserve

PTCA: History, Indications, Materials used, Types of Angioplasty balloons (OTW, SOE, Fixed-wire balloons, Perfusion balloons, Compliant and Non-Compliant balloons, Stent Implantation, Contraindications, Complications

Unit: 3 (15 Hrs)

IC HARDWARES: Stents: Composition, Types, Guide wires: Composition, Types, Catheters: Diagnostic and Guiding

IABP AND OTHER CARDIAC ASSIST DEVICES: IABP- Physiologic Principles of Counter pulsation, Indications, Contraindications, Insertion, Timing: Timing errors, Troubleshooting, Weaning and Balloon Removal, Complications, Basics of Percutaneous ventricular assist devices: Tandem Heart, Impella, Percutaneous Coronary Bypass.

Unit: 4 (15 Hrs)

PERIPHERAL CAROTID ANGIOGRAPHY: Introduction, Cerebrovascular Anatomy and pathology, Diagnosis and patient selection, Patient preparation, Diagnostic procedure, Post procedure Care

CARDIAC PHARMACOLOGY: Local Anesthetics, Analgesics And Sedatives: Opioids, Morphine, Fentanyl, Diazepam, Midazolam, Lorazepam, Vasodilators: Nitroglycerine, Sodium Nitroprusside, Beta receptor blockers: Metoprolol, Propranolol, Esmolol, Labetalol, Calcium Channel Blockers: Diltiazem, Verapamil, Nicardipine, Anticoagulation Agents: Platelet Aggregation Inhibitors, Aspirin, Clopidogrel, Glycoprotein IIb/IIIa Inhibitors, Tirofiban, Heparin, Warfarin, Thrombolytics: Streptokinase, Urokinase, Anistreplase, rTPA, Reteplase, Tenecteplase

**MRSPTU M.SC. (CARDIAC CARE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

Reference books:

- Invasive Cardiology, 3rd Edition by Sandy Watson.
- THE INTERVENTIONAL CARDIAC CATHETERIZATION HANDBOOK, 3rd Edition by Morton J. Kern

MRSPTU

RESEARCH METHODOLOGY & BIOSTATISTICS

Subject Code: MCCTS1-203

L T P C

Duration: 60 (Hrs.)

4 0 0 4

Course Objectives: The course is intended to give an overview of research and statistical models commonly used in medical and bio-medical sciences. The goal is to impart an intuitive understanding and working knowledge of research designs and statistical analysis. The strategy would be to simplify, analyse the treatment of statistical inference and to focus primarily on how to specify and interpret the outcome of research.

Course Outcomes: Student will be able to understand develop statistical models, Research designs with the understating of background theory of various commonly used statistical techniques as well as analysis interpretation & reporting of results and use of statistical software.

Unit: 1 (15 Hrs)

Research Methodology

- Scientific Methods of Research: Definition of Research, Assumptions, Operations and Aims of Scientific Research. Research Process, Significance and Criteria of Good Research, Research Methods versus Methodology, Different Steps in Writing Report, Technique of Interpretation, Precaution in interpretation, Significance of Report Writing, Layout of the Research Report
- Research Designs: Observational Studies: Descriptive, explanatory, and exploratory, Experimental Studies: Pre-test design, post-test design, Follow-up or longitudinal design, Cohort Studies, Case Control Studies, Cross sectional studies, Intervention studies, Panel Studies
- Sampling Designs: Census and Sample Survey, Implications of a Sample Design, Steps in Sampling Design Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of Sample Designs (Probability sampling and non-probability sampling), How to Select a Random Sample?, Systematic sampling, Stratified sampling, Cluster sampling, Area sampling, Multi-stage sampling, Sampling with probability proportional to size, Sequential sampling.

Unit: 2 (15 Hrs)

- Measurement in research: Measurement Scales, Sources of Error in Measurement, Tests of Sound Measurement, Technique of Developing Measurement Tools, Scaling Meaning of Scaling, Scale Classification Bases, Important Scaling Techniques, Scale Construction Techniques, Possible sources of error in measurement, Tests of sound measurement.
- Methods of Data Collection: Types of data, Collection of Primary Data, Observation Method, Interview Method, Collection of Primary Data.
- Sampling Fundamentals : Need and importance for Sampling, Central Limit Theorem, Sampling Theory, Concept of Standard Error, Estimation, Estimating the Population Mean Estimating Population Proportion, Sample Size and its Determination, Determination of Sample Size through the Approach Based on Precision Rate and Confidence Level.

Unit: 3 (16 Hrs)

- Data Presentation: Types of numerical data: Nominal, Ordinal, Ranked, Discrete and continuous. Tables: Frequency distributions, Relative frequency, Graph: Bar charts,

MRSPTU M.SC. (CARDIAC CARE TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS

Histograms, Frequency polygons, one way scatter plots, Box plots, two way scatter plots, line graphs. Measures of Central Tendency and Dispersion: Mean, Median, Mode Range, Inter quartile range, variance and Standard Deviation, Coefficient of variation, grouped mean and grouped standard deviation (including merits and demerits).

- Testing of Hypotheses: Definition, Basic Concepts, Procedure for Hypothesis Testing, Measuring the Power of a Hypothesis Test, Normal distribution, data transformation Important Parametric Tests, Hypothesis Testing of Means, Hypothesis Testing for Differences between Means, Hypothesis Testing for Comparing Two Related Samples, Hypothesis Testing of Proportions, Hypothesis Testing for Difference between Proportions, Hypothesis Testing for Comparing a Variance to Some Hypothesized Population Variance, Testing the Equality of Variances of Two Normal Populations
- Chi-square Test: Chi-square as a Non-parametric Test, Conditions for the Application Chi-square test, Steps Involved in Applying Chi-square Test, Alternative Formula, Yates' Correction, and Coefficient by Contingency. Measures of Relationship: Need and meaning, Correlation and Simple Regression Analysis

Unit: 4 (14 Hrs)

- Analysis of Variance and Covariance: Analysis of Variance (ANOVA): Concept and technique of ANOVA, One-way ANOVA, Two-way ANOVA, ANOVA in Latin Square Design Analysis of Co-variance (ANOCOVA), ANOCOVA Technique. Nonparametric or Distribution-free Tests: Important Nonparametric or Distribution-free Test Sign test, Wilcoxon signed-Rank Test, Wilcoxon Rank Sum Test: Mann-Whitney U test Kruskal Walli's test, Friedman's test, and Spearman Correlation test.
- Vital Health Statistics: Measurement of Population: rate, crude rate, specific rate, Measurement of fertility: specific fertility rate, Total fertility rate, Reproduction rate, Gross Reproduction Rate, Net Reproduction Rate, Measures related to mortality: Crude Death Rate (CDR), Age-specific death Rate, Infant and child mortality rate, Measures related to morbidity.
- Computer Application Use of Computer in data analysis and research, Use of Software and Statistical package. Introduction to SPSS. Importing data from excel, access, tab and comma separated files. Entering data, labeling a variable, coding and recoding a categorical and continuous variable. Converting data from string to numeric variables, sorting & filtering, merging, appending data sets. Frequencies, descriptive statistics, cross tabulations. Diagrammatic presentation include histogram, bar chart, pie chart, scatter diagram, box plot, line chart. Parametric test of hypothesis-one sample, Independent and paired sample t test, one way ANOVA & post HOC test. Testing for normality, Chi-square test with measures of association. Pearson correlation. Non parametric test.

Reference books:

1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, Publisher Marcel Dekker Inc. New York.
2. Fundamental of Statistics – Himalaya Publishing House- S.C. Gupta
3. Design and Analysis of Experiments – PHI Learning Private Limited, R. Pannerselvam,
4. Design and Analysis of Experiments – Wiley Students Edition, Douglas and C. Montgomery

**INTRODUCTION TO NON-INVASIVE TECHNIQUES IN CARDIOLOGY-
PRACTICAL**

Subject Code: MCCTS1-204

**L T P C
0 0 4 2**

Duration: 60 (Hrs.)

Course Objectives: To teach students about common non-invasive techniques, investigations carried out with indications and complications.

Course Outcomes: Identify indications for non-invasive techniques based on international Guidelines. Identify indications for non-invasive techniques.

Experiments:

- Steps to perform an 12 lead ECG
- Patient positioning according to various conditions
- Proper communication with patient to find out the history
- ECG machine operating and maintenance

Text Books

- ECG Made Easy –Atul Luthra
- Reference by PGDCC – IGNOU Handbooks for ECG, ECHO and Stress Test
- Echo Made Easy: Sam Kaddoura
- Reference by PGDCC – IGNOU Handbooks for ECG, ECHO and Stress Test.
- Feigen Baum’s Echocardiography Tajik Jamil for Echocardiography.

INVASIVE CARDIOLOGY - PRACTICAL

Subject Code: MCCTS1-205

**L T P C
0 0 4 2**

Duration: 60 (Hrs.)

Course Objectives: To enable students, understand new techniques for procedures in and around the heart emerge that again need expert knowledge and manual dexterity. To understand such interventions which include diagnostic and therapeutic electrophysiology; implantation or exchange of complex pacemaker systems or percutaneous cardioverter defibrillator-pacers; percutaneous valve repairs or replacements etc.

Course Outcomes: To enable students to not only be a helping hand to those just starting out in the specialty but also to serve as a reference for those who have been working in Invasive field for some time.

Lists of Experiments:

- Learn about Probe and Scanner settings.
- Learn about Structural and Functional assessment of the heart.
- Learn about various windows and views used in Echocardiography.
- Learn about qualitative reporting system along with various software's associated with Echo reporting.

Reference books:

- Invasive Cardiology, 3rd Edition by Sandy Watson.
- THE INTERVENTIONAL CARDIAC CATHETERIZATION HANDBOOK, 3 rd Edition by Morton J. Kern

RESEARCH METHODOLOGY AND BIostatISTICS (PRACTICAL)

Subject Code: MCCTS1-206

**L T P C
0 0 4 2**

Duration: 60 (Hrs.)

Course Objectives: The course is intended to give understanding about practical use of research and statistical models commonly used in medical and bio-medical sciences. The goal is to impart an intuitive understanding and working knowledge of research designs and statistical analysis. The strategy would be to simplify, analyse the treatment of statistical inference and to focus primarily on how to specify and interpret the outcome of research.

Course Outcomes: Students will be able to understand and develop statistical models, Research designs with the understating of background theory of various commonly used statistical techniques as well as analysis interpretation & reporting of results and use of statistical software.

List of experiments:

1. Statistical Analysis Using Excel, SPSS, MINITAB® , DESIGN OF EXPERIMENTS, R - Online Statistical Software's to Industrial and Clinical trial approach
2. Practical use of Factorial Designs: 22, 23 design.
3. Practical related to Response Surface methodology: Central composite design, Historical design, Optimization Techniques
4. Graphs: Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph
5. Designing the methodology: methods of data collection, Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.
6. Data presentation
7. Measures of central tendency
8. Tests of hypotheses: Chi square test, measure of relationship
9. Analysis of variance and co-variance
10. Non-parametric test

Reference Books:

1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, Publisher Marcel Dekker Inc. New York.
2. Fundamental of Statistics – Himalaya Publishing House- S.C. Gupta
3. Design and Analysis of Experiments –PHI Learning Private Limited, R. Pannerselvam,
4. Design and Analysis of Experiments – Wiley Students Edition, Douglas and C. Montgomery

**MRSPTU M.SC. (CARDIAC CARE TECHNOLOGY)
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BASICS OF CLINICAL SKILL LEARNING

Subject Code: MCCTS1-207

**L T P C
4 0 0 4**

Duration: 60 (Hrs.)

Course Objectives:

1. To understand the basic ideas on how to check for Vital Signs of the Patient
2. In this course the students will learn how to handle the patients and their positioning
3. They will also learn on the Basics of Nasal-Gastric Tube
4. The Students will learn on Administration of IV, IV and Medication
5. Students will know about Cleanliness in the Asepsis

Course Outcomes: After successful accomplishment of the course,

1. The students would be able to Measure Vital Signs,
2. Do basic physical Examination of the patients, NG tube basics,
3. Administration of Medicines
4. The students will learn about Asepsis, and
5. The Cleanliness related to asepsis and on mobility of the patients

UNIT-I (15 Hrs)

MEASURING VITAL SIGNS: Temperature: Axillaries Temperature, Pulse: Sites of pulse, Measurement, Respiratory, Blood Pressure, Pain: Pain Scale

PHYSICAL EXAMINATION: Observation, Auscultation (Chest), Palpation, Percussion, History Taking

UNIT-II (15 Hrs)

FEEDING: ENTRAL FEEDING, NG TUBE: Measurement, Procedure, Care and Removal of Nasal-Gastric Tube, Nasal-Gastric Tube Feeding, and Parenteral Nutrition.

UNIT-III (15 Hrs)

ADMINISTRATIONS: Oral, Intravenous, Intramuscular, Subcutaneous, Recapping of Syringe, Loading of Drugs, Calculation of Drugs, Venipuncture, IV Infusion, Cannula, Attachment of IV infusion Set, Fluid Collection, Heparin Lock, Maintenance of IV set, Performing Nebulizer Therapy, Inhaler, Oxygen Therapy (Nasal, prongs, nasal Catheter, Venturi Mask, face mask)

UNIT-IV (15 Hrs)

ASEPSIS: Hand wash Techniques,(Medical, Surgical) Universal Precaution, Protecting Equipment: Using Sterile Gloves, Opening a Sterile package and Establishing a Sterile Field, Sterile Dressing Changes, Surgical Attire ,Wound Dressing, Suture Removal, Cleaning and Application of Sterile Dressing, Wearing and Removal of personal protective Equipment

MOBILITY AND SUPPORT: Moving and positioning, range of Motion exercises (Active & Passive) Assisting for Transfer, Application of Restraints

Reference Books:

1. ECG Made Easy –AtulLuthra
2. Reference by PGDCC – IGNOU Handbooks for ECG, ECHO and Stress Test
3. Echo Made Easy: Sam Kaddoura
4. Reference by PGDCC – IGNOU Handbooks for ECG, ECHO and Stress Test.
5. Feigen Baum's Echocardiography Tajik Jamil for Echocardiography.
6. Invasive Cardiology, 3rd Edition by Sandy Watson.
7. THE INTERVENTIONAL CARDIAC CATHETERIZATION HANDBOOK, 3rd Edition by Morton J. Kern

THIRD SEMESTER

ECHOCARDIOGRAPHY-ADVANCED

Subject Code: MCCTS1-301

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives: To provide practically and clinically useful application of Echocardiography. To explain echo techniques available and to put echo into a clinical perspective.

Course Outcomes: To develop an understanding regarding Echocardiography. To train students to perform Echocardiography examinations by explaining the position of transducers. To make students aware of recent advances in Echocardiography. To understand the role of Cardiac Care technician while assisting the Cardiologist as well as when performing individually.

Unit: 1. ECHOCARDIOGRAPHY FOR CORONARY ARTERY DISEASE (20 HRS)

Understanding coronary circulation: Coronary anatomy and physiology, pathogenesis of atherosclerotic plaques, abnormalities of coronary perfusion, wall thickening.

- Wall motion segmentation, analysis and scoring: Segmental analysis for wall motion defects, coronary artery territories, detection and quantitation of Ischemic muscle-wall motion scoring, Ischemic Cardiomyopathy. Myocardial infarction: Detecting and assessing MI, co-relation with coronary anatomy, prognostication following MI. Complications of MI: Aneurysm, pseudo aneurysm, Ventricular Septal Defect, thrombo-embolic potential, right ventricular involvement. Stress echocardiography: Protocols for stress echocardiography, detection of reversible Ischemic, detecting inducible ischaemia/viability, specificity and sensitivity. Newer echo techniques and their application in CAD: Tissue Doppler, Speckle echo & Contrast echo - indications, contraindications, drug dosage, delivery of contrast, interpretation with study of myocardial perfusion and LV opacification. Role of CT Angiography, MRI and Nuclear perfusion & myocardial viability in CAD g. LVAD: indications, technique and post-op evaluation

Unit: 2 ECHOCARDIOGRAPHY FOR VALVULAR HEART DISEASE: (20 HRS)

- Haemodynamic information derived from Normal Echocardiography. Mitral stenosis: Etiopathogenesis, pathophysiology and haemodynamics, diagnosis, assessing severity, secondary effects, assessment for balloon mitral valvotomy- Transesophageal echocardiography and its uses. Mitral regurgitation: Mitral valve prolapse and analysis of segments, Haemodynamics of MR, diagnosis of MR, assessing severity and secondary effects, pre-op, intra-op and postoperative, assessment for mitral valve repair,
- Use of three dimensional echocardiography for mitral valve surgery, flail mitral valve, papillary muscle dysfunction. mitral annular calcium. Aortic stenosis: Etiopathogenesis and haemodynamics, sub-valvar, valvar and supra-valvar lesions, cuspal morphology, diagnosis and assessment of secondary effects, time course and prognostication, pre-operative and postoperative assessment.
- Aortic regurgitation: Etiopathogenesis and haemodynamics, diagnosis, assessing severity, secondary effects, relevant aspects of left ventricular function, timing of surgery, preoperative and post-operative assessment. Tricuspid & Pulmonary valve disease: Anatomy and physiology of the healthy valve, structural and functional changes in various disease states organic and functional involvement, tricuspid stenosis, tricuspid

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regurgitation and assessment of severity, infundibular, valvar, supra valvar and peripheral pulmonic stenosis, approach to pulmonary artery hypertension.

- Prosthetic valves: Types and normal function of mechanical valves, stenosis regurgitation, use of transesophageal echo for prosthetic valves, endocarditis: and its sequelae in native and prosthetic heart valves.

Unit: 3 (10 Hrs)

- ECHOCARDIOGRAPHY IN MYO-PERICARDIAL, AORTIC, SYSTEMIC DISORDERS & CARDIAC MASSES

Hypertrophic Cardiomyopathy: Morphological variants, diagnosis, hemodynamics, assessing intracavitary and outflow tract gradients, evaluation of therapy, pre and postprocedural evaluation. Idiopathic dilated cardiomyopathy: Diagnosis and differentiation from other disorders such as IHD, ventricular functions and secondary effects, pre and post-procedural evaluation for cardiac re-synchronization therapy.

- Overview of cardiac transplantation. Restrictive Cardiomyopathy: Diagnosis and haemodynamics, infiltrative cardiomyopathies, miscellaneous- myocardial diseases in neuromuscular disorders, infectious agents and toxins. Diseases of the pericardium

Unit: 4 (10 Hrs)

- Pericardial effusion: Detection of fluid, diagnosis-pleural versus pericardial fluid, quantitation, loculated effusions, cardiac tamponade-diagnosis, haemodynamics etiology, pericardiocentesis Constrictive pericarditis: Diagnosis and haemodynamics. Differentiation from restrictive Cardiomyopathy, pre and post-surgical evaluation. 20 29/54 Miscellaneous: acute pericarditis, pericardial thickening, pericardial cysts, absent pericardium.
- Diseases of the Aorta: Aortic dilatation and aneurysms, Aortic dissection diagnosis and classification, false aneurysms, aneurysms of the aortic sinuses rupture, haemodynamics, pre-and post surgical evaluation. Miscellaneous trauma, infections, aorta-left-ventricular tunnel, atherosclerosis, Role of transesophageal echocardiography. Echocardiography in systemic disorders.
- Cardiac masses: Normal variants, primary cardiac neoplasms and secondaries involving the heart, secondary effects, extra cardiac masses, intra cardiac thrombi, ultrasonic typing, manmade objects in the heart. Electrophysiology: echo in bundle branch blocks and Wolf-Parkinson-White syndrome, Atrial fibrillation, ectopic rhythm-ventricular and supra-ventricular, pacemakers, CRT & ICD. Use of TEE in intensive care setup

Reference books-

1. Echocardiography by Feigenbaum (Latest Edition)
2. Echo manuals by Mayo Clinic Lecture notes.
3. Text book of Clinical Echocardiography, Catherine M. Otto (Hardcover International)
4. Cardiology by Braunwald and Hurst (Latest edition)
5. Journal articles Cardiology by Braunwald and Hurst (Latest edition)
6. Echo made easy by Sam Kaudor

ECHOCARDIOGRAPHY- ADVANCED PRACTICAL

Subject Code: MCCTS1-305

**L T P C
0 0 4 2**

Duration: 60 (Hrs.)

Course Objectives: To provide practically and clinically useful application of Echocardiography. To explain echo techniques available and to put echo into a clinical perspective.

Course Outcomes: To develop an understanding regarding Echocardiography. To train students to perform Echocardiography examinations by explaining the position of transducers. To make students aware of recent advances in Echocardiography. To understand the role of Cardiac Care technician while assisting the Cardiologist as well as when performing individually.

LIST OF EXPERIMENTS

- Linear measurements: indirect M-Mode markers of left ventricular function. ii. Assessing global LV function. iii. Regional left ventricular function: wall motion scoring, relationship to vascular supply, use of tissue Doppler where indicated. iv. Evaluation of diastolic function: Methods for evaluating diastolic function, Doppler evaluation of diastolic function, Evaluation of mitral inflow, determination of isovolumic relaxation time, Evaluation of pulmonary vein flow, Doppler tissue imaging. v. Complications of IHD such as aneurysms, VSD, clots & MR especially from a surgical perspective.
- Intensive care setup, protocols to follow in emergency situations & CPR, IV line insertion
- Administrative issues – maintenance of quality & standards in hospitals, record
- maintenance, stocks & purchase, medico legal issues
- How to prepare a report in various procedure - Routine trans-thoracic echo: adult and congenital/pediatric, TEE, contrast echo, vascular study & advanced
- Archiving of clinical data and images & research: Basics

Reference books-

- Echocardiography by Feigenbaum (Latest Edition)
- Echo manuals by Mayo Clinic Lecture notes.
- Text book of Clinical Echocardiography, Catherine M. Otto (Hardcover International)
- Cardiology by Braunwald and Hurst (Latest edition)
- Journal articles Cardiology by Braunwald and Hurst (Latest edition)
- Echo made easy by Sam Kaudor

DEVELOPMENT OF CARDIOVASCULAR SYSTEM: FETAL & NEONATAL

Subject Code: MCCTS1-302

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objective:

- To understand the description of fate of certain fetal structures once postnatal circulation is established.
- To provide an outline of Cardiovascular Anatomy to improve the student's understanding of the technical and diagnostic procedures used with special emphasis on applied aspects in Cardiology

Course Outcomes:

- This course will provide overall information of the structural development of the cardiovascular system.
- To encourage students to apply this knowledge to understand developmental anomalies in the Cardiovascular System.

Unit 1 (15 Hrs.)

- Early development of embryo: Early development of embryo, early blood vessel formation, Intra-embryonic blood vessel, Extra-embryonic blood vessel.
- Development of the heart: Formation and position of the heart tube, Formation and position of the heart loop, Mechanism of cardiac looping, Formation of the embryonic ventricle, Development of the sinus venosus, Formation of the cardiac septa, Atrial septation, the atrio-ventricular canal, the Muscular interventricular septum, the septum in truncus arteriosus and the conus cordis.

Unit 2 (15 hrs.)

- Formation of the cardiac valves: Formation of the cardiac valves, The Atrioventricular Valve, The semilunar valve.
- Formation of the great systemic veins: The cardiac veins, the vitelline veins, The Umbilical veins, the vena cava.

Unit 3 (15 hrs.)

Fetal & neonatal circulation: Blood flow pattern, oxygenation & venous return to the Heart, Cardiac output and its distribution, Intra - cardiac vascular pressure, myocardial function & its Energy metabolism

Characteristics of fetal circulation and changes occur at birth: Postnatal Circulation in Detail

Unit 4 (15 hrs.)

- Etiology of cardiovascular malformation: Congenital anomalies in detail
- Adult circulation: Systemic Circulation, Pulmonary Circulation.

REFERENCE BOOKS:

- E. Kenneth Weir, MD, Stephen L. Archer, MD, John T. Reeves The Fetal and Neonatal Pulmonary Circulation. 2000.
- Cardiovascular and Respiratory Physiology in the Fetus ...Petter Karlberg, Michelle Couchard-Monset, John Lind. 1986.

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CCT DIRECTED CLINICAL EDUCATION – II

Subject Code: MCCTS1-303

Duration: 405 (Hrs.)

Students will gain additional skills in interventional procedures, cardiac pharmacology and recent advancements. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate pharmacological and invasive techniques.

*The Dissertation work will begin from 3rd Semester, and will continue through the 4th Semester.

For Seminar/Presentations there will be a maximum of 50 marks. Seminar / presentations will be evaluated by the teachers of the dept. The marks obtained in the same will be kept confidentially with the Head of the Dept. and will be submitted along with the internal assessment marks.

DISSERTATION / PROJECT WORK

1. Dissertation/Project work should be carried out as an individual Dissertation and actual bench work.
2. The students will carry independent project work under the supervision of the staff of Department on an advanced topic assigned to him/her. In house projects are encouraged. Students may be allowed to carry out the project work in other Departmental laboratories/ Research institutes / Industries as per the availability of Infrastructure.
3. Co guides from the other institutions may be allowed.
4. The Dissertation/Project work will begin from 3rd Semester, and will continue through the 4th Semester.
5. The Dissertation/Project report (also work book shall be presented at the time of presentation and viva voce) will be submitted at the end of the 4th Semester and evaluated.
6. Five copies of the project report shall be submitted to the Director, SBS.
7. For the conduct of the End Semester Examination and evaluation of Dissertation/Project work the University will appoint External Examiners.
8. Since the dissertation is by research, Dissertation/Project work carries a total of 250 marks and evaluation will be carried out by both internal and external evaluators.
9. The student has to defend his/her Dissertation/Project Work in a seminar which will be evaluated by an internal and external experts appointed by the University.
10. The assignment of marks for Project/Dissertation is as follows:

Part I: Topic Selection, Review of Literature, Novelty of works-50 marks

Part-II: a. Continuous Internal Assessment, Novelty, Overall Lab Work Culture - 100 Marks

b. Dissertation/Project work book: 50 Marks

c. Viva-Voce: 50 Marks

d. However, a student in 4th semester will have to opt for general elective course from other related disciplines in addition to his Dissertation/Project work in the parent department.

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF PHARMACY

SYLLABUS

FOR

M.SC. (DIALYSIS TECHNOLOGY)

(2 YEARS PROGRAMME)

2023 BATCH ONWARDS

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SCHEME

1 st Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MDLTS1-101	Anatomy & Physiology in Renal-I	3	1	0	40	60	100	4
MDLTS1-102	Nutrition	3	1	0	40	60	100	4
MDLTS1-103	Pharmacology in Renal	3	1	0	40	60	100	4
MDLTS1-104	Anatomy & Physiology in Renal-I Practical	0	0	4	60	40	100	2
MDLTS1-105	Nutrition-Practical	0	0	4	60	40	100	2
MDLTS1-106	Introduction to Clinical-Practical	0	0	4	60	40	100	2
Total		9	3	12	300	300	600	18

2 nd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MDLTS1-201	Anatomy & Physiology in Renal-II	3	1	0	40	60	100	4
MDLTS1-202	Imaging in Kidney Diseases	3	1	0	40	60	100	4
MDLTS1-203	Biomedical Instrumentation & Dialysis Equipment	3	1	0	40	60	100	4
MDLTS1-204	Anatomy & Physiology in Renal-II Practical	0	0	4	60	40	100	2
MDLTS1-205	Imaging in Kidney Diseases-Practical	0	0	4	60	40	100	2
MDLTS1-206	Biomedical Instrumentation & Dialysis Equipment-Practical	0	0	4	60	40	100	2
Total		9	3	12	300	300	600	18

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3 rd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MDLTS1-301	Nephrology & Kidney Disease	3	1	0	40	60	100	4
MDLTS1-302	Emergency Medicines	3	1	0	40	60	100	4
MDLTS1-303	Hemodialysis	3	1	0	40	60	100	4
MDLTS1-304	Peritoneal Dialysis	3	1	0	40	60	100	4
MDLTS1-305	Renal Transplantation	3	1	0	40	60	100	4
MDLTS1-306	Nephrology & Kidney Disease & Emergency Medicines-Practical	0	0	4	60	40	100	2
MDLTS1-307	Hemodialysis & dialysis equipment-Practical	0	0	4	60	40	100	2
MDLTS1-308	Peritoneal Dialysis & Renal transplantation-Practical	0	0	4	60	40	100	2
Total		15	5	12	380	420	800	26

4 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MDLTS1-401	Thesis and Dissertation	0	0	40	80	120	200	20

The candidate shall undergo an internship of six months in the relevant department. The internship report shall be submitted to the principal & Viva-Voce examination shall be conducted by an external expert.

Overall Marks / Credits

Semester	Marks	Credits
1 st	600	18
2 nd	600	20
3 rd	800	26
4 th	200	20
Total	2200	84

FIRST SEMESTER

**MRSPTU M.SC. (DIALYSIS TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

ANATOMY & PHYSIOLOGY IN RENAL-I

Subject Code: MDLTS1-101

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Outcomes:

- To provide a comprehensive understanding of the anatomy and physiology of the urinary tract and kidney.
- To familiarize students with the embryology and fetal development related to the urinary system.
- To explain the physiological mechanisms involved in kidney function, including glomerular filtration, tubular reabsorption, and tubular secretion.
- To introduce the concept of peritoneal dialysis and the physiological aspects of peritoneal membrane transport.

Unit: 1 (10 hrs)

Anatomy of Urinary Tract & Kidney: Gross anatomy of the kidney, Location of kidney, Size, Protection, and Structure of the kidney – gross structure blood supply, nerve supply, lymphatic flow, L.S of Kidney.

Unit: 2 (10 hrs)

Embryology and fetal development in brief. Anatomy of peritoneum: Description Size, Nature, Blood supply, Lymphatic drainage

Unit: 3 (10 hrs)

Physiology of Kidney: Basic concepts Glomerular filtration, renal auto regulation of blood supply & GFR clearance, Tubular reabsorption, Aldosterone, ADH & water homeostasis, Tubular secretion, Maximal tubular transport capacity

Summary of major functions of Nephron & its components in urine formation: Glomerulus, PCT, Henley's loop (Descending limb & thick ascending limb), DCT Collecting duct: Cortical, Medullary.

Unit: 4 (15 hrs)

Physiological values: Urea, Creatinine, Electrolytes, Calcium, Phosphorus, uric acid, Magnesium, Glucose, 24 hours urinary indices – urea, Creatinine, electrolytes Ca & M.

Physiology of peritoneum during P.D. Diffusion through the peritoneum: Definition, Factors influencing solute transport- Peritoneal permeability, Solute characteristics, Concentration gradient, Peritoneal blood flow, Dialysis solution temperature, and Available membrane area.

Unit: 5 (15 hrs)

Osmosis through the peritoneal membrane. Ultrafiltration, Drug transport

Composition and function of blood – Introduction Red blood cells: Erythropoiesis, stages of differentiation function, count physiological, variation. Hemoglobin: structure, functions, concentration physiological variation methods of Estimation of Hb White blood cells: Production, function, life span, count, differential count Platelets: Origin, normal count, morphology functions.

Reference books-

1. Principles of Renal Physiology
2. Principles of Physiology – Devasis Pramanik, 5th edition.
3. Human Physiology for BDS –Dr A.K. Jain, 5th edition.
4. Textbook of Medical Physiology, Guyton , 2nd South Asia Edition.
5. Textbook of Physiology Volume I & II – Dr. A. K. Jain.
6. Comprehensive textbook of Medical Physiology Volume I & II – Dr. G. K. Pal.
7. Basics of medical Physiology –D Venkatesh and H.H Sudhakar, 3rd edition.

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NUTRITION

Subject Code: MDLTS1-102

L T P C
3 1 0 4

Duration: 60 (Hrs.)

Course Outcomes:

- Students will be able to apply the principles of nutritional assessment to design and evaluate nutritional assessment systems, considering reference distribution, limits, and cutoff points.
- Students will acquire the skills to select appropriate methods for measuring food consumption and evaluating nutrient intake data, including the use of recommended nutrient intake tables and probability approaches.
- Students will develop an understanding of clinical dietetics and its applications, enabling them to prescribe diets for specific health conditions and manage nutrition-related disorders.
- Students will gain knowledge of anthropometric assessment techniques and growth measurements.

Unit: 1 (15 Hrs.)

Principles of Nutritional Assessment: Introduction, Nutritional assessment system, Methods used in nutritional assessment, the design of nutritional assessment system, Evaluation of nutritional assessment indices. Reference distribution, Reference limits, Cutoff points.

Food consumption of Individual: Methods, New development in measuring food consumption, selecting an appropriate method, Summary, Evaluation of nutrient intake data, Tables of recommended nutrient intakes, Evaluating Nutrient intakes of individuals, Evaluating the nutrient intakes of population groups, Probability approach to evaluating nutrient intakes.

Unit: 2 (15 Hrs.)

Renal Nutrition: Part I Nutrition: Energy (Calories), Protein, Lipid (Fats& Cholesterol), Carbohydrates, Thiamine vitamin B1, aneurine, Riboflavin, Vitamin B6 (pyridoxine, adermin), Nicotinic acid (Niacin, nicotinamide), Folic acid (folate, folacin, pteroylglutamic acid), Vitamin b12 (cobalamin), Pantothenic acid(filtrate factor), Choline, biotin, Ascorbic acid (vitamin C), Vitamin A, Vitamin D, Vitamin E, Vitamin K, Bioflavonoid (vitamin P), Sodium, Potassium, Iron, Calcium, Phosphate, Magnesium, Manganese, Iodine, Copper, Cobalt, Chloride, Fluoride, trace elements, Dietary Fibers, Water.

Part II: Foods: Wheat, Rice, Pulses, Soya beans, Maize, Millets, Milk, Egg, Meats, Nuts & Dried Fruits, Sweet foods & sweetening agents, Fish, Vegetables, Fruits, Spices, Beverage.

Unit: 3 (15 Hrs.)

Clinical dietetics: Diet Prescription, Peptic ulcer, Flatulence, Constipation, Diarrhea & dysentery, Protein- Energy malnutrition, Anemic, underweight Obesity, Diabetes mellitus, Kidney disease, Renal failure, Kidney stones, Coronary Heart Diseases and atherosclerosis, High BP, Congestive cardiac failure, Tube feeding.

Anthropometric assessment: Advantages and limitations of anthropometric assessment, Sources of error in nutritional anthropometry, Evaluation of anthropometric indices, Anthropometric assessment of growth, Growth measurement, Indices derived from growth measurements.

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Unit: 4 (15 Hrs)

Evaluation of nutrient intake data: Tables of recommended nutrient intakes, Evaluating Nutrient intakes of individuals, evaluating the nutrient intakes of population groups, Probability approach to evaluating nutrient intakes.

Reference books:

1. Jelliffe, D. B.: Assessment of the Nutritional Status of the Community; World Health Organization.
2. Mahan, L.K. and Escott- Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
3. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (1999): Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.
4. Williams, S.R. (1993): Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby College Publishing.

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SYLLABUS 2023 BATCH ONWARDS

PHARMACOLOGY IN RENAL

Subject Code: MDLTS1-103

L T P C
3 1 0 4

Duration: 60 (Hrs.)

Course Outcomes:

- Students will be able to identify and describe the medications commonly used by patients with renal failure, including their mechanisms of action, appropriate dosages, potential side effects, and contraindications.
- Students will gain knowledge of the pharmacokinetic and pharmacodynamic principles relevant to renal disease, enabling them to understand how medications are absorbed, distributed, metabolized, and eliminated in patients with compromised renal function.
- Students will develop a comprehensive understanding of hemodialysis and peritoneal dialysis, including the use of specific medications, dialysis concentrates, and potassium exchange resins,
- Students will develop an understanding of various dialysis techniques and medications along with appropriate administration methods and potential adverse effects.

Unit: 1 (10 hrs.)

Medications commonly used by patient with renal failure: Antacids and phosphate binders, Anti anemic drugs, Anticoagulants, Antihypertensives

Unit: 2 (10 hrs.)

Medications commonly used by patient with renal failure: Antimicrobials, Antipruritis, Cardiovascular drugs, Chelating agents, Electrolytes, Laxatives and, Local anesthetics, Potassium ion exchange resin, Thrombolytic agents, Vitamins

Unit: 3 (10 hrs.)

Pharmacology related to Renal disease: Pharmacokinetic and Pharmacodynamic principles, IV fluid therapy with special emphasis in renal disease.
Diuretics–Classification, actions, dosage, side effects & contraindications

Unit: 4 (15 hrs)

Antihypertensive–Classification, action, dosage, side effects & contraindications, special reference during dialysis, vasopressors, Drugs used in hypotension.
Drugs & Dialysis–Dose & duration of administration of drugs
Dialysable drugs–Phenobarbitone, Lithium, Methanol etc
Vit D & its analogues, phosphate binders, iron, folic acid & other vitamins of therapeutic value
Erythropoietin in detail.

Unit: 5 (15 hrs)

Hemodialysis and Peritoneal dialysis: Heparin including low molecular weight heparin, Protamine sulphate, Gluteraldehyde, sodium hypochlorite, hydrogen peroxide role as disinfectants & adverse effects of residual particles applicable to gluteraldehyde
Haemo dialysis concentrates – composition & dilution (Acetate & bicarbonates)
PD fluid in particular hypertonic solutions composition (Dextrose, icodextrin solutions)
Potassium exchange resins with special emphasis on mode of administration.

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Reference books:

1. Daugridas J. T. Handbook of dialysis technology, 7th ed.
2. Danovitch, Handbook of Renal Transplantation, 6th ed.
3. Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varghese
4. National Kidney foundation
5. Essentials of Medical Pharmacology – Tripathi

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**MRSPTU M.SC. (DIALYSIS TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

ANATOMY & PHYSIOLOGY IN RENAL-I PRACTICAL

Subject Code: MDLTS1-104

**L T P C
0 0 4 2**

Duration: 4Hrs./Week

Course Outcomes:

- Students will be able to demonstrate knowledge of the principles and concepts underlying the identification tests for macronutrients.
- Students will acquire practical skills in conducting qualitative tests for carbohydrates, proteins, lipids, minerals, and vitamins, and be able to interpret the results obtained from these tests.
- Students will understand the physiological significance of macronutrients in human metabolism and health.
- Students will develop critical thinking skills to troubleshoot and refine experimental procedures for nutrient identification.

Experiments related to:

- Formation of urine by kidney
- Renal associated mechanism for controlling extracellular fluid osmolality and sodium concentration
- Renal regulation of Blood volume and extracellular fluid Volume, Excretion and regulation of urea, potassium, and other substances, Regulation of Acid-Base Balance

Reference Books:

1. Manipal Manual of Anatomy for Allied Health Sciences courses: Madhyastha S.
2. G.J. Tortora & N.P Anagnostakos: Principles of Anatomy and Physiology
3. B.D. Chaurasia: Handbook of General Anatomy

**MRSPTU M.SC. (DIALYSIS TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

NUTRITION PRACTICAL

Subject Code: MDLTS1-105

L T P C
0 0 4 2

Duration: 4Hrs./Week

- **Course Outcomes:** Students will be able to apply the principles of nutritional assessment to design and evaluate nutritional assessment systems, considering reference distribution, limits, and cutoff points.
- Students will acquire the skills to select appropriate methods for measuring food consumption and evaluating nutrient intake data, including the use of recommended nutrient intake tables and probability approaches.
- Students will develop an understanding of clinical dietetics and its applications, enabling them to prescribe diets for specific health conditions and manage nutrition-related disorders.
- Students will gain knowledge of anthropometric assessment techniques and growth measurements.

Experiments:

- Introduction and identification tests for Macronutrients
- Qualitative tests for Carbohydrates
- Qualitative tests for Protein
- Qualitative tests for Lipids
- Qualitative tests for Minerals & Vitamins

Reference books:

1. Jelliffe, D. B.: Assessment of the Nutritional Status of the Community; World Health Organization.
2. Mahan, L.K. and Escott- Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.

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INTRODUCTION TO CLINICAL PRACTICAL

Subject Code: MDLTS1-106

**L T P C
0 0 4 2**

Duration: 4Hrs./Week

Course Outcomes:

- Demonstrate proficiency in adjusting variable bicarbonate settings based on specific indications in dialysis.
- Apply appropriate isolated UF settings based on patient needs and clinical indications in dialysis.
- To learn about various diagnostic tests related to subject.

Experiment:

- Variable bicarbonate settings and indication
- Isolated UF settings and indications
- Advanced options – BVM, BTM and Single-needle Haemodialysis
- APD Machine settings
- PET test (Peritoneal Dialysis)
- Adding medicines in PD bags
- Assisting Venovenous catheter insertion

Reference books:

1. Jelliffe, D. B.: Assessment of the Nutritional Status of the Community; World Health Organization.
2. Mahan, L.K. and Escott- Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
3. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (1999): Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.
4. Williams, S.R. (1993): Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby College Publishing.

SECOND SEMESTER

**MRSPTU M.SC. (DIALYSIS TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

ANATOMY & PHYSIOLOGY IN RENAL-II

Subject Code: MDLTS1-201

**L T P C
3 1 0 4**

Duration: 60 (Hrs.)

Course Objectives:

- To develop a comprehensive understanding of the anatomy and microscopic structure of the urinary system, including the kidney, ureter, bladder, urethra, sphincters, and prostate.
- To explore the anatomy of the vascular system related to hemodialysis, focusing on the upper limb vessels, neck vessels, and femoral vessels, including their course, distribution, branches, origin, and abnormalities.
- To examine the regulatory mechanisms of the renal system, including water regulation, electrolyte regulation, and the regulation of acid-base balance. Additionally, to understand the role of renal hormones such as vitamin D, erythropoietin, renin, and prostaglandins.

Course Outcomes:

- Students will be able to describe the structural anatomy of the urinary system, including the kidney and its various components, and understand their functions in the excretory process.
- Students will be able to identify and describe the anatomy of the vascular system relevant to hemodialysis, including the course, distribution, branches, and abnormalities of major vessels.
- Students will gain an understanding of the regulatory mechanisms involved in the renal system, including water and electrolyte balance, acid-base regulation, and the role of renal hormones. They will be able to explain the physiological processes and abnormalities associated with these mechanisms.

Unit: 1 (12 Hrs)

Basic anatomy of urinary system: The Kidney (structural anatomy), ureter, bladder, urethra, Sphincters, Prostate.

Microscopic anatomy: Nephron: Glomerular structure, tubules Interstitium, Juxta Glomerular apparatus.

Unit: 2 (12 Hrs)

Anatomy of Vascular system related to Hemodialysis: Upper limb vessels (Course, distribution, branches, origin, and abnormalities), Neck vessels (Course, distribution, branches, origin, and abnormalities), Femoral vessels (Course, distribution, branches, origin, and abnormalities).

Unit: 3 (12 Hrs)

Renal regulatory Mechanism, Water regulatory mechanism, Electrolyte regulation (Sodium, Potassium, Chloride, Calcium, Phosphate, Magnesium), Regulation of acid – base balance (basic principles & abnormalities).

Renal hormones & Vit D, erythropoietin, Renin, Prostaglandins.

Unit: 4 (10 Hrs)

Routes of solute transport: Intracellular, Extracellular.

Factors that enhance diffusion: Increased dialysis solution flow, increased blood flow, High concentration gradient, Pre-warmed dialysis solution, Osmotic pressure.

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Hemostasis – basic principles Coagulation cascade, Coagulation factors, Regulation of procoagulants & anticoagulants BT, CT, PT, PTT, thrombin time.

Unit: 5 (14 Hrs)

Plasma Proteins – Production, concentration, types, albumin, globulin, Fibrinogen, prothrombin functions. Hemostasis & Blood coagulation: Hemostasis: Definition, normal hemostasis, clotting factors, mechanism of clotting, disorders of clotting factors. Blood Bank: Blood groups – ABO system, Rh system Blood grouping & typing Cross matching: Rh system – Rh factor, Rh in compatibility. Blood transfusion – Indication, universal donor and recipient concept. Selection criteria of a blood donor. transfusion reactions Anticoagulants – Classification, examples and uses Anemia's: Classification – morphological and etiological. Effects of anemia on body Erythrocyte sedimentation Rate (ESR) and Packed cell volume load Volume: Normal value, determination of blood volume and regulation of blood Volume Body fluid: pH, normal value, regulation and variation Lymph: lymphoid tissue formation, circulation, composition and function of lymph.

Reference books-

1. Principles of Renal Physiology
2. Principles of Physiology – Devasis Pramanik, 5th edition.
3. Human Physiology for BDS –Dr A.K. Jain, 5th edition.
4. Textbook of Medical Physiology, Guyton , 2nd South Asia Edition.
5. Textbook of Physiology Volume I & II – Dr. A. K. Jain.
6. Comprehensive textbook of Medical Physiology Volume I & II – Dr. G. K. Pal.
7. Basics of medical Physiology –D Venkatesh and H.H Sudhakar, 3rd edition.

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IMAGING IN KIDNEY DISEASES

Subject Code: MDLTS1-202

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

- To understand the principles and techniques of emergency medicine and Advanced Cardiac Life Support (ACLS), including the importance of timely medical interventions and the role of the American Heart Association.
- To develop knowledge and skills in assessing and managing cardiovascular and respiratory emergencies, including CPR techniques, airway management, and the use of automated external defibrillation.
- To explore special resuscitation situations and pediatric BLS, including stroke, trauma, near-drowning, and cardiac arrest associated with specific conditions, and to learn the unique techniques and considerations for resuscitation in these cases.

Course Outcomes:

- Students will be able to demonstrate competence in providing basic life support and ACLS techniques, including CPR, airway management, and automated external defibrillation.
- Students will understand the ethical and legal considerations in emergency medicine, including decision-making, CPR initiation and discontinuation, and safety measures during training and actual rescue situations.
- Students will gain knowledge and awareness of specific resuscitation situations and pediatric BLS, enabling them to effectively respond to emergencies involving stroke, trauma, drowning, and other unique circumstances.

Unit: 1 (12 Hrs)

- **Emergency medicine/ACLS/ renal nutrition:** BLS in perspective- The need for Medical interventions, The ultimate Coronary Care Unit, Emergency Cardiac Care, The chain of Survival, Role of the American Heart Association
- Cardio Pulmonary Function and actions for survival - The Cardiovascular and Respiratory system, Action for survival
- Risk factors and prudent Heart living- Risk factors for Heart Attack, Prudent Heart Living, Summary: The role of Prevention

Unit: 2 (12 Hrs)

- **Adult BLS:** Citizen response to Cardio-pulmonary Emergency, Indication for BLS, The sequence of BLS; Assessment, EMS activations and the ABC of CPR, CPR performed by one rescuer and two rescuers, Foreign – Body airway obstruction Management, CPR: The Human Dimension, BLS Research Initiative
- **Ethical and Legal considerations-** Values in Decision Making, Instituting and Discontinuing CPR, Legal mandates, Conclusions, Safety during CPR Training and actual rescue, Disease transmission during CPR Training, Disease transmission during actual performance of CPR, Automated External Defibrillation, Importance of Automated External Defibrillation, Overview of Automated External Defibrillation, Advantage and Disadvantage of Automated External Defibrillation, Use of Automated External

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Defibrillation during Resuscitation attempts, Automated External Defibrillation treatment algorithm, Post resuscitation care, Training, Maintenance of Skills, Medical control, Quality assurance

Unit: 3 (12 Hrs)

- Special Resuscitation Situation: Stroke, Hypothermia, Near – Drowning, Cardiac arrest associated with Trauma, Electric shock and lightning stroke, Pregnancy, Asphyxiation, Special techniques and pitfalls and complication, Unique situation
- Pediatric BLS- Epidemiology, Injury prevention, Prehospital care, The sequence of Pediatric BLS - the ABC of CPR, Activation of the EMS system obstructive, Foreign Body airway, BLS in Trauma

Unit: 4 (12 Hrs)

- Cardiopulmonary Resuscitation and Advanced Cardiac Life Support: Basic Life Support, General Considerations of Advanced Cardiac Life Support: Arrhythmia recognition and defibrillation-ventilation and airway management-route of drug administration-IV fluids-diagnose and correct the underlying cause of the arrest-internal cardiac compression-initiation and discontinuation of resuscitation.
- Specific Arrest Sequences in Advanced Cardiac Life Support : VF and Pulseless VT-Systole-Bradycardia-Pulseless electrical activity(PEA)-Tachycardias, Post resuscitation Management, Common Medications Used in Advanced Cardiac Life Support : Epinephrine-Atropine sulfate-Lidocaine-Procaïnamide hydrochloride-Bretyliumtosylate magnesium sulfate-adenosine-Diltiazem or verapamil-Isoproterenol-Sodium bicarbonate-Calcium

Unit: 5 (12 Hrs)

- Critical Care: Respiratory Failure: General considerations-pathophysiology-Blood gas analysis, Oxygen therapy: Nasal prongs-venturi masks- Nonre breathing masks-A continuous positive airway pressure mask-Bilevel positive airway pressure, Airway Management and Tracheal Intubation: Airway Management-Endotracheal intubation-Surgical airways, Mechanical Ventilation: Indications-Initiation of mechanical ventilation- Management of problems and complications-Weaning from mechanical ventilation- Drugs commonly used during endotracheal intubation and mechanical ventilation, Shock: Resuscitative Principles-Individual shock states, Hemodynamic Monitoring and Pulmonary Artery Catheterization: Indications obtaining, pulmonary capillary wedge tracing-acceptance of PAOP reading transmural, pressure-Cardiac output-Interpretation of hemodynamic readings
- Cardiac Arrhythmias- Recognition and Management: Clinical diagnosis of arrhythmias Electrocardiographic data- Bradyarrhythmias- premature complexes-Tachycardia. Antiarrhythmic Drug Therapy: General Principles-Antiarrhythmic agents, Related Topics: Syncope-Electro cardioversion-Cardiac pacing-Anti-tachycardia devices

Reference books:

1. Sutton, Textbook of Radiology and Imaging, 7th ed.
2. Harrison's Principles of Internal Medicine, 20th ed.
3. Manual of Nephrology, Robert Schrier Reference books or related websites: Oxford Handbook of Nephrology, 2nd ed.

**MRSPTU M.SC. (DIALYSIS TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

BIOMEDICAL INSTRUMENTATION & DIALYSIS EQUIPMENT

Subject Code: MDLTS1-203

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

- Students will be able to grasp the fundamental concepts and components of biomedical instrumentation, including transducers and their applications in the field of biomedicine.
- Students will gain knowledge about the sources of bioelectric potentials, such as resting and action potentials, and understand the theory behind various types of electrodes used in biomedical instrumentation.
- Students will learn about the physiological effects of electrical current, methods of accident prevention, patient care and monitoring techniques, and the importance of electrical safety in the context of medical equipment.

Course Outcomes:

- Ability to analyze and apply transducer principles in biomedical applications.
- Proficiency in utilizing bioelectric potentials and electrodes for biomedical measurements.
- Understanding of electrical safety practices and patient care in medical equipment.

Unit: 1 (15 Hrs)

- Introduction to Biomedical Instrumentation: The Age of Biomedical Engineering, Development of BM instrumentation, Biometrics, Introduction to the man-instrument system, Components of the man-instrument system physiological systems of the body, Problems encountered in measuring a living system
- Basic Transducer principles: The transducer and transduction principles, Active transducers, Passive transducers, Transducers for Biomedical applications

Unit: 2 (15 Hrs)

- Sources of Bioelectric potentials: Resting and action potentials, Propagation of Action potentials, The Bioelectric potentials
- Electrodes: Electrode theory, Biopotential electrodes, Biochemical transducers
- The computer in Biomedical Instrumentation: The digital computer - Computer Hardware, Computer software. Microprocessors - Types of microprocessors, Microprocessors in Biomedical Instrumentation- Calibration , Table lookup , Averaging , Formatting and printout, Interfacing the computer and medical instrumentation and other equipment.- Digital interfacing requirement , Analog-to-digital and Digital-to-Analog conversion, Biomedical computer application - Data acquisition, storage and retrieval, data reduction and transformation, mathematical operation, pattern recognition, limit detection, statistical analysis of data, data presentation ,control function – Computer analysis of the ECG, the digital computer in the clinical chemistry laboratory, digital computerized in hemodialysis machine, other computer application

Unit: 3 (15 Hrs)

- Electrical safety of Medical Equipment: Physiological effects of electrical current, Shock hazards from electrical equipment, Methods of accident prevention- Grounding, Double

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insulation, Protection by low voltage, Ground – fault circuit interrupter, Isolation of patient – connected parts Isolated power distribution systems

- Patient care and monitoring: The elements of intensive – care monitoring, Patient monitoring displays, Diagnosis, calibration and reparability of patient – monitoring equipment, Other instrumentation for monitoring patients, The organization of the hospital for patient care monitoring, Defibrillator, Description of Machine self test, Technical safety checks and maintenance, General notes, Technical safety checks and maintenance procedures maintenance checklist

Unit: 4 (15 Hrs)

Adjustment: Overview of the Dip switches, Calibration mode, Hydraulics, Dir detector, Calibration Program, Diagnostics Program, General notes, Setup Menu- Overview, Main menu, Circuit diagram and circuit description, Block diagram, level detector control (LD), BLD, Mother board, CPU, Input / output board, Display board, Power supply, Hep - Module

Reference books:

1. Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese.
2. Introduction to Biomedical Equipment Technology by Joseph J.Carr, John m. Brown

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ANATOMY & PHYSIOLOGY IN RENAL-II PRACTICAL

Subject Code: MDLTS1-204

L T P C

Duration: 60 (Hrs.)

0 0 4 2

Course Objectives:

- To develop a comprehensive understanding of vital signs, including pulse, blood pressure, temperature, respiratory rate, and pulse oximetry, and their significance in healthcare.
- To provide students with practical skills in examining the chest through techniques such as inspection, percussion, palpation, and auscultation, enabling them to assess respiratory health effectively.

Course Outcomes:

- Students will be able to accurately measure and interpret vital signs, demonstrating proficiency in assessing the physiological condition of patients.
- Students will gain proficiency in conducting thorough examinations of the chest, utilizing various techniques to evaluate respiratory health and detect abnormalities.
- Students will acquire knowledge of laboratory tests, including arterial blood gases, reference ranges, and the ability to interpret abnormal values, enhancing their diagnostic skills and understanding of patient care.

Experiments:

- Vital Signs (Pulse, Blood Pressure, Temperature, Respiratory Rate, Pulse Oximetry)
- Examination of the Chest (Inspection, Percussion, Palpation, Auscultation).
- Laboratory Tests - Reference ranges and interpretation of abnormal values, Arterial Blood Gases.

Reference books:

1. Manipal Manual of Anatomy for Allied Health Sciences courses: Madhyastha S.
2. G.J. Tortora & N.P Anagnostakos: Principles of Anatomy and Physiology
3. B.D. Chaurasia: Handbook of General Anatomy

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SYLLABUS 2023 BATCH ONWARDS**

IMAGING IN KIDNEY DISEASES PRACTICAL

Subject Code: MDLTS1-205

**L T P C
0 0 4 2**

Duration: 60 (Hrs.)

Course Objectives:

- The objective of this course is to provide students with comprehensive knowledge and practical skills in the field of dialysis. By the end of the course, students will be able to understand the principles and techniques involved in dialysis treatment and demonstrate proficiency in managing dialysis units.

Course Outcomes:

- Understand the functioning and operation of a dialysis room, including the equipment and instruments used in the process.
- Gain knowledge about water treatment plants and their significance in maintaining the quality of water used for dialysis.
- Acquire basic skills in electronics, plumbing, and computer systems relevant to dialysis equipment and infrastructure.
- Develop an understanding of the principles and practices involved in the management of a dialysis unit, including patient care, scheduling, and quality control.
- Familiarize with the process of conducting dialysis in an ICU setting and understand the specific considerations and challenges involved.
- Learn about peritoneal dialysis as an alternative method and gain proficiency in performing the procedure.
- Explore special and advanced dialysis procedures, such as hemodiafiltration or plasmapheresis, and understand their applications and benefits.
- Demonstrate knowledge and competence in performing cardiopulmonary resuscitation (CPR) techniques, particularly in emergency situations related to dialysis treatment.

Experiment:

- Dialysis Room
- Water treatment plant
- Electronics, Plumbing, Computer
- Management of Dialysis unit
- ICU Side Dialysis
- Peritoneal Dialysis
- Special & advanced dialysis procedures
- CPR Demo

Reference books:

Manual of Nephrology, Robert Schrier Reference books or related websites: Oxford Handbook of Nephrology, 2nd ed.

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BIOMEDICAL INSTRUMENTATION & DIALYSIS EQUIPMENT PRACTICAL

Subject Code: MDLTS1-206

L T P C

Duration: 60 (Hrs.)

0 0 4 2

Course Objectives:

- To develop a comprehensive understanding of repair techniques and procedures used in machine service and repair, specifically focusing on dialysis machines and associated medical equipment.
- To equip students with the necessary skills to perform fault diagnostics and computer-aided maintenance in dialysis machines, ensuring effective and efficient repair processes.

Course Outcomes:

- Students will be able to apply repair techniques and procedures to diagnose and troubleshoot issues in dialysis machines, demonstrating proficiency in fault diagnostics.
- Students will gain hands-on experience in performing planned preventative maintenance, decalcification, cleaning, disinfection, and infection control measures for dialysis machines and related equipment, emphasizing the importance of patient safety and hygiene.

Experiment-

- Machine Service And Repair: Repair techniques and procedures, Fault diagnostics, Computer aided maintenance Planned preventative maintenance, Hospital / Community, Decalcification, Cleaning Disinfection, Infection control, Dialysis Chairs, Other renal equipment, associated medical equipment.
- Dialysate and dialysate delivery system: preparation, Delivery system – batch type and proportioning type, Drake Willock, Centry, Gambrom, Fresenius etc., Maintenance and trouble shooting, Acetate, Bicarbonate.
- Dailysate supply subsystems: Water pre-treatment – Water pressure regulation – Temperature control – Temperature sensors – Chemical proportioning – Degasing flow and negative pressure control – Monitors. Conductivity cell – chemical concentration monitor – Temperature compensation – Temperature monitors – Pressure monitors – Flow - Rate monitors – Blood leak monitors – Readout devices – Alarms.
- Dialysis machine maintenance: Maintenance / - Repairing and servicing / - Drake-Winlock proportioning unit

Reference books:

1. Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese.
2. Introduction to Biomedical Equipment Technology by Joseph J.Carr, John m. Brown

THIRD SEMESTER

**MRSPTU M.SC. (DIALYSIS TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

NEPHROLOGY & KIDNEY DISEASE

Subject Code: MDLTS1-301

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

- To explore recent advances in dialysis and nephrology, including the field of cyber nephrology, and understand their implications in the diagnosis and management of renal diseases.
- To develop a comprehensive understanding of the classification, etiology, pathophysiology, assessment, and management of renal diseases such as acute kidney injury, chronic kidney disease, and various renal disorders.

Course Outcomes:

- Students will be able to analyze and evaluate the recent advances in dialysis and nephrology, including the application of cyber nephrology, and apply this knowledge to enhance the diagnosis and treatment of renal diseases.
- Students will gain a deep understanding of the classification, etiology, pathophysiology, assessment, and management of renal diseases, enabling them to effectively diagnose and manage patients with acute kidney injury, chronic kidney disease, and other renal disorders.

Unit: 1 (12 Hrs)

- Recent Advance in Dialysis and Nephrology
- Cyber Nephrology

Unit: 2 (12 Hrs)

- Basic concepts related to renal failure
- Classification of renal disease –Acute Kidney Injury, Chronic Kidney Disease (Diagnosis, Precaution, Management), Acute Kidney Injury, Classification, Pre renal uremia (Etiology, pathophysiology, assessment, management), Intra-renal uremia (Etiology, pathophysiology, assessment, management, Post renal uremia (Etiology, pathophysiology, assessment, management), Clinical course o AKI, Initiating stage, Oliguric stage, Diuretic stage, Recovery stage

Unit: 3 (12 Hrs)

Chronic Kidney Disease (Includes causes, signs and symptoms, treatment), Developmental/congenital disorder, Cystic disorder, Tubular disorder, Neoplasms, Infectious disease, Glomerulonephritis, Obstructive disorders

Unit: 4 (12 Hrs)

Renal problem and systemic disease, Diabetes mellitus (DM), Diabetes insipidus (DI), Primary hyperparathyroidism, Hepatorenal syndrome, Gout, Amyloidosis, Scleroderma or progressive systemic sclerosis Good pasture syndrome SLE (Systemic lupus Erythromatosis), HUS, Nephrotic syndrome, Hypertensive nephropathy

Unit: 5 (12 Hrs)

Renal problem in pregnancy

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Reference books:

1. Basics of medical Physiology –D Venkatesh and H.H Sudhakar, 3rd edition.
2. Principles of Physiology – DevasisPramanik, 5th edition.
3. Human Physiology for BDS –Dr A.K. Jain, 5th edition.
4. Textbook of Medical Physiology, Guyton , 2nd South Asia Edition.
5. Textbook of Physiology Volume I & II – Dr. A. K. Jain.
6. Comprehensive textbook of Medical Physiology Volume I & II – Dr. G. K. Pal.

MRSPTU

**MRSPTU M.SC. (DIALYSIS TECHNOLOGY)
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EMERGENCY MEDICINES

Subject Code: MDLTS1-302

L T P C
3 1 0 4

Duration: 60 (Hrs.)

Course Objectives:

- To provide students with a comprehensive understanding of renal diseases and their epidemiology.
- To develop students' knowledge and skills in managing emergency situations related to renal diseases, including cardiovascular emergencies, electrolyte emergencies, hematologic and gastrointestinal emergencies, as well as complications related to access and problems during and after hemodialysis.

Course Outcomes:

- Students will be able to demonstrate a clear understanding of the epidemiology and major aspects of renal diseases.
- Students will acquire the necessary knowledge and skills to identify and manage emergency situations associated with renal diseases, including cardiovascular emergencies (hyperkalemia, hypermagnesemia, hypocalcemia), electrolyte emergencies (pulmonary edema/volume overload, angina/chest pain, hypertensive emergencies, pericarditis/tamponade), hematologic and gastrointestinal emergencies (anemia and bleeding, metabolic bone disease), and emergencies related to access, problems during and after hemodialysis.

Unit: 1 (15 hrs)

Introduction to emergency: Renal diseases, epidemiology

Unit: 2 (15 hrs)

Cardiovascular Emergencies: Hyperkalemia, Hypermagnesemia, Hypocalcemia

Unit: 3 (15 hrs)

Electrolyte Emergencies: Pulmonary Edema/Volume Overload, Angina/Chest Pain, Hypertensive Emergencies, Pericarditis/Tamponade

Unit: 4 (15 hrs)

- **Hematologic and Gastrointestinal Emergencies:** Anemia and Bleeding, Metabolic Bone Disease
- Emergencies Related to Access, Problems During and After Hemodialysis

Reference books-

1. Essentials of Medical Pharmacology – Tripathi
2. Harrison's Principles of Internal Medicine, 20e
3. Manual of Nephrology, Robert Schrier

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HEMODIALYSIS

Subject Code: MDLTS1-303

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

- Understand the protocols and procedures for maintaining and calibrating dialysis equipment, including routine preventative maintenance checks and their frequency.
- Gain knowledge of the principles and processes involved in hemodialysis, including the correct calibration of equipment for the intended activities.

Course Outcomes:

- Demonstrate proficiency in maintaining and calibrating dialysis equipment by following established protocols and conducting routine preventative maintenance checks.
- Apply the principles and processes of hemodialysis to ensure the accurate calibration and proper functioning of equipment for safe and effective treatment.

Unit: 1 (15 hrs)

- Protocol for the equipment to be maintained/calibrated, Routine preventative maintenance checks and their frequency, Correct calibration of equipment for the intended activities.
- Process of Hemodialysis.

Unit: 2 (15 hrs)

- Range of tests and test equipment associated with maintenance and diagnosis of faults on dialysis equipment
- Suitable tests to verify safety, accuracy and operational effectiveness of equipment, including electrical safety

Unit: 3 (15 hrs)

- Principles of operation, function and expected performance, The basis and methods behind electrical safety tests.
- The calibrations and tests to be performed, including calibrating the UF, conductivity, temperature and flow control systems.

Unit: 4 (15 hrs)

- Diagnose routine or common faults in dialysis equipment and relevant corrective action, Use of equipment and PC based diagnostic systems.
- Obtain suitable samples for QA testing using appropriate sampling
- Type and range of samples that is required for QA.

Reference books-

1. John T. Daugirdus, Handbook of Dialysis, 7th ed.
2. Nissonsen, Handbook of Dialysis
3. Henrich, Textbook of Dialysis, 5th ed.

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SYLLABUS 2023 BATCH ONWARDS**

PERITONEAL DIALYSIS

Subject Code: MDLTS1-304

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

- Understand the principles and process of peritoneal dialysis.
- Familiarize students with the physiological aspects and apparatus of peritoneal dialysis.

Course Outcomes:

- Ability to assess and prescribe peritoneal dialysis for acute and chronic conditions.
- Identify and manage complications associated with peritoneal dialysis.

Unit: 1 (16 hrs)

Introduction to Peritoneal Dialysis, Process of peritoneal dialysis, Advantages and disadvantages of CAPD

Unit: 2 (14 hrs)

Physiology of Peritoneal Dialysis, apparatus of Peritoneal Dialysis, peritoneal access disease.

Unit: 3 (16 hrs)

Acute Peritoneal Dialysis prescription, adequacy of Peritoneal dialysis and chronic peritoneal Dialysis prescription.

Unit: 4 (14 hrs)

- Volume status and fluid overload in Peritoneal Dialysis
- Peritonitis and exit site infections
- Mechanical and metabolic complications of Peritoneal Dialysis

Reference books-

1. Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese.
2. Introduction to Biomedical Equipment Technology by Joseph J.Carr, John m. Brown

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SYLLABUS 2023 BATCH ONWARDS**

RENAL TRANSPLANTATION

Subject Code: MDLTS1-305

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

- To provide students with a comprehensive overview of renal transplantation, including its history, immunology, and the therapeutic approach for chronic renal failure.
- To familiarize students with the concepts of renal preservation, transplantation, abnormal bladder conditions, histocompatibility, surgical techniques, kidney allocation, pathology, and infection in kidney transplant recipients.

Course Outcomes:

- Students will gain a thorough understanding of the immunological aspects of renal transplantation and the therapeutic options available for treating chronic renal failure.
- Students will be able to explain the surgical techniques involved in renal transplantation, including renal preservation, abnormal bladder conditions, and the importance of histocompatibility in ensuring successful transplantation.
- Students will acquire knowledge of kidney allocation processes, common pathological conditions associated with renal transplantation, and the management of infections in kidney transplant recipients.
- Students will develop an awareness of the ethical and legal considerations related to kidney donation, enhancing their understanding of the broader societal impact of renal transplantation.

Unit -1 (20 hours)

- Renal transplantation: An overview and history
- The immunology of transplantation, Chronic renal failure and renal transplantation therapy

Unit-2 (20 hours)

- Renal preservation, transplantation and abnormal bladder.
- Histocompatibility and surgical techniques of renal transplantation.

Unit-3 (20 Hours)

- Kidney allocation and pathology of renal transplantation
- Infection of kidney transplant recipients
- Ethical and legal aspects of kidney donation

Reference books-

1. Danovitch, Manual of Renal Transplantation, 6th ed.
2. Peter Morris, Renal Transplantation. 9th ed.

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SYLLABUS 2023 BATCH ONWARDS**

NEPHROLOGY & KIDNEY DISEASE AND EMERGENCY MEDICINES PRACTICAL

Subject Code: MDLTS1-306

**L T P C
0 0 4 2**

Duration: 60 (Hrs.)

Course Objectives:

- Understand the importance of laboratory tests in diagnosing and monitoring kidney disease.
- Gain knowledge of emergency procedures and drugs used in the treatment of kidney disease and related conditions.

Course Outcomes:

- Students will be able to interpret blood tests and urine tests to identify indicators of kidney disease.
- Students will be familiar with the different emergency drugs used in emergency medicine and understand their appropriate usage, including in dialysis emergencies.

Experiment-

- Blood tests for kidney disease
- urine tests
- Blood serum
- Ultrasound during kidney disease
- Kidney biopsy
- What is the current research in emergency medicine
- What are the 5 emergency drugs
- Dialysis emergency medicine and their usage

Reference books-

1. Textbook of Medical Physiology, Guyton, 2nd South Asia Edition.
2. Textbook of Physiology Volume I & II – Dr. A. K. Jain.
3. Comprehensive textbook of Medical Physiology Volume I & II – Dr. G. K. Pal.

**MRSPTU M.SC. (DIALYSIS TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

HEMODIALYSIS & DIALYSIS EQUIPMENT PRACTICAL

Subject Code: MDLTS1-307

L T P C

Duration: 60 (Hrs.)

0 0 4 2

Course Objectives:

- To familiarize students with the equipment used during hemodialysis and develop their understanding of its functionality, operation, and maintenance.
- To provide students with a comprehensive understanding of the methods employed in hemodialysis, including the principles, techniques, and procedures involved.

Course Outcomes:

- Upon completion of the course, students will be able to identify and describe the various types of equipment used during hemodialysis, such as dialyzers, dialysis machines, bloodlines, and vascular access devices. They will also demonstrate competence in handling and troubleshooting these equipment effectively.
- By the end of the course, students will be able to explain the different methods employed in hemodialysis, including conventional hemodialysis, hemodiafiltration, and continuous renal replacement therapy. They will have a sound understanding of the underlying principles, indications, contraindications, and potential complications associated with each method.

Experiment-

- Equipment used during hemodialysis
- What are the methods for hemodialysis
- What are the 3 major components of hemodialysis

Reference books-

1. John T. Daugirdus, Handbook of Dialysis, 7th ed.
2. Nisnonsen, Handbook of Dialysis
3. Henrich, Textbook of Dialysis, 5th ed.

**MRSPTU M.SC. (DIALYSIS TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

PERITONIAL DIALYSIS & RENAL TRANSPLANTATION PRACTICAL

Subject Code: MDLTS1-308

L T P C
0 0 4 2

Duration: 60 (Hrs.)

Course Objectives:

- Understand the principles and procedures of peritoneal dialysis, including the peritoneal dialysis test, types of peritoneal dialysis, and the major steps involved in the peritoneal dialysis exchange.
- Gain knowledge about renal transplantation, including the different methods of renal transplantation, the types of kidney transplantation, and the historical significance of the first successful kidney transplantation experiment.

Course Outcomes:

- Students will be able to explain the peritoneal dialysis test, identify the three types of peritoneal dialysis, and describe the three major steps involved in peritoneal dialysis exchange.
- Students will be able to discuss the principles underlying peritoneal dialysis and describe the tests performed for renal transplantation.
- Students will be familiar with the methods of renal transplantation, including the three types of kidney transplantation.
- Students will have knowledge of the first successful kidney transplantation experiment, including the identity of the researcher who performed it and the methodology employed.

Experiment-

- What is the peritoneal dialysis test
- 3 types of peritoneal dialysis
- 3 major steps in peritoneal dialysis exchange
- Which principal is used in peritoneal dialysis
- Tests for renal transplantation
- Methods of renal transplantation
- What are the three types of kidney transplantation
- Who performed the first successful kidney transplantation experiment and how?

Reference books-

1. Danovitch, Manual of Renal Transplantation, 6th ed.
2. Peter Morris, Renal Transplantation. 9th ed.
3. Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese.
4. Introduction to Biomedical Equipment Technology by Joseph J. Carr, John m. Brown

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF PHARMACY

SYLLABUS

FOR

M.SC. (MEDICAL LAB TECHNOLOGY)

(2 YEARS PROGRAMME)

2023 BATCH ONWARDS

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**MRSPTU M.SC. (MEDICAL LAB TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

SCHEME

1 st Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MMLTS3-101	Clinical Biochemistry	3	1	0	40	60	100	4
MMLTS3-102	Human Anatomy and Physiology	3	1	0	40	60	100	4
MMLTS3-103	Immunology, Vaccinology and Transplantation Technology	3	1	0	40	60	100	4
MMLTS3-104	Clinical Microbiology	3	1	0	40	60	100	4
MMLTS3-105	Clinical Hematology & Blood Banking Technology	3	1	0	40	60	100	4
MMLTS3-106	Immunology, Vaccinology and Transplantation Technology-Lab	0	0	4	60	40	100	2
MMLTS3-107	Clinical Microbiology-Lab	0	0	4	60	40	100	2
TOTAL		15	5	8	320	380	700	24

2 nd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MMLTS3-201	Diagnostic Biochemistry & Organ Function Test	3	1	0	40	60	100	4
MMLTS3-202	Histopathology and Morbid Anatomy Techniques	3	1	0	40	60	100	4
MMLTS3-203	Cytology & Cytogenetic	3	1	0	40	60	100	4
MMLTS3-204	Human Genetics & Human Genome	3	1	0	40	60	100	4
MMLTS3-205	Diagnostic Biochemistry & Organ Function Test- Lab	0	0	4	60	40	100	2
MMLTS3-206	Histopathology and Morbid Anatomy Techniques-Lab	0	0	4	60	40	100	2
MMLTS3-207	Cytology & Cytogenetic-Lab	0	0	4	60	40	100	2
MMLTS3-208	Diagnostic Microbiology & Immuno Haematology-Lab	0	0	4	60	40	100	2
MMLTS3-209	Human Genetics & Human Genome-Lab	0	0	4	60	40	100	2
TOTAL		12	4	20	460	440	900	26

**MRSPTU M.SC. (MEDICAL LAB TECHNOLOGY)
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3rd Semester. Choose any one specialization

SPECIALIZATION Degree will be awarded in the following categories:

M.Sc. MLT (Hematology)

- i . Clinical Hematology Non Neoplastic
- ii Clinical Hematology Neoplastic
- iii Immunohematology & Advanced Hematologic Techniques

3 rd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MMLTS3-301	Clinical Hematology (Non Neoplastic)	3	1	0	40	60	100	4
MMLTS3-302	Clinical Hematology (Neoplastic)	3	1	0	40	60	100	4
MMLTS3-303	Immuno Pathology & Advanced Hematologic Techniques	3	1	0	40	60	100	4
MMLTS3-304	Immuno Hematology-Lab	0	0	4	60	40	100	2
TOTAL		9	3	4	180	220	400	14

M.Sc. MLT (Clinical Biochemistry)

- i Advances in Biochemical Sciences
- ii Intermediary Metabolism & Metabolic Disorders
- iii Diagnostic Enzymology

3 rd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MMLTS3-305	Advances in Biochemical Sciences	3	1	0	40	60	100	4
MMLTS3-306	Intermediary Metabolism & Metabolic Disorders	3	1	0	40	60	100	4
MMLTS3-307	Diagnostic Enzymology	3	1	0	40	60	100	4
TOTAL		9	3	0	120	180	300	12

M.Sc. MLT (Clinical Microbiology)

- i General Issues in Clinical Microbiology
- ii Diagnostic Microbiology
- iii Instrumentation & Techniques in Medical Microbiology

3 rd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MMLTS3-308	General Issues in Clinical Microbiology	3	1	0	40	60	100	4
MMLTS3-309	Diagnostic Microbiology	3	1	0	40	60	100	4
MMLTS3-310	Instrumentation & Techniques in Medical Microbiology	3	1	0	40	60	100	4
TOTAL		9	3	0	120	180	300	12

**MRSPTU M.SC. (MEDICAL LAB TECHNOLOGY)
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4 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MMLTS3-401	Project work	0	0	40	60	340	400	20
Total							400	20

The candidate shall undergo internship in relevant department. The internship report shall be submitted to the parent institute & Viva-Voce examination shall be conducted by external expert.

or

The candidates will be supervised by the concerned faculty & the project report will be submitted to the institute. The Viva-Voce examination shall be conducted by external expert.

Overall Marks / Credits

Semester	Marks	Credits
1 st	700	24
2 nd	900	26
3 rd	300/400	12/14
4 th	400	20
Total	2300/2400	82/84

FIRST SEMESTER

CLINICAL BIOCHEMISTRY

Subject Code: MMLTS3-101

**L T P C
3 1 0 4**

(Duration: 60hrs)

Course Objectives:

- The course aims to provide the students with analytical and presentational skills. This will be achieved in methods and skills lectures, classes and seminars, and small group teaching.
- The student will participate in: Two journal clubs which guide the student through a detailed analysis of a research paper.

Course Outcomes:

- Understand biochemistry at the atomic level, draw molecules and reaction mechanisms perfectly.
- Understand in detail about amino acid structures, types of amino acids, classifications, structure of proteins and types of proteins

UNIT 1 (15 Hrs)

Principles of the assay procedures for biological materials - Blood sugar and its metabolism - Estimation of blood sugar i) God-Pod method ii) Folin-Wu method iii) Orthotoluidine method - Metabolism of protein - Estimation of total protein i) BCG method ii) Biuret method - Estimation of serum albumin i) BCG method - Serum Creatinine estimation i) Jaffe's method Lipid profile: Fat, definition, important biological fats, cholesterols, clinical significance of cholesterol. Methods of estimation and the normal levels i) Serum cholesterol a) CHOD/ POD method b) Wybengo and Nileggis method ii) LDL Cholesterol iii) HDL cholesterol CHOD/ POD method iv) Triglycerides method GOP/ PA method Serum Electrolytes: (Their importance and normal blood values) i) Na⁺ ii) K⁺ iii) Ca⁺⁺ - T₃, T₄, TSH (Thyroid Stimulating hormone)

UNIT 2 (15 Hrs)

Clinical significance, Principle of estimation - Bilirubin general, types and jaundice - Liver function test i) Bilirubin estimation (Mally evlen method, Jendrassik and Grof method, direct spectrophotometric method) ii) Alkaline phosphatase and acid phosphatase estimation by King's method iii) SGOT, SGPT Reatam frank method. ALP, PT etc. - Glucose tolerance test (G.T.T.), Importance, Principle and techniques of GTT - Insulin tolerance test - Gastric juice analysis - Xylose absorption test - Analysis of calculi - Cerebrospinal fluid (CSF) - Composition and function of CSF - Clinical significance of CSF analysis - Estimation of sugar and protein in CSF.

UNIT 3 (15 Hrs)

Automation in urine chemistry - Physical and chemical examinations of urine samples; Qualitative tests for inorganic urinary ingredients. - Common qualitative and quantitative test of urine - Quality control of clinical investigation - Automation in clinical biochemistry laboratory - Laboratory organization, management and maintenance of record - Normal and abnormal levels - Clearance test for renal function - Protein properties - Protein structure - Total protein estimation - Protein purification.

UNIT 4 (15 Hrs)

Immunochemical techniques - General principles - Production of antibodies - The precipitation reaction in gels; Immunodiffusion(ID) - Radio immunoassay(RIA) - Enzyme-Linked

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immunoassay(ELISA) - Fluorescent immunoassay(FIA) Molecular biology techniques - Introduction and structure of nucleic acid - Function of nucleic acid - Isolation of nucleic acid - Physical analysis of DNA - Isolation of specific nucleic acid and sequences. nit-V Protein and enzyme techniques - Enzyme nomenclature - Steady state enzyme kinetics - Enzyme assay techniques - Immobilized enzymes Centrifugation Techniques -Basic principles of sedimentation -Centrifuges and their use Electrophoretic technique General principles and introduction to - Electrophoresis of proteins - Electrophoresis of nucleic acid Chromatographic techniques General principles and introduction to - Low pressure column chromatography - High performance liquid chromatography(HPLC) - Partition chromatography - Ion-exchange chromatography - Gas-liquid chromatography(GLC) - Thin layer chromatography(TLC) - Paper chromatography.

Books Recommended:

- Biochemistry by Lubert Stryer -W.H.Freeman and company New York
- Lehninger's- 3rd edition. Principles of Biochemistry – Lehninger, Nelson. D.L.,
- Harper Illustrated Biochemistry – Murray R.K. Grannar, D.K. Mayes-P.A. Eral 28th edition
- Medical Biochemistry – N.V. Bhagavan -Academic Press 4th edition 2002.
- Text Book of Biochemistry – A.S. Saini, C.B.S Publishers and distributors 2nd edition.
- Tietz fundamentals of Clinical Chemistry – Burtis. C.A. Ashwood E. R. 3rd, 4th editions
- Tietz Text book of Clinical Chemistry and molecular diagnostics – Burtis. C.A. Ashwood E. R. 3rd, 4th and 5th editions
- Varley's Practical Clinical Biochemistry 4th, 5th, 6th editions
- Text Book of Biochemistry with Clinical Correlations – Devlin T.M. Wiley Liss, New York 6th Edition
- Clinical Physiology of Acid-Base balance and Electrolyte disorders – Rose. B.D – Mcgraw-HillInternational edition New York 4th edition
- Methods in Bio-Statistics for Medical students – Mahajan. B.K. Jaypee brothers MedicalPublishers, New Delhi.
- Clinical Chemistry – Theory analysis and Correlation – Kalpan. L.A. 4th edition
- Principles of Biochemistry -4th edition; Lehninger, Nelson, Cox.

**MRSPTU M.SC. (MEDICAL LAB TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

HUMAN ANATOMY AND PHYSIOLOGY

Subject Code: MMLTS3-102

L T P C

(Duration: 60hrs)

3 1 0 4

Course Objectives:

- This course introduces the students to the basics of cell and its components.
- Explore the intricacies of human anatomy and physiology to grasp how the body's systems work in harmony to maintain homeostasis and support life.
- Gain proficiency in identifying anatomical structures and explaining their physiological roles, enabling a deeper comprehension of health, disease, and medical intervention

Course Outcomes:

- Demonstrate a thorough understanding of human anatomical structures and their relationships, enhancing diagnostic skills and medical interpretations.
- Explain physiological principles and mechanisms, enabling the prediction of how the human body responds to various internal and external stimuli.
- Integrate interdisciplinary knowledge to appreciate the holistic nature of the human body, encouraging collaborative approaches for improved patient care and health outcomes.

UNIT 1(15Hrs)

Nervous system, Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters. Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. Structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)

UNIT 2(15Hrs)

Respiratory system: Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration, lung volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods.

Urinary system: Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.

UNIT 3(15Hrs)

Endocrine system: Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders.

Digestive system: Anatomy of GI tract with special reference to anatomy and functions of stomach, (Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT. Energetics Formation and role of ATP, Creatinine Phosphate and BMR.

UNIT 4(15Hrs)

Reproductive system anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization,

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spermatogenesis, oogenesis, pregnancy and parturition

Blood clotting: Chemistry of blood coagulation and coagulation disorders

Suggested Readings:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee Brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J. W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice - Best and Taylor. Williams & Wilkins Co, River view, MI, USA

IMMUNOLOGY, VACCINOLOGY AND TRANSPLANTATION TECHNOLOGY

Subject Code: MMLTS3-103

**L T P C
3 1 0 4**

(Duration: 60hrs)

Course Objectives:

The Course aims to facilitate critical decision-making in vaccinology by providing participants with a comprehensive overview of the various aspects of vaccinology (immunology, vaccine development, clinical trials, regulatory processes, vaccine-specific issues including new vaccines, vaccination strategies and policies, programme implementation).

Course Outcomes:

An education in cell biology will impart knowledge to the students to understand origins of cells and the generation of cell diversity, as well as the common features of cellular structure and function – how they obtain energy, synthesize new molecules, communicate, proliferate and survive. It will also emphasize on the fundamental importance of cell biology in modern science, particularly in relation to cell technologies and health.

UNIT 1 (15 Hrs)

Immune system and immunity: History of immunology, composition and function of cells and organs involved in immune system. Immune responses: evolution of immune response, immunological tolerance, active and passive immunization, innate immunity and acquired immunity. Determinants of innate immunity: Species and strains, individual differences, Influence of age, hormonal influence, nutritional factors and mechanical barriers and surface secretions, Non-specific immune mechanisms: surface defenses, tissue defenses, opsonization, inflammatory reactions, hormone balance.

UNIT 2 (15 Hrs)

Antigens and antibodies: Antigens – structure and properties, types-iso and allo haptens, adjuvant, antigens specificity. Immunoglobulin-Structure, heterogeneity, types and subtypes, properties (Physiochemical and biological). Theories of antibody production. Complement: - structure, components, properties and functions of different components, complement pathways and biological consequences of complement activation. Antigen-antibody reactions: in vitro methods- agglutinations, precipitation, complement fixation, immunofluorescence, ELISA, Radio immunoassay (RIA)

UNIT 3 (15 Hrs)

Lymphocytes, their subpopulation, their properties and functions, membrane bound receptors of lymph cells, Helper T cells in immune response. Development and differentiation of B and T cells. Mechanism of cell mediated immunity, immune tolerance to self-antigens. Synthesis of antibodies and antibody diversity, Hybridoma technology. Immunogenetics: Blood groups and transplantation antigens, Major Histocompatibility complex and tumour immunology: structure and functions and disease association of MHC and HLA-system. Gene regulation and Ir-genes. HLA and tissue transplantation, graft versus host reaction and rejection, Immune suppression-specific and non-specific, Autoimmunity-theories, mechanisms and diseases. Tumour immunology-tumour specific antigens, immune response to tumour.

UNIT 4 (15 Hrs)

Hypersensitivity reactions: Antibody mediated-type I anaphylaxis, type II antibody dependent cell cytotoxicity, type III immune complex mediated reactions, Type IV cell mediated hypersensitivity reactions. Defects in immune system: Primary and secondary defects, defects in complements, defective phagocyte mechanisms, Allergy, Immunoprophylaxis-types of vaccines and vaccine production, monoclonal antibodies and hybridoma technology.

Suggested Readings

- Ivan M. Roitt, J. Brostoff and D. K. Male, Immunology, Gower Medical Publishing, London.1993.
- Clark WR, The experimental foundations of modern immunology. John Wiley and Sons Inc. New York. 1991.
- Janis Kuby, Immunology, II edition. W. H. Freeman and Company, New York. 1993.
- Janeway Travers, Immunobiology- the immune system in health and disease. Current Biology Ltd. London, New York. 3rd ed.,1997.
- Peter J. Delves, Ivan M. Roitt, Encyclopedia of Immunology; Academic Press. 2 nd Ed., 1998.
- Chapel H and Halbey M, Essentials of Clinical Immunology. ELBS. 1986.
- Leslie Hudson and Frank C. Hay. Practical Immunology. Blackwell Scientific Publication. 3rd ed., 1989. 22 | Page Vels institute of science, technology and advanced studies document on locf im

**IMMUNOLOGY, VACCINOLOGY AND TRANSPLANTATION TECHNOLOGY
LAB**

Subject Code: MMLTS3-106

**L T P C
0 0 4 2**

(Duration: 60hrs)

Course Objective:

The Course aims to facilitate critical decision-making in vaccinology by providing participants with a comprehensive overview of the various aspects of vaccinology (immunology, vaccine development, clinical trials, regulatory processes, vaccine-specific issues including new vaccines, vaccination strategies and policies, programme implementation).

Course Outcome:

An education in cell biology will impart knowledge to the students to understand origins of cells and the generation of cell diversity, as well as the common features of cellular structure and function – how they obtain energy, synthesize new molecules, communicate, proliferate and survive. It will also emphasize on the fundamental importance of cell biology in modern science, particularly in relation to cell technologies and health.

Practicals:

- a. Interferon induction-isolation and assay
- b. Development of monoclonal antibodies by hybridoma technology
- c. Production of poly clonal antibodies and testing-immunodiffusion
- d. Immunoelectrophoresis, crossed antigen-antibody electrophoresis, ELISA, RIA, Immunoblotting
- e. Immunofluorescence, agglutination, rosette-formation, Complement fixation
- f. Antigen induced T cell proliferation.
- g. Generation of cytotoxic T lymphocyte

Suggested Readings

- Ivan M. Roitt, J. Brostoff and D. K. Male, Immunology, Gower Medical Publishing, London.1993.
- Clark WR, The experimental foundations of modern immunology. John Wiley and Sons Inc. New York. 1991.
- Janis Kuby, Immunology, II edition. W. H. Freeman and Company, New York. 1993.
- Janeway Travers, Immunobiology- the immune system in health and disease. Current Biology Ltd. London, New York. 3rd ed.,1997.
- Peter J. Delves, Ivan M. Roitt, Encyclopedia of Immunology; Academic Press. 2 nd Ed., 1998.
- Chapel H and Halbey M, Essentials of Clinical Immunology. ELBS. 1986.

CLINICAL MICROBIOLOGY

Subject Code: MMLTS3-104

**L T P C
3 1 0 4**

(Duration: 60hrs)

Course Objective:

- Medical microbiology is a subject where basic knowledge of microbiology is in focus. In the course one learns more about medical microbiology with a focus on bacteriology and virology.
- Introduction to bacteriology includes the structure and properties of bacteria, both as a normal flora and as a pathogen.

Course Outcome:

- Upon completion of this course students should be able to: Make decisions about the pathogenicity of organisms associated with human infections.
- Apply appropriate microbiology laboratory techniques, methodologies, instruments and equipment in accordance with current laboratory safety protocol.

UNIT 1 (15Hrs)

Systemic Bacteriology 1. Introduction to Systematic Bacteriology 2. Basic trends of classification scope and importance of systematic bacteriology 3. Morphological staining, culture, biochemical characteristics, lab diagnosis etc. of the following: Staphylococci and Micrococci; Streptococci and Pneumococci; Corynebacterium Diphtheriae; Enterobacteriaceae- I (E.coli, Klebsiella and Enterobacter), Enterobacteriaceae-II (Salmonella, Shigella and Proteus); Pseudomonas; Vibrio cholerae; Neisseria and Haemophilus; Mycobacteria; Brucella; Bordetella; Clostridia; Leptospira; Mycoplasma; Rickettsia; Chlamydia.

UNIT 2 (15Hrs)

Bacteriological examinations of water, milk, food and air Bacterial pathogenicity i) Definitions of pathogenicity, pathogenesis and virulence ii) Sources of infection iii) Modes of spread of infections iv) Types of infections Nosocomial infections: Introduction, common types of nosocomial infections, surveillance (Bacteriological) and control of nosocomial infections. Specimen processing i) Blood ii) sputum iii) throat swab iv) Nasopharyngeal swab v) swab (Pus-wound) vi) urine vii) genital discharges and swabs viii) C.S.F. and other body fluids ix) Stool and rectal swab.

UNIT 3 (15Hrs)

Medical Mycology • General characteristics, morphology and reproduction of medically important fungi. • Classification of medically important fungi • Fungi causing superficial mycoses, subcutaneous mycosis and systemic infection • Antimycotic agents • Antifungal chemotherapy • Preparation of culture media for fungi and culture techniques SDA, Corn Meal agar, Rice Starch Agar, slide cultures etc • Staining of fungi and preparation, storing and processing of samples (KOH Preparation, Lactophenol Cotton Blue etc) • Contaminants and opportunistic fungi. Methods of culturing and assaying of viruses Classification of viruses Replication of DNA, RNA +ve RNA-ve viruses, retroviruses Viral vaccines: conventional: killed / attenuated; DNA; peptide; recombinant proteins. Introduction to Medical Parasitology: La diagnosis of parasites in stool; blood body fluids. Diagnostic tests of identification of parasites.

UNIT 4 (15Hrs)

Sterilization techniques: biohazards; containment facilities, BSL 2, 3, 4 Bacterial and viral vectors Biological warfare agents Mode of action of antibiotics and antiviral: molecular mechanism of drug resistance (MDR) Hospital-acquired infections (nosocomial), immune compromised states Water and waste management for water-bom diseases Investigations and handling of epidemic

Suggested Readings

- Ananthnarayanan. R & C. K. Jeyaram Panicker, Textbook of Microbiology,;Orient Longman. Ed.8; 2006.
- David Greenwood, Richard B. Slack John F. Peutherer Medical Microbiology, Churchill Livingstone, London. 16th Edn., 2002.
- Baron EJ, Fine Gold S.M; Diagnostic Microbiology. Blackwell Scientific Systems. 1995. 44 | Page VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED STUDIES DOCUMENT ON LOCF IMMUNOLOGY & MICROBIOLOGY
- J.G. Colle, A.Simmons, A.G. Fraser, B.P. Marmion, Mackie & McCartney Practical Medical Microbiology, Elsevier.Ed.14; 2006.
- Topley & Wilson, Topley & Wilson's Principles of Bacteriology, Virology & Immunity, Vol III; Bacterial Diseases, Edward Arolla, London. Ed.8; 1990.
- Jagadish Chandar, 1996; A Textbook of Medical Mycology; Interprint, New Delhi.
- Alexopoulos C.J, Introductory Mycology; John Wiley & Sons Inc, N.Y. 1992.
- H.C. Dube , Introduction to Fungi, Vikas Publishing House. Ed.3; 2005.
- D.R. Arora & B.R. Arora Medical Parasitology, CBS Publishers & Distributors, New Delhi. 1st Edn., 2002.
- Subhas Chandra Parija, Medical Parasitology, 2nd Edn., 2009 MLT 504: Human Physiology

CLINICAL MICROBIOLOGY-LAB

Subject Code: MMLTS3-107

**L T P C
0 0 4 2**

(Duration: 60hrs)

Course Objective:

- Medical microbiology is a subject where basic knowledge of microbiology is in focus. In the course one learns more about medical microbiology with a focus on bacteriology and virology.
- Introduction to bacteriology includes the structure and properties of bacteria, both as a normal flora and as a pathogen.

Course Outcome:

- Upon completion of this course students should be able to: Make decisions about the pathogenicity of organisms associated with human infections.
- Apply appropriate microbiology laboratory techniques, methodologies, instruments and equipment in accordance with current laboratory safety protocol.

List of Practical

- Aseptic practice in laboratory and safety precautions Care and maintenance of laboratory equipments like water bath, Centrifuges, oven, refrigerator, incubator etc
- Preparation of axenic cultures Preparation and pouring of Media-Nutrient agar, Blood agar, Mac-conkey agar, sugars, serum sugar kligler iron agar, Robertson cooked meat lowen stainjensons agar, sabourads dextrose agar.
- Operation of autoclave, hot air oven, distillation plant, filter like Seitze and membrane and sterility test Preparation of reagents (oxidase, Kovac etc).
- Disposal of contaminated materials like cultures etc
- Testing of disinfectants- Phenol coefficient and “In use tests “ Quality control of media, reagents etc
- Preparation of antibiotic discs, performance of antimicrobial susceptibility test Processing and identification of pure bacterial cultures
- Collection of specimens for microbiological investigations such as blood, urine, throat swab, rectal swab, stool pus swab, C.S.F. and other body fluids and O.T. specimens etc
- Processing of water, milk, food, and air samples for bacteriological examinations
- Identification of bacterial of medical importance up to species level.
- Plating of clinical specimen of media for isolation purification, identification, and quantitations purposes. Skin test like montoux, lepramin etc
- Antimicrobial susceptibility test for microbacteria To prepare different culture media used in mycology Staining technique a) KOH preparation b) LCB and c) India ink preparation To observe characteristics of common laboratory contaminants (fungal)
- Collection and processing of samples for diagnosis of fungal infections-Skin, nail, hair, body fluids, and secretions etc
- Staining techniques Haemagglutination test, Commercial kits based diagnosis, Antibiotic sensitivity (bacterial), Electron microscopic (demo), Bacterial culture Agar gel diffusion, ELISA

**MRSPTU M.SC. (MEDICAL LAB TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

Suggested Readings:

- Ananthnarayanan. R & C. K. Jeyaram Panicker, Textbook of Microbiology,;Orient Longman. Ed.8; 2006.
- David Greenwood, Richard B. Slack John F. Peutherer Medical Microbiology, Churchill Livingstone, London. 16th Edn., 2002.
- J.G. Colle, A.Simmons, A.G. Fraser, B.P. Marmion, Mackie & McCartney Practical Medical Microbiology, Elsevier.Ed.14; 2006.
- Topley & Wilson, Topley & Wilson's Principles of Bacteriology, Virology & Immunity, Vol III; Bacterial Diseases, Edward Arolla, London. Ed.8; 1990.
- Jagadish Chandar, 1996; A Textbook of Medical Mycology; Interprint, New Delhi.
- Alexopoulos C.J, Introductory Mycology; John Wiley & Sons Inc, N.Y. 1992.
- H.C. Dube , Introduction to Fungi, Vikas Publishing House. Ed.3; 2005.
- D.R. Arora & B.R. Arora Medical Parasitology, CBS Publishers & Distributors, New Delhi. 1st Edn., 2002.

CLINICAL HAEMATOLOGY & BLOOD BANKING TECHNOLOGY

Subject Code: MMLTS3-105

L T P C

(Duration: 60 hrs)

3 1 0 4

Course Objective:

- To educate and train a person to a skilled level of expertise in the domain area of the growing Health Sector.
- To enable the students to acquire knowledge of Pathological laboratory and operation of ground based growing Health Industry needs.

Course Outcome:

- This course provides analytical skills in different areas of clinical laboratory, clinical research and quality standards.
- In the rapidly growing area of scientific knowledge and skills, laboratory science is an important area of study for medical laboratory technicians.

UNIT 1 (15Hrs)

Introduction, History and Discovery to blood group system - Human blood group antigen, their inheritance, antibodies, and secretors. - ABO Blood Group System,: Sub-groups; Source of antigen, types of antibodies; Rhesus (RH) Blood Group System- Nomenclature and types of antigens ; mode of inheritance ; types of antibodies , techniques of grouping and cross matching - Coomb's test –direct and indirect test; titration of antibody - Compability test in blood transfusion, complication and hazards of blood transfusion

UNIT 2 (15Hrs)

Laboratory investigation of transfusion reactions and miss matched transfusion - Preparation of packed red cells and various fractions of blood for transfusion purposes - Blood collection-selection and screening of donor, collection of blood, various anticoagulants, and storage of blood - Organization, operation and administrations of blood bank - Structure, collection and significance of bone marrow composition and functions - Staining of bone marrow smears and preparation of histological sections - Hemoglobin, its synthesis, functions and degradation - Haemoglobin pigments and their measurement - Abnormal haemoglobin and their means of identification and estimation

UNIT 3 (15Hrs)

LE cell phenomenon and various methods of its demonstration, clinical importance - Haemostatic mechanisms and theories of blood coagulation - Physiochemical properties of coagulation factors - Screening coagulation procedures - Quantative essay of coagulation factors. Anatomy and physiology of Hamopoiesis , Anaemias , and other disorders of Erythropoiesis, Disorder of Leucopois, Physiology of Haemostasis and disorder of blood coagulation and fibrinolysis, immunogenetics , Routine Haematological techniques. Use of different anticoagulants , Haemoglobin estimation and standarization , red cells indices , total leucocyte counts , platelets count , blood and bone marrow preparation , staining with leishman stains , MGG and Perl's stain , reticulocyte count , investigation of haemolytic anaemia , screening coagulation test , preparation of brain thromboplastin , Euglobulin clot lysis , Fibrinogen level, FDPS , Blood grouping and matching , Coomb's test, Agglutination techniques, Serum Fe , Iron binding capacity , Investigation of nutritional anemia's

UNIT 4(15Hrs)

Artificial blood Iron metabolism and its disorder Antigens to blood groups, Components of Blood and its preservation Mechanism of Haemostatics Blood components separator Essentials of Blood Banks Role of Blood as a parameter of diagnostic industry Basic principles and clinical aspects of cell counter Electrode analyzer Artrial blood gas analyzer.

Suggested Readings:

- Clinical Pathology, Hematology & Blood Banking *by Nanda Maheshwari*
- Concise Text in Clinical Pathology, Hematology & Blood Banking Author :SURABHI BANSAL

MRSPTU

SECOND SEMESTER

DIAGNOSTIC BIOCHEMISTRY & ORGAN FUNCTION TEST

Subject Code: MMLTS3-201

L T P C

(Duration: 60 hrs)

3 1 0 4

Course Objectives:

- Through this course the students are exposed to importance of biological macromolecules
- They acquire knowledge in the quantitative and qualitative estimation of biomolecules
- They study the influence and role of structure in reactivity of biomolecules

Course Outcomes:

At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions.

Unit 1 (15 Hrs)

Quality control, GMP and GLP, records Biochemical disorders Immune disorders Genetic disorders, chromosomal disorders, single cell disorders and complex traits. Chromosomal disorders: autosomal; sex chromosomal; karyotype analysis. G-banding, in situ hybridization (FISH and on –FISH), and comparative genomic hybridization (CGH).

Unit 2 (15 Hrs)

Cancer cytogenetics; special karyotyping. DNA diagnostics: PCR based diagnostics, ligation chain reaction, southern blot diagnostics, array-based diagnostics, DNA sequencing, genetic profiling, single nucleotide polymorphism. Haemoglobinopathies Neuro developmental disorders, Neuro degenerative disorders. Dynamic mutations.

Unit 3 (15 Hrs)

Biochemical diagnostics: inborn errors of metabolism, haemoglobinopathies, mucopolysaccharidoses, lipidoses, and glycogen storage disorders. Immunodiagnostics: diagnosis of infectious disease and mycobacterium diseases. Phage display, Immunoarrays, FACs

Unit 4 (15 Hrs)

Organ function tests- biochemical diagnosis and assessment of diseases of liver, kidney, pancreas, thyroid, muscle and CNS, and adrenals. Malabsorption syndromes and their biochemical evaluation. Blood and disorders- biochemical derangement in anemia. Enzymes and isoenzymes and their application in various disorders. Disturbances in acid-base balance. Lipoproteins and its disorders. Diabetes and atherosclerosis.

Suggested Readings

- Ananthnarayanan. R & C. K. Jeyaram Panicker, Textbook of Microbiology,; Orient Longman. Ed.8; 2006.
- David Greenwood, Richard B. Slack John F. Peutherer Medical Microbiology, Churchill Livingstone, London. 16th Edn., 2002.
- J.G. Colle, A.Simmons, A.G. Fraser, B.P. Marmion, Mackie & McCartney Practical Medical Microbiology, Elsevier.Ed.14; 2006.
- Topley & Wilson, Topley & Wilson's Principles of Bacteriology, Virology & Immunity, Vol III; Bacterial Diseases, Edward Arolla, London. Ed.8; 1990.

HISTOPATHOLOGY AND MORBID ANATOMY TECHNIQUES

Subject Code: MMLTS3-202

L T P C

(Duration: 60 hrs)

3 1 0 4

Course Objectives:

- Through this course the students are exposed to importance of biological macromolecules
- They acquire knowledge in the quantitative and qualitative estimation of biomolecules
- They study the influence and role of structure in reactivity of biomolecules.

Course Outcomes:

- Students will be taught Mendelian genetics, their principles and gene interaction.
- They learn about chromosomal aberrations and structure of chromosomes.

Unit 1 (15 Hrs)

Theory lectures / Seminars / Group Discussions: General Pathology and Cytology of tumors: Pathology and Cytology of female genital tract. (8 sections) i. Anatomy, embryology, histology and physiology of female genital tract. ii. Cytology of female genital tract and normal vaginal flora. iii. Inflammatory lesions of vagina and cervix. iv. Cytology of benign disorders of epithelia of uterine cervix and vagina. v. Precancerous and cancerous lesions of cervix vi. Effect of therapeutic procedure such as radiotherapy and drugs on epithelia of female genital tract. vii. Significance of cervical cancer screening. viii. Hormonal cytology in various age groups.

Unit 2 (15 Hrs)

Histology and Cytology of normal respiratory tract. ii. Cellular abnormalities due to benign disorders of respiratory tract. iii. Etiopathogenesis of lung cancer and method of cytodagnosis of lung cancer. iv. Cytological morphological characteristics of primary versus secondary lung carcinoma. v. Importance of lung cancer screening and accuracy of pulmonary cytology. vi. Role of cytologic techniques in diagnosis of cancer.

Unit 3 (15 Hrs)

Urinary tract ii. Anatomy, histology and cytology (normal urine) iii. Etiopathogenesis of bladder cancer and role of urinary cytology in diagnosis of bladder cancer and cancer of other sites. iv. Cytology of urothelial cancer. v. Gastrointestinal tract. vi. Anatomy, histology and normal cytology. vii. Cytology of malignant tumors. Effusions, Anatomy, Histology and cytology of pleural peritoneal and pericardial cavities. Benign and malignant cell population in effusions. Cytology of cerebrospinal fluid and miscellaneous fluids. Aspiration biopsy cytology-general principles of technique and cytodiagnosis. Breast and Nipple secretions vi. Anatomy and histology of breast. Cytology of nipple secretions and breast aspirates

Unit 4 (15 Hrs)

Automation in cytology laboratory ii. Application of flow cytometry iii. Etiology of cancer and methods of tumor induction iv. Sex chromatin and chromosomal abnormalities in cancer

Suggested Readings

- Practical Pathology Including Morbid Anatomy and Post-Mortem Technique By James Miller.
- Practical Pathology including morbid anatomy and post-mortem technique (Ex Lib Sydney Dernley) Miiller, James, and James Davidson

CYTOLOGY & CYTOGENETIC

Subject Code: MMLTS3-203

**L T P C
3 1 0 4**

(Duration: 60 hrs)

Course Objectives:

- Demonstrate proficiency in maintaining a safe work place, including observation of lab safety procedures, use of personal protective equipment, identification hazards and proper disposal of commonly used chemicals and biohazardous materials.
- Demonstrate improvement in communication skills, including maintenance of laboratory notebooks, oral presentations and written report

Course Outcomes:

- Follow a protocol independently, including locating materials and equipment, practicing good lab procedures and accurately performing all experimental procedures.
- Analyze experimental results, differentiating between expected and unexpected results, trouble shooting, interpreting results and making conclusions.

UNIT 1 (15 Hrs)

Cytologic Techniques In addition to the rotational posting to look after the routine laboratory procedures, (Hospital Service Part), the candidate shall take learn the following special laboratory procedures: Methods of preparation of fluids for microscopic examination: a) Preparation of direct or sediment smears b) Cyto centrifuge preparation c) Preparation with membrane filters d) Preparation cell blocks e) Processing of haemorrhagic fluids f) Methods of preparation of cell suspensions

UNIT 2 (15 Hrs)

Technique of processing of cytologic samples for electron microscopic examination - Different staining techniques for sex chromatin - Direct technique of chromosomal analysis in tumors and karyotyping - Special staining techniques (including background of staining reaction of each); Mucus, Glycogen, Lipids, Pigments. - Enzyme cytochemistry; Acid and alkaline phosphatase and peroxidase. - Methods of monoclonal antibody staining in smears

UNIT 3 (15 Hrs)

Correction of technical errors in preparation and staining of cytological smears. Methods of disinfection, cleaning of glassware / laboratory equipments used in collection and processing of specimens, sterilization of equipments / instruments / syringes and needles / solutions for special laboratory use. Preparation of distilled water, saline and buffers commonly used for special cytological techniques. Light microscope, working and its applications Phase contrast microscope working and its application Electron microscope: working and application Fluorescent microscope: working and application Methods of examination under polarizing light and dark ground illumination

UNIT 4 (15 Hrs)

Methods of specimen collection Cervical smear for malignant cytology Vaginal smear or hormonal cytology Methods of pleural and pericardial tapping Methods of sputum induction in cases with non-productive cough To see the endoscopic procedures for collection of Brush cytology specimens from tracheobronchial tree, Oesophageal and gastric lesions Principles of techniques of fine needle aspiration biopsy.

**MRSPTU M.SC. (MEDICAL LAB TECHNOLOGY)
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Suggested Readings

- Alberts, B. Bray, D. Lewis, J. Raff, M. Roberts, K. and Watson, J. D. 1989. Molecular Biology (Ed.) Garland Publishing Inc. New York.
- Atherly, A. G., Girton, J. R. and McDonald, J. F. 1999. The Science of Genetics. Saunders College USA.
- Burnham, C. R. 1962. Discussions in Cytogenetics, Burgess Publishing Co., Minnesota.
- Busch. H. and Rothblum, L. 1982 Volume X. The cell nucleus: DNA part A, Academic Press.
- Hartl, D. L. and Jones E. W. 1998. Genetics: Principles and Analysis (4ih Ed.) Jones and Barew Publishers, Massachusetts, USA.

MRSPTU

HUMAN GENETICS & HUMAN GENOME

Subject Code: MMLTS3-204

**L T P C
3 1 0 4**

(Duration: 60 hrs)

Course Objectives:

- The instructional goal is to develop a thorough knowledge and understanding of human chromosomes, mitosis and meiosis in humans. Instructional Goal:
- The goal is to develop and understanding and skill in the mechanics of inheritance, patterns of inheritance, and Mendelian inheritance in humans.

Course Outcomes:

Knowledge: Human s Genetics offers knowledge and about the various aspects and concepts of Human genome and related genetic disorders.

UNIT 1 (15 Hrs)

History and development of human genetics; organization of the human genome Genes and chromosome structure, function and inheritance. Repetitive DNA in human genome Alu and SINE repeats. Functional organization of centromeres and telomerase and centrosomes.

UNIT 2 (15 Hrs)

Methods for genetic study in man-pedigree analysis, chromosomal analysis, biochemical analysis. Somatic cell genetics (somatic cell hybrids, monochromosome, hybrid panels, gene mapping, hybridoma technology, polyclonal and monoclonal antibody), molecular genetics analysis. Tissue culture techniques, long-term and short term cultures, lymphoblastoid cell lines; congenital abnormalities; clinical aspects of autosomal and sex chromosomal disorder; inborn errors of metabolism, haemoglobinopathies.

UNIT 3 (15 Hrs)

Human genome mapping – genetic mapping, physical mapping-restriction fragment length, polymorphism, pulse field gel electrophoresis, yeast artificial chromosome, bacterial artificial chromosomes, PI derived artificial chromosomes, expressed sequence tags, sequence-tagged sites. Micro satellites and single nucleotide polymorphism. Inherited human disease-single gene diseases, complete traits. Identification and isolation of disease genes- positional cloning, functional cloning, DNA and cDNA microarrays. Yeast two-hybrid system. Statistical methods for genetic analysis of complex traits, cancer genetics.

UNIT 4 (15 Hrs)

Immunogenetics; pre-natal diagnosis – chorionic villus sampling, amniocentesis. Pre-implantation diagnosis. Genetic diagnosis. Genetic counseling. Gene therapy-concept, vectors, gene targeting and tissue specific expression. Ethics and human genetics. Introduction to pharmacogenomics and toxicogenomics.

Suggested Readings

1. Pravash Sen. Gupta, Clinical Immunology; Oxford University Press. 2003.
2. Noel R. Rose, Herman Friedman, John L. Fahey, Manual of Clinical Laboratory Immunology. ASM. III edition; 1986.
3. Leslie Hudson and Frank C. Hay, Practical Immunology, Blackwell Scientific Publication. Ed.3; 1989.
4. Goding J.W., Monoclonal Antibodies: Principle and Practice; Academic Press. 2001.
5. Carl A. K. Borreback, Antibody Engineering, Oxford University Press. Ed.2; 1995.

**MRSPTU M.SC. (MEDICAL LAB TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

DIAGNOSTIC BIOCHEMISTRY & ORGAN FUNCTION TEST-LAB

Subject Code: MMLTS3-205

L T P C

(Duration: 60 hrs)

0 0 4 2

Course Objectives:

- Through this course the students are exposed to importance of biological macromolecules
- They acquire knowledge in the quantitative and qualitative estimation of biomolecules
- They study the influence and role of structure in reactivity of biomolecules

Course Outcomes:

At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions.

Practical:

1. G-banded chromosomal preparation for detection of autosomes of autosomal/sec.
2. Chromosomal disorders (translocation, deletion, Down's syndrome, Klinefelter syndrome, Turner's syndrome, etc).
3. FISH for detection of : translocations, inversions (using appropriate probes) (eg, chro 9-22 translocation; X-Y translocation).
4. PCR base diagnosis (e.g. fragile-X syndrome; SRY in sex chromosomal anomalies).
5. Native PAGE analysis of enzyme.
6. Isozyme analysis of enzyme variants.
7. Hormonal detection by ELISA Kits. a) T3 b) T4 e) TSH f) LSH c) Free T3 d) Free T4 g) FSH h) Prolact.

Suggested Readings

- Ananthnarayanan. R & C. K. Jeyaram Panicker, Textbook of Microbiology,;Orient Longman. Ed.8; 2006.
- David Greenwood, Richard B. Slack John F. Peutherer Medical Microbiology, Churchill Livingstone, London. 16th Edn., 2002.
- Baron EJ, Fine Gold S.M; Diagnostic Microbiology. Blackwell Scientific Systems. 1995.
- 44 | P a g e VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED STUDIES DOCUMENT ON LOCF IMMUNOLOGY & MICROBIOLOGY
- J.G. Colle, A.Simmons, A.G. Fraser, B.P. Marmion, Mackie & McCartney Practical Medical Microbiology, Elsevier.Ed.14; 2006.
- Topley & Wilson, Topley & Wilson's Principles of Bacteriology, Virology & Immunity, Vol III; Bacterial Diseases, Edward Arnold, London. Ed.8; 1990.

HISTOPATHOLOGY AND MORBID ANATOMY TECHNIQUES-LAB

Subject Code: MMLTS3-206

**L T P C
0 0 4 2**

(Duration: 60 hrs)

Course Objectives:

- Through this course the students are exposed to importance of biological macromolecules
- They acquire knowledge in the quantitative and qualitative estimation of biomolecules
- They study the influence and role of structure in reactivity of biomolecules.

Course Outcomes:

- Students will be taught Mendelian genetics, their principles and gene interaction.
- They learn about chromosomal aberrations and structure of chromosomes.

Practical:

1. Method of Disinfection - Preparation of Distill Water
2. Fixilation and various fixatives
3. Decalcification
4. Processing
5. Sections and types of Microtomes
6. Staining – Methods and preparation of Staining H & E Staining.
7. Methods of staining preparation – Routine Staining..H & E Stain...,PAP mStain, Geimsa, Pas Stain, Vinkossa Staining
8. AFB Staining
9. Pars – Persion blue for RH

Suggested Readings

- Practical Pathology Including Morbid Anatomy and Post-Mortem Technique By James Miller.
- Practical Pathology including morbid anatomy and post-mortem technique (Ex Lib Sydney Dernley) Miiller, James, and James Davidson

CYTOLOGY & CYTOGENETICS -LAB

Subject Code: MMLTS3-207

**L T P C
0 0 4 2**

(Duration: 60 hrs)

Course Objectives:

- Demonstrate proficiency in maintaining a safe work place, including observation of lab safety procedures, use of personal protective equipment, identification hazards and proper disposal of commonly used chemicals and biohazardous materials.
- Demonstrate improvement in communication skills, including maintenance of laboratory notebooks, oral presentations and written report

Course Outcomes:

- Follow a protocol independently, including locating materials and equipment, practicing good lab procedures and accurately performing all experimental procedures.
- Analyze experimental results, differentiating between expected and unexpected results, trouble shooting, interpreting results and making conclusions.

Practical Diagnostic Experience:

1. Cervical Cancer Screening
2. Identification of normal, inflammatory, metaplastic dysplastic and malignant cells
3. Identification of specific infections, Trichomonas vaginalis, candidiasis, Actinomycetes, Herpes, genital condylomatous lesions
4. Identification of cells foreign to cervix
5. Hormonal cytology : Calculation of hormonal indices and its interpretation Identification of benign and malignant cells in the following types of Specimens: i) Sputum and bronchial brush cytology ii) Esophageal and Gastric brush cytology iii) Oral Scraping iv) Effusions v) C.S.F and other body fluids vi) Urine vii) Breast aspiration smears and nipple discharge.

Suggested Readings

- Alberts, B. Bray, D. Lewis, J. Raff, M. Roberts, K. and Watson, J. D. 1989. Molecular Biology (Ed.) Garland Publishing Inc. New York.
- Atherly, A. G., Girton, J. R. and McDonald, J. F. 1999. The Science of Genetics. Saunders College USA.
- Burnham, C. R. 1962. Discussions in Cytogenetics, Burgess Publishing Co., Minnesota.
- Busch. H. and Rothblum, L. 1982 Volume X. The cell nucleus: DNA part A, Academic Press.
- Hartl, D. L. and Jones E. W. 1998. Genetics: Principles and Analysis (4th Ed.) Jones and Baw Publishers, Massachusetts, USA.
- Khush, G. S. 1973. Cytogenetics of Aneuploids, Academic Press, New York, London.
- Karp, G. 1999. Cell and Molecular Biology; Concepts and Experiments, John Wiley and Sons Inc. USA

DIAGNOSTIC MICROBIOLOGY & IMMUNO HAEMATOLOGY -LAB

Subject Code: MMLTS3-208

**L T P C
0 0 4 2**

(Duration: 60 hrs)

Course Objectives:

- Apply systematized problem solving techniques to identify and correct procedural errors, identify instrument malfunctions and seek proper supervisory assistance, and verify the accuracy of laboratory results obtained.
- Operate and maintain laboratory equipment, utilizing appropriate quality control and safety procedures.

Course Outcomes:

- Perform routine clinical laboratory procedures within acceptable quality control parameters in Hematology, Chemistry, Immunohematology, and Microbiology under the general supervision of a Clinical Laboratory Scientist or Pathologist.
- Demonstrate technical skills, social behavior, and professional awareness incumbent upon a laboratory technician.

Practicals:

1. Typing of erythrocytes, Antigen and Antibodies (ABO and Rh)
2. Direct Coomb's Test
3. Indirect Coomb's Test
4. Major and Minor errors matching
5. HBSAg testing
6. Malaria , Syphilis
7. Handling of various laboratory instrument, cleaning, reagent preparation and drawing of the graph.
8. Principles application and maintenance of following laboratory equipments
Immunoelectro Microscope
9. pH meter, Spectrophotometer including ELISA
10. Anti-D titration
11. Preparation of Antigen and Standardizing them.

Suggested Readings

- Fundamental Immunology (Hardcover) By William E. Paul. Publisher: Lippincott Williams and Wilkins.
- Immunology: International Edition (Paperback) By Janis Kuby, Thomas J. Kindt, Barbara A. Osborne and Richard A. Goldsby. WH Freeman and Co. Ltd.
- Immunology (Paperback) By Richard A. Goldsby, Thomas J. Kindt, Barbara A. Osborne and Janis Kuby. WH Freeman and Co. Ltd.
- Immunology (Paperback) By Ivan M. Roitt, Jonathan Brostoff and David Male. Publisher: Mosby.
- Introduction to Medical Immunology By Gabriel Virella, Marcel Dekker Inc.

HUMAN GENETICS & HUMAN GENOME -LAB

Subject Code: MMLTS3-209

**L T P C
0 0 4 2**

(Duration: 60 hrs)

Course Objectives:

- The instructional goal is to develop a thorough knowledge and understanding of human chromosomes, mitosis and meiosis in humans. Instructional Goal:
- The goal is to develop and understanding and skill in the mechanics of inheritance, patterns of inheritance, and Mendelian inheritance in humans.

Course Outcomes:

Knowledge: Human s Genetics offers knowledge and about the various aspects and concepts of Human genome and related genetic disorders.

Practical of Human genetics

- i. Pedigree analysis
- ii. Chromosome preparation PHA- stimulated short term blood cultures, air dried chromosome preparation.
- iii. G-banding of chromosome.
- iv. Karyotype prepatation. v. In situ hybridization-FISH (example with centromeric and telomeric probes).
- v. Polyacrylamide gel electrophoresis- detection of enzyme.(for example G6PD, and X-linked enzyme)

Suggested Readings

1. Pravash Sen. Gupta, Clinical Immunology; Oxford University Press. 2003.
2. Noel R. Rose, Herman Friedman, John L. Fahey, Manual of Clinical Laboratory Immunology. ASM. III edition; 1986.
3. Leslie Hudson and Frank C. Hay, Practical Immunology, Blackwell Scientific Publication. Ed.3; 1989.
4. Goding J.W., Monoclonal Antibodies: Principle and Practice; Academic Press. 2001.
5. Carl A. K. Borreback, Antibody Engineering, Oxford University Press. Ed.2; 1995.

THIRD SEMESTER

CLINICAL HEMATOLOGY (NON NEOPLASTIC)

Subject Code: MMLTS3-301

L T P C

(Duration: 60 hrs)

3 1 0 4

Course Objective:

1. Distinguish normal and abnormal hematological laboratory findings to predict the diagnosis of hematological disorders and diseases.
2. Recognize laboratory results consistent with leukemia and other white blood cell disorders.

Course Outcome:

1. Correlate hematological findings with those generated in other areas of the clinical laboratory, patient symptoms and clinical history, to make appropriate and effective on-the-job professional decisions.
2. Perform basic hematological laboratory testing, assess laboratory data and report findings according to laboratory protocol

UNIT 1 (15 Hrs)

Hematopoiesis- Theories of Hematopoiesis (origin and development of Blood cells) - Normal Erythropoiesis, Role of Erythropoietin in Erythropoiesis, destruction of Erythrocytes - Leucopoiesis (development and maturation of granulocytes and nongranulocytes), antigen independent and antigen dependent lymphopoiesis - Megakaryopoiesis-stages of megakaryocyte development and release of platelet, micromegakaryocytes.

UNIT 2 (15 Hrs)

Disorder of Red cell-Anemia-Definition, Normal Erythrocytes kinetics and pathophysiology, various classification of Anemia and adaptive mechanism in Anemia, Lab diagnosis of Anemia - Iron metabolism and Heme synthesis, Iron Deficiency in Anemia of chronic disorder, sideroblastic Anemia, hemochromatosis, porphyria - Hereditary disorders of Haemoglobin structures and synthesis. - Structural variants of haemoglobin, pathophysiology of structural haemoglobin variants, sickle cell Anemia with lab diagnosis - Thalassemia, definition, types of thalassemia including Alpha, Beta thalassemia, pathophysiology and lab diagnosis - Hemolytic Anemia-Classification, intrinsic and extrinsic, hemolytic Anemia, hereditary spherocytosis, hereditary elliptocytosis, PNH, G6PD and Pyruvate kinase deficiency, HUS, TTP, IDC - Immune hemolytic Anemia: classification ,pathophysiology and lab diagnosis - Megaloblastic Anemia, Pathophysiology and lab diagnosis

UNIT 3 (15 Hrs)

Disorder of White Blood Cells: Neutrophilia, Luekemoid reaction, neutropenia, morphologic abnormalities of neutrophils, functional abnormalities of neutrophils, reactive eosinophilic and hyper eosinophilic syndrome, lymphocytosis, infectious mono nucleosis, lymphocytopenia

UNIT 4 (15 Hrs)

Hemostatic mechanisms, Disorder and Lab Diagnosis: Role of platelet in hemostasis, lab investigation of primary hemostasis - Secondary hemostasis, coagulation factors, coagulation pathways-intrinsic and extrinsic, fibrinolytic system, screening test for coagulation and fibrinolysis. - Platelet disorders in primary hemostasis - Von-Wille Brand disorder, factor VIII & IX deficiency, fibrinogen deficiency, lupus like anticoagulant, thrombosis and conditions pre-disposing to thrombosis, heparin anticoagulants.

Suggested Readings:

1. Pravash Sen. Gupta, Clinical Immunology; Oxford University Press. 2003.
2. Noel R. Rose, Herman Friedman, John L. Fahey, Manual of Clinical Laboratory Immunology. ASM. III edition; 1986.
3. Leslie Hudson and Frank C. Hay, Practical Immunology, Blackwell Scientific Publication. Ed.3; 1989.
4. Goding J.W., Monoclonal Antibodies: Principle and Practice; Academic Press. 2001.
5. Carl A. K. Borreback, Antibody Engineering, Oxford University Press. Ed.2; 1995.

MRSPTU

CLINICAL HEMATOLOGY (NEOPLASTIC)

Subject Code: MMLTS3-302

L T P C

(Duration: 60 hrs)

3 1 0 4

Course Objective:

1. Understand both established information and recent clinical advances in coagulopathies, anticoagulant and thrombolytic therapies;
2. Understand blood and marrow morphology and hematopathology;

Course Outcome:

1. Able to successfully function within NHS organisational and management systems.
2. Communicates effectively and is able to share decision making, while maintaining appropriate situational awareness, professional behaviour and professional judgement.

UNIT 1 (15 Hrs)

Principles of diagnosis of hematopoietic-Lymphoid neoplasm - Classification of hematopoietic neoplasm - Classification of lymphoid neoplasm - Cancer biology

UNIT 2 (15 Hrs)

Molecular genetic of myeloid leukemia's, CBF translocation, RAR translocation - Molecular genetic of lymphoid leukemia's, tel gene translocation, E2A translocation - Molecular genetic of non-Hodgkin lymphomalignancies - Complication of hematopoietic neoplasm: host defense defect, haemorrhagic, neurologic, metabolic complication, organ infiltration, ocular, renal, anemia, abdominal, musculoskeletal complications.

UNIT 3 (15 Hrs)

Hematopoietic growth factor, their application in hematologic neoplastic conditions - Hematopoietic stem cell transplantation and its applications - Tumor antigens. - Cytokines, interferon, interleukins, their role in hematologic neoplastic conditions.

UNIT 4 (15 Hrs)

Classification of acute leukemia's - Acute lymphoblastic leukemia's, clinical features, diagnosis, classification and risk factor assessment - Acute myelogenous leukemia's, epidemiology, clinical features, immunophenotypes, classification, clinicopathologic syndromes and special types - Myelodysplastic syndromes: classification, diagnosis, clinical features, pathogenesis, biologic features and lab findings - Chronic myeloid leukemia's: history, incidence, clinical features, diagnosis, bone marrow findings, cytogenetic findings, immunophenotypes and molecular findings, cellular and molecular pathogenesis - Polycythemia vera: history, epidemiology, clinical feature, blood and lab findings, bone marrow study, cytogenetic and pathogenesis - Myelofibrosis: History and pathogenesis, clinical features, lab finding and diagnosis - Chronic lymphocytic leukemia: Aetiology, clinical findings, lab findings and staging - Non Hodgkin's lymphomas: aetiology, clinical features, classification and lab findings - Hodgkin Disease: Aetiology, epidemiology, clinical feature and staging and lab diagnosis - Plasma cell dyscrasis: Aetiology, cytogenetic and molecular biology, protein abnormalities, clinical features and lab diagnosis.

Suggested Readings

1. Pravash Sen. Gupta, Clinical Immunology; Oxford University Press. 2003.
2. Noel R. Rose, Herman Friedman, John L. Fahey, Manual of Clinical Laboratory

**MRSPTU M.SC. (MEDICAL LAB TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

- Immunology. ASM. III edition; 1986.
3. Leslie Hudson and Frank C. Hay, Practical Immunology, Blackwell Scientific Publication. Ed.3; 1989.
 4. Goding J.W., Monoclonal Antibodies: Principle and Practice; Academic Press. 2001.
 5. Carl A. K. Borreback, Antibody Engineering, Oxford University Press. Ed.2; 1995.

MRSPTU

IMMUNO PATHOLOGY & ADVANCED HEMATOLOGIC TECHNIQUES

Subject Code: MMLTS3-303

L T P C

(Duration: 60 hrs)

3 1 0 4

Course Objective:

1. Distinguish normal and abnormal hematological laboratory findings to predict the diagnosis of hematological disorders and diseases.
2. Recognize laboratory results consistent with leukemia and other white blood cell disorders.

Course Outcome:

1. Correlate hematological findings with those generated in other areas of the clinical laboratory, patient symptoms and clinical history, to make appropriate and effective on-the-job professional decisions.
2. Perform basic hematological laboratory testing, assess laboratory data and report findings according to laboratory protocol.

UNIT 1 (15 Hrs)

Basic Immunohematology: Blood group antigens, red cells membrane structure. Blood group antibody and complements - Erythrocytes antigen and antibody, ABO and Rh system and other red blood cells and antigen and anti body - Immuno hematology test and procedures, factors affecting haemagglutination, compatibility testing, anti human globulin test - New techniques and automation.

UNIT 2 (15 Hrs)

Blood collection, donor registration, donor selection, medical history, phlebotomy and donor reactions - Blood processing test: guideline for blood transfusion and testing - Pre transfusion testing - Artificial blood and blood substitute.

UNIT 3 (15 Hrs)

Component preparation and uses - Organization, planning and management of blood bank - Licensing of blood bank - Quality control in blood banking - Special situations hemapheresis, plasmapheresis and leucopheresis.

UNIT 4 (15 Hrs)

Flow cytometry: principle, instrumentation and application of flow cytometry - Advance monoclonal antibody testing and procedures - Advance cytogenetic method and their hematologic application - Molecular genetic and its application in hematology, PCR, hybridization, stem cell therapy and gene therapy.

Suggested Readings

1. Pravash Sen. Gupta, Clinical Immunology; Oxford University Press. 2003.
2. Noel R. Rose, Herman Friedman, John L. Fahey, Manual of Clinical Laboratory Immunology. ASM. III edition; 1986.
3. Leslie Hudson and Frank C. Hay, Practical Immunology, Blackwell Scientific Publication. Ed.3; 1989.
4. Goding J.W., Monoclonal Antibodies: Principle and Practice; Academic Press. 2001.
5. Carl A. K. Borreback, Antibody Engineering, Oxford University Press. Ed.2; 1995.

IMMUNO HEMATOLOGY-LAB

Subject Code: MMLTS3-304

L T P C

0 0 4 2

Course Objective:

- Develop proficiency in performing and interpreting ABO and Rh blood typing using standard serological methods.
- Acquire skills to screen for and identify clinically significant antibodies, ensuring compatibility in blood transfusions.
- Learn to conduct cross matching procedures to ensure safe and effective blood transfusions, minimizing the risk of transfusion reactions.

Course Outcome:

- Demonstrate accurate blood typing and identification of ABO and Rh blood groups using serological techniques.
- Analyze and interpret serological test results, applying this knowledge to solve complex immune hematological problems.
- Understand and adhere to safety protocols and quality control measures in the immunohematology laboratory.

List of Practical's

1. Blood Grouping
2. Differential Leukocyte Count
3. Total Leukocyte Count
4. Widal Test
5. Rapid Plasma Reagin (RPR) Test
6. Single Radial Immuno diffusion (SRID)
7. Ouchterlony Double Diffusion
8. Rocket Immuno Electrophoresis
9. Counter Current Immuno electrophoresis
10. Enzyme Linked Immuno sorbent Assay (ELISA) – DOT
11. Enzyme Linked Immuno sorbent Assay (ELISA) – Plate
12. Immuno precipitation
13. Western Blotting

ADVANCES IN BIOCHEMICAL SCIENCES

Subject Code: MMLTS3-305

**L T P C
3 1 0 4**

(Duration: 60 hrs)

Course Objective:

1. Distinguish normal and abnormal hematological laboratory findings to predict the diagnosis of hematological disorders and diseases.
2. Recognize laboratory results consistent with leukemia and other white blood cell disorders.

Course Outcome:

1. Correlate hematological findings with those generated in other areas of the clinical laboratory, patient symptoms and clinical history, to make appropriate and effective on-the-job professional decisions.
2. Perform basic hematological laboratory testing, assess laboratory data and report findings according to laboratory protocol.

UNIT 1 (15 Hrs)

Signal Transduction Hormone Receptors, Hormone Classification, Peptide, Steroid and tyrosine derivatives, Signal Transduction by different groups of hormones. Hormone action by Calcium and calmodulin.

UNIT 2 (15 Hrs)

Metabolism of Xenobiotics Xenobiotics, Cytochrome P450, Phase I and Phase II reaction, affect of age and sex on activities of Xenobiotic metabolizing enzymes. Salicylate –Poisoning, Heavy Metals-Lead, Mercury, Zinc poisoning and preventive measures.

UNIT 3 (15 Hrs)

Biochemical and Genetical Basis of Disease Biochemical basis of disease, molecular basis of disease, Major classes of genetic disease, diagnosis and treatment, molecular medicine.

UNIT 4 (15 Hrs)

Molecular Techniques & Bioinformatics Polymerase Chain Reaction, Microarray, Blotting; Southern, Northern and Western Blotting, Immunofluorescence and Gel documentation. Gene annotation, DNA sequence data, Homology search of DNA and amino acids; Blast, Fasta, Human Genome Project, Application in Medical Science.

Suggested Readings

1. Pravash Sen. Gupta, Clinical Immunology; Oxford University Press. 2003.
2. Noel R. Rose, Herman Friedman, John L. Fahey, Manual of Clinical Laboratory Immunology. ASM. III edition; 1986.
3. Leslie Hudson and Frank C. Hay, Practical Immunology, Blackwell Scientific Publication. Ed.3; 1989.
4. Goding J.W., Monoclonal Antibodies: Principle and Practice; Academic Press. 2001.
5. Carl A. K. Borreback, Antibody Engineering, Oxford University Press. Ed.2; 1995.

INTERMEDIARY METABOLISM & METABOLIC DISORDERS

Subject Code: MMLTS3-306

**L T P C
3 1 0 4**

(Duration: 60 hrs)

Course Objective:

1. Distinguish normal and abnormal hematological laboratory findings to predict the diagnosis of hematological disorders and diseases.
2. Recognize laboratory results consistent with leukemia and other white blood cell disorders.

Course Outcome:

1. Correlate hematological findings with those generated in other areas of the clinical laboratory, patient symptoms and clinical history, to make appropriate and effective on-the-job professional decisions.
2. Perform basic hematological laboratory testing, assess laboratory data and report findings according to laboratory protocol.

UNIT 1 (15 Hrs)

Biological Oxidation: Oxidation and reduction, oxidases, Dehydrogenases, Hydroperoxidases, oxygenases and mono oxygenase.

UNIT 2 (15 Hrs)

Carbohydrate Metabolism : Metabolism of Glycogen, Glycogenesis, Glycogenolysis, Hormonal regulation, Regulation of Glycogen metabolism, Gluconeogenesis, futile cycles, blood glucose level regulation, cori cycle, Glucose transport and transporters. Clinical significant of gluconeogenesis, Pentose phosphate PATHWAY. Diabetes, Ketosis, Hypoglycemia, Glycogen-Storage diseases.

UNIT 3 (15 Hrs)

Lipid Metabolism: Lipid Transport and storage, Plasma Lipoproteins, Apolipoproteins, Lipoprotein metabolism, Clinical Significance of Lipoprotein. Cholesterol synthesis and regulation Hyperlipidimia, Atherosclerosis.

UNIT 4 (15 Hrs)

Amino Acid Metabolism: Amino acids, Biosynthesis and clinical significance of Polyamine, Nitric Oxide, Histamine, Serotonin, Melatonin, Creatinine, Melanin and GABA (γ - Amino by tyrate). Phenyl ketonurea, Tyrosinimia and other amino acid metabolic disorders. Introduction to nucleic acid metabolism, denovo and salvage pathway and disorders of purine and pyrimidine metabolism.

Suggested Readings

1. Pravash Sen. Gupta, Clinical Immunology; Oxford University Press. 2003.
2. Noel R. Rose, Herman Friedman, John L. Fahey, Manual of Clinical Laboratory Immunology. ASM. III edition; 1986.
3. Leslie Hudson and Frank C. Hay, Practical Immunology, Blackwell Scientific Publication. Ed.3; 1989.
4. Goding J.W., Monoclonal Antibodies: Principle and Practice; Academic Press. 2001.
5. Carl A. K. Borreback, Antibody Engineering, Oxford University Press. Ed.2; 1995.

DIAGNOSTIC ENZYMOLOGY

Subject Code: MMLTS3-307

**L T P C
3 1 0 4**

(Duration: 60 hrs)

Course Objective:

1. Distinguish normal and abnormal hematological laboratory findings to predict the diagnosis of hematological disorders and diseases.
2. Recognize laboratory results consistent with leukemia and other white blood cell disorders.

Course Outcome:

1. Correlate hematological findings with those generated in other areas of the clinical laboratory, patient symptoms and clinical history, to make appropriate and effective on-the-job professional decisions.
2. Perform basic hematological laboratory testing, assess laboratory data and report findings according to laboratory protocol.

UNIT 1 (15 Hrs)

Historical perspectives, General Characteristics, nomenclature and IUB enzyme classification (rational, overview and specific examples) introduction to the following terms with examples - Holoenzyme, apoenzyme, cofactors, co enzyme, prosthetic group, metalloenzyme measurement and expression of enzymatic activity, Enzyme assay activity units (I.U. and metal) Enzyme specificity types and theories (Lock and key, induced fit and three points attachment) Riboenzymes and Abzymes. Isolation and purification of enzyme, criteria of homogeneity of enzymes.

UNIT 2 (15 Hrs)

Enzyme Kinetics Factor affecting enzyme activity enzyme concentration, substrate concentration, pH and temp. Derivation of Michaelis-Menten equation of unisubstrate reaction K_m and its significance, K_{cat} / K_M and its importance, measurement of K_m and V_{max} line Lineweaver-Burk and other linear transformation, Bisubstrate reaction. Enzyme inhibition, types of reversible inhibition competitive, uncompetitive, derivation of equation for different types of inhibitors, determination of K_i .

UNIT 3 (15 Hrs)

Role of cofactor in enzyme catalysis $NAD^+/HADP$, FMN / FAD coenzyme A, TPP, PLP, Lipic acid, Vitamin B12 and tetrahydrofolic. Factors contributive to enzymatic catalysis proximity and orientation, acid base catalysis, covalent catalysis mechanism of action of chymotrypsin and Lysozyme. Control of enzyme activity feedback inhibition, allosteric control with special reference to aspartate trans carbomylase. Sigmoidal kinetics, concerted and sequential model for action of allosteric enzyme. Reversible and irreversible modification of enzyme.

UNIT 4 (15 Hrs)

Protein legend interaction. Binding of protein to legend having single binding site and two binding site, cooperatively phenomena and Scatchard plot. Clinical significance of CPK, CK MB, LDH, SGOT, SGPT, Cholinestrace amylase, lipase aldolase alkaline and acid phosphate. Central of enzymatic activity feedback inhibition.

**MRSPTU M.SC. (MEDICAL LAB TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

Suggested Readings

1. Pravash Sen. Gupta, Clinical Immunology; Oxford University Press. 2003.
2. Noel R. Rose, Herman Friedman, John L. Fahey, Manual of Clinical Laboratory Immunology. ASM. III edition; 1986.
3. Leslie Hudson and Frank C. Hay, Practical Immunology, Blackwell Scientific Publication. Ed.3; 1989.
4. Goding J.W., Monoclonal Antibodies: Principle and Practice; Academic Press. 2001.
5. Carl A. K. Borreback, Antibody Engineering, Oxford University Press. Ed.2; 1995.

MRSPTU

GENERAL ISSUES IN CLINICAL MICROBIOLOGY

Subject Code: MMLTS3-308

**L T P C
3 1 0 4**

(Duration: 60 hrs)

Course Objective:

1. Distinguish normal and abnormal hematological laboratory findings to predict the diagnosis of hematological disorders and diseases.
2. Recognize laboratory results consistent with leukemia and other white blood cell disorders.

Course Outcome:

1. Correlate hematological findings with those generated in other areas of the clinical laboratory, patient symptoms and clinical history, to make appropriate and effective on-the-job professional decisions.
2. Perform basic hematological laboratory testing, assess laboratory data and report findings according to laboratory protocol.

UNIT 1 (15 Hrs)

Epidemiology of Infectious diseases, hospital acquired infection management of hospital waste, Investigation of an infection out break. Animal and human ethics involved in Microbiological work.

UNIT 2 (15 Hrs)

Selection of Diagnostic Tests:- Analysis of tests, Test – Verification and Validation, Bioassays of Vitamins and Antibiotics, Sterility test, Endotoxin test, Procedure and significances. Quality in the clinical Microbiology Lab – QC, QA program.

UNIT 3 (15 Hrs)

Statistical Analysis Of Microbiological Data And Research: Introduction to Mean, Mode, Median, Mean deviation, standard deviation, coefficient of variation correlation and Regression analysis. Theorems: Probability and simple binomial distribution sampling – t, Z and F test of significance, small and large samples of medical significance Chi-square test.

UNIT 4 (15 Hrs)

Computer applications: Introduction to components of computers, Data storage devices, memory concepts, software and its types, Elementary idea to DOS- Applications of common packages – WINDOWS 3, 1, 95 and 98. Introduction to algorithms and flowcharts. Application in Medical Microbiology and information communications (data bases, emails, local networks).

Suggested Readings

1. Pravash Sen. Gupta, Clinical Immunology; Oxford University Press. 2003.
2. Noel R. Rose, Herman Friedman, John L. Fahey, Manual of Clinical Laboratory Immunology. ASM. III edition; 1986.
3. Leslie Hudson and Frank C. Hay, Practical Immunology, Blackwell Scientific Publication. Ed.3; 1989.
4. Goding J.W., Monoclonal Antibodies: Principle and Practice; Academic Press. 2001.
5. Carl A. K. Borreback, Antibody Engineering, Oxford University Press. Ed.2; 1995.

DIAGNOSTIC MICROBIOLOGY

Subject Code: MMLTS3-309

**L T P C
3 1 0 4**

(Duration: 60 hrs)

Course Objective:

1. Distinguish normal and abnormal hematological laboratory findings to predict the diagnosis of hematological disorders and diseases.
2. Recognize laboratory results consistent with leukemia and other white blood cell disorders.

Course Outcome:

1. Correlate hematological findings with those generated in other areas of the clinical laboratory, patient symptoms and clinical history, to make appropriate and effective on-the-job professional decisions.
2. Perform basic hematological laboratory testing, assess laboratory data and report findings according to laboratory protocol.

UNIT 1 (15 Hrs)

Bacteriology:- Biochemical tests for identification of bacteria. Molecular Mechanism of drug resistance, detection of antibacterial resistance, antimicrobial susceptibility testing Cultivation of anaerobic bacteria of medical significance. Laboratory diagnosis of bacterial diseases – Diphtheria, Tuberculosis, Typhoid, Syphilis, Gonorrhoea, Urinary Tract Infections, Food Poisoning.

UNIT 2 (15 Hrs)

Mycology:- classification of fungal diseases - Superficial, Cutaneous, Subcutaneous and Systemic Mycoses, Opportunistic infections. Transmission of fungal diseases, Immunity to fungal diseases – Laboratory diagnosis of fungal diseases In-vitro antifungal susceptibility testing, antifungal drug resistance.

UNIT 3 (15 Hrs)

Parasitology and virology - Processing of body fluids and stool specimen for identification of parasites culture techniques and animal inoculation methods for identification of parasites. Cultivation of animal viruses Viral serological and molecular techniques.

UNIT 4 (15 Hrs)

Immunology Immunity to infectious agents, Measurement of humoral response, cell mediated response, Phagocytic uptake and killing, Recombinant vaccines. Immunological techniques:- Immuno blotting, ELISPOT, Complement fixation, RIA and immuno fluorescence. Hypersensitivity reactions

Suggested Readings

1. Pravash Sen. Gupta, Clinical Immunology; Oxford University Press. 2003.
2. Noel R. Rose, Herman Friedman, John L. Fahey, Manual of Clinical Laboratory Immunology. ASM. III edition; 1986.
3. Leslie Hudson and Frank C. Hay, Practical Immunology, Blackwell Scientific Publication. Ed.3; 1989.
4. Goding J.W., Monoclonal Antibodies: Principle and Practice; Academic Press. 2001.
5. Carl A. K. Borreback, Antibody Engineering, Oxford University Press. Ed.2; 1995.

INSTRUMENTATION & TECHNIQUES IN MEDICAL MICROBIOLOGY

Subject Code: MMLTS3-310

L T P C

(Duration: 60 hrs)

3 1 0 4

Course Objective:

1. Distinguish normal and abnormal hematological laboratory findings to predict the diagnosis of hematological disorders and diseases.
2. Recognize laboratory results consistent with leukemia and other white blood cell disorders.

Course Outcome:

1. Correlate hematological findings with those generated in other areas of the clinical laboratory, patient symptoms and clinical history, to make appropriate and effective on-the-job professional decisions.
2. Perform basic hematological laboratory testing, assess laboratory data and report findings according to laboratory protocol.

UNIT 1 (15 Hrs)

Role of the Microbiologist:- Responsibility to the patient and clinician. General Concept for specimen collection and handling. Lab physical Design and Organization – Lab Design with report to safety of air handling system, Mechanical system, walls, floors, ceilings and furniture, Institution. Organization of the Microbiology laboratory.

UNIT 2 (15 Hrs)

Microscopy –Principles, application of light microscopy dark field microscopy, fluorescence microscope, Electron microscopy TEM, SEM, Automation in microbiology. Preparation of stains – Gram, Alberts, Capsule, Spore, Ziehl, Neelsen, Lactophenol Cotton Blue, Preparation of reagents used in biochemical analysis.

UNIT 3 (15 Hrs)

Instrumentation Techniques: Centrifugation Basic principles and common centrifuges used in Laboratory. (Clinical high speed & ultra, Electrophoresis General Principal, application of Gel electrophoresis, PAGE, Agarose Gel electrophoresis Spectroscopy UV – VIS absorption Spectroscopy, Flow Cytometry Principle and application.

UNIT 4 (15 Hrs)

Molecular and Techniques and Bioinformatics – Polymerase Chain Reaction, Micro array, Southern Blotting, Northern Blotting, Western blotting Immunofluorescence and gel documentation. Introduction to Bioinformatics Gene annotation, DNA sequence data, Homology search of DNA and amino acids, BLASTA, FASTA, Human Genome Project.

Suggested Readings

1. Pravash Sen. Gupta, Clinical Immunology; Oxford University Press. 2003.
2. Noel R. Rose, Herman Friedman, John L. Fahey, Manual of Clinical Laboratory Immunology. ASM. III edition; 1986.
3. Leslie Hudson and Frank C. Hay, Practical Immunology, Blackwell Scientific Publication. Ed.3; 1989.
4. Goding J.W., Monoclonal Antibodies: Principle and Practice; Academic Press. 2001.
5. Carl A. K. Borreback, Antibody Engineering, Oxford University Press. Ed.2; 1995.

FOURTH SEMESTER

PROJECT WORK

Project work which will carry 400 marks

The project will be based upon the research and actual bench work. It will begin from the 3rd semester and will continue through the 4th one. The project report will be submitted at the end of the 4th semester and evaluated (50% evaluation by internal examiner and 50% evaluation by external examiner)

MRSPTU

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF PHARMACY

SYLLABUS

FOR

M.SC. (CLINICAL EMBRYOLOGY)

(2 YEARS PROGRAMME)

2023 BATCH ONWARDS

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**MRSPTU M.SC. (CLINICAL EMBRYOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

SCHEME

1 st Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MCEMS1-101	Introduction of Clinical Embryology	3	1	0	40	60	100	4
MCEMS1-102	Biochemistry including Steroid Metabolism	3	1	0	40	60	100	4
MCEMS1-103	Embryology and Physiology of Human Reproductive System	3	1	0	40	60	100	4
MCEMS1-104	Basic Concept of Cell Biology & Molecular Biology	3	1	0	40	60	100	4
MCEMS1-105	Introduction to Clinical Embryology-Practical	0	0	4	60	40	100	2
MCEMS1-106	Embryology and Physiology of Human reproductive system-Practical	0	0	4	60	40	100	2
MCEMS1-107	Basic concept of cell biology & molecular biology-Practical	0	0	4	60	40	100	2
Total		12	4	12	340	360	700	22

2 nd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MCEMS1-201	IVF Procedure: Fertilization, Embryo Production & Cryopreservation Techniques	3	1	0	40	60	100	4
MCEMS1-202	Reproductive Disorders and Histology	3	1	0	40	60	100	4
MCEMS1-203	Infertility, and its Clinical Management, Andrology	3	1	0	40	60	100	4
MCEMS1-204	Cytogenetic	3	1	0	40	60	100	4
MCEMS1-205	IVF Procedure: Fertilization, Embryo Production & Cryopreservation Techniques -Practical	0	0	4	60	40	100	2
MCEMS1-206	Reproductive Disorders and Histology -Practical	0	0	4	60	40	100	2
MCEMS1-207	Cytogenetic -Practical	0	0	4	60	40	100	2
Total		12	4	12	340	360	700	22

**MRSPTU M.SC. (CLINICAL EMBRYOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

3 rd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MCEMS1-301	Assisted Reproductive Techniques	3	1	0	40	60	100	4
MCEMS1-302	Research methodology -Quality Control, Research Ethics, Scientific Writing	3	1	0	40	60	100	4
MCEMS1-303	Clinical Biochemistry	3	1	0	40	60	100	4
MCEMS1-304	Assisted Reproductive Techniques - Practical	0	0	4	60	40	100	2
MCEMS1-305	Clinical Biochemistry - Practical	0	0	4	60	40	100	2
MCEMS1-306	Research methodology - Quality control, Research ethics, Scientific writing -Practical	0	0	8	60	40	100	4
Total		9	3	16	300	300	600	20

4 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MCEMS1-401	Internship and Dissertation	0	0	40	80	120	200	20
Total		0	0	40	80	120	200	20

The candidate shall undergo internship in relevant department. The internship report shall be submitted to the parent institute & Viva-Voce examination shall be conducted by external expert.

or

The candidates will be supervised by the concerned faculty & the project report will be submitted to the institute. The Viva-Voce examination shall be conducted by external expert.

Overall Marks / Credits

Semester	Marks	Credits
1 st	700	22
2 nd	700	22
3 rd	600	20
4 th	200	20
Total	2200	84

FIRST SEMESTER

**MRSPTU M.SC. (CLINICAL EMBRYOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

INTRODUCTION OF CLINICAL EMBRYOLOGY

Subject Code: MCEMS1-101

**L T P C
3 1 0 4**

Duration: 60 Hrs.

Course Outcomes: After completing this module students will be able

- To know about clinical embryology
- Application and scope of clinical embryology
- To learn and solve the problems regarding reproduction and reproductive systems.
- To know about the different techniques of clinical embryology

UNIT-I (15 hrs)

Introduction of clinical embryology, application, scope, concept of embryology, Historical review of embryology, type of embryology (descriptive, comparative, experimental, chemical, analytical embryology)
Significance of Embryology.

UNIT-II (15 hrs)

Gametogenesis: Primordial germ cell, events of gametogenesis,
Oogenesis: time, duration, stages, structure of mature Ovum,
Spermatogenesis: time, duration, stages, structure of Sperm.

Unit-III (15 hrs)

Fertilization: Site of Fertilization,
Approximation of gametes, contact and fusion of gametes, effect of fertilization,
Early embryonic development: Cleavage, implantation, formation of germ layers,

Unit-IV (15 hrs)

Implantation and placentation
Preimplantation, Development of reproductive organs
Anatomy of Sperms Embryonic fields

Recommended books

1. Balinsky, B.I and Fabian, B.C. (2012) An Introduction to Embryology, 5th Edition. Cengage Publishers
2. Sastry, K.V. and Shukla, V. (2018) Developmental Biology. Rastogi Publications.
3. Mishra, S. (2010) Langman's Medical Embryology, South Asia Edition
4. Williams, Text Book of Endocrinology, 10th edition (2002), W.B. Saunders Publications

**MRSPTU M.SC. (CLINICAL EMBRYOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

BIOCHEMISTRY INCLUDING STEROID METABOLISM

Subject Code: MCEMS1-102

**L T P C
3 1 0 4**

Duration: 60 Hrs.

Course Outcomes:

- Biochemistry Majors will gain proficiency in basic laboratory techniques in both chemistry and biology,
- Students will be able to apply the scientific method to the processes of experimentation and hypothesis testing.
- The course aims to provide an advanced understanding of the core principles and topics of Biochemistry and their experimental basis, and
- It will enable the students to acquire specialized knowledge and understanding of selected aspects by means of a stem/branch lecture series and a research project.

UNIT-I (15 hrs)

Chemical structures of biomolecules: Starch, Glycogen, Cellulose, Chitin, Hyaluronate, Chondroitin sulphate and Keratin sulphate,

UNIT-II (15 hrs)

Basic structure and classification of Amino acids., Biologically active peptides- Glutathione, Aspartame, Enkephalins, Oxytocin & Vasopressin, Super secondary structures in Protein, Protein denaturation and folding Abnormal Hemoglobin.

UNIT-III (15 hrs)

Degradation and Biosynthesis: Degradation of glucose and Palmitic acid, Biosynthesis of urea, Gluconeogenesis, Glycogen synthesis

UNIT-IV (15 hrs)

Structure and Functions of Enzymes, Immobilized enzymes and their applications. Steroid hormones, biochemistry of steroid hormones, classification, their functions, metabolism of steroid hormones

RECOMMENDED BOOK

1. Biochemistry by Mary K. Campbell Saunders and Harcourt Brace company. Florida (1999)
2. Principles of Biochemistry by Albert Lehninger, David L. Nelson and Michael M.Cox. CBSPublishers. Delhi. (2000)
3. Harper's Biochemistry, International 1 25thed. Robert K. Murray, peter A. Mayes, Daryl K.Granner. Victor W. Rodwell. McGraw Hill. Lange Medical books (1999)
4. Outline of Biochemistry, Eric. C. Conn, Paul K. Stump. George Bruening, Roy, H. Ooi, Johnwiley and sons, New York.
5. A Text-book of Biochemistry by Edward Staunton, Wilbert, K. Todd, Howard S. Mason, John T. Van Bruggen. Macmillon Publishing Co. (1974).

MRSPTU M.SC. (CLINICAL EMBRYOLOGY)
SYLLABUS 2023 BATCH ONWARDS

EMBRYOLOGY AND PHYSIOLOGY OF HUMAN REPRODUCTIVE SYSTEM

Subject Code: MCEMS1-103

L T P C
3 1 0 4

Duration: 60 Hrs.

Course Outcomes:

- The student will be able to identify the key concepts of the structure and function of human reproductive system.
- The student will be able to build communication skills while involved in peer teaching of clinical embryology.
- The students will get a comprehensive overview of the morphology and functional reproductive system of the human body.
- The course will provides an insight to the implications of disruption of normal structure and function.

UNIT-I (15 hrs)

Physiology of male reproductive System: testosterone synthesis, function, its regulation, semen composition, and its analysis, Sex determination, differentiation, physiology of Puberty, Physiology of Female reproductive System, Sex hormones

UNIT-II (1 5hrs)

Oosterogen Synthesis, function, its regulation, Progesterone: Synthesis, function and its regulation, Female reproductive Cycle, ovarian cycle, Uterine cycle, Cervical and vaginal changes.

UNIT-III (15 hrs)

Hormonal regulations of menstrual cycle, abnormalities of menstrual cycle, menopause, Ovulation and test for ovulation

UNIT-IV (15 hrs)

Physiology of pregnancy and test, physiology of Labor and lactation, Physiology of Fetus and New born, placenta: hormones.

Recommended books

1. Guyton, Text Book of Medical Physiology, 12th edition(2011), Elseveir Publication
2. Prof .G.K.Pal, Text Book of medical Physiology, 2nd Edition(2015), Ahuja Publication
3. Indu Khurana, Medical Physiology, 1st Edition (2012), Elsevier Publication
4. A.K.Jain, Text Book of Physiology , 6th edition vol i&ii, Avichal publishing company, 2016
5. Williams, Text Book of Endocrinology , 10th edition (2002), W.B. Saunders Publications

**MRSPTU M.SC. (CLINICAL EMBRYOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

BASIC CONCEPT OF CELL BIOLOGY & MOLECULAR BIOLOGY

Subject Code: MCEMS1-104

**L T P C
3 1 0 4**

Duration: 60 Hrs.

Course Outcomes:

- To make aware the students regarding various cell organelles and their functioning with special stress on human chromosome.
- Students will get a comprehensive overview of the structure of cell and organelles functions
- Students will get knowledge about DNA replication and genetic expression.
- Students will be able to understand the basic mechanisms behind cell growth and division

UNIT-I (15 hrs)

The Cell : cell organization, organelles, Intracellular compartments Cytoskeleton & Cell Dynamics Cell junctions; Cell adhesion; Extracellular Matrix; Cell migration, Cell signaling – Typical ligand-receptor systems; Intracellular signaling systems; Signal transduction,

UNIT-II (15 hrs)

Cell growth & Division – Basic mechanism of mitosis & apoptosis, Oncogenes, Tumor Suppressor Genes, and Programmed Cell Death.

UNIT-III (15 hrs)

DNA Replication; Mutations & Repair Mechanisms; Recombination Transcription – Synthesis of RNA; RNA Processing; Regulation Translation – Mechanism; Regulation Protein Metabolism – Synthesis;

UNIT-IV (15 hrs)

Targeting and Degradation Regulation of Gene Expression Hormonal Regulation and Metabolism, Genetic code, karyotyping and PCR

Recommended books

1. Watson, Hopkins, Roberts, Steitz and Weiner, Molecular Biology of the Gene 1984, The Benjamin/Cumming Pub. Co. Inc. California.
2. Alberts, Bray, Lewis, Raff., Roberts and Wtson (1983) Molecular Biology of the Cell, Garland pub. Inc. New York
3. Benjamin Lewin Gene IV, V, VI and VII 1997, Oxford Univ. Press. U.K.
4. Mayers R.A. Molecular Biology and Biotechnology, A comprehensive desk reference (Ed)VCH Pub. Inc. New York.
5. Brown T.A. Molecular Biology, Bios Scientific Pub. Ltd. Oxford.
6. Walker and Ginglod 1992. Molecular Biology & Biotechnology, Royal Society of Chemistry Cambridge.
7. Gardener, Simmons and Snustad. Principles of Genetics 1991, Wiley & Sons. Inc. New York

**MRSPTU M.SC. (CLINICAL EMBRYOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

BASIC CONCEPT OF CELL BIOLOGY & MOLECULAR BIOLOGY PRACTICAL

Subject Code: MCEMS1-107

**L T P C
0 0 2 1**

Duration: 30 Hrs.

Course Outcomes

- Students will be able to get information regarding various cell organelles and their functioning with special stress on human chromosomes.
- Students will get a comprehensive overview of the structure of cell and organelles functions
- Students will be able to understand the basic process behind cell growth
- Students will learn about DNA replication.

PRACTICALS

1. To study the structure of cell
2. Permanent slides of mitosis and meiosis
3. Protocol of DNA Replication
4. Polymerase chain reaction (PCR)
5. Karyotyping

Recommended books

1. Watson, Hopkins, Roberts, Steitz and Weiner, Molecular Biology of the Gene 1984, The Benjamin/Cumming Pub. Co. Inc. California.
2. Alberts, Bray, Lewis, Raff., Roberts and Wtson (1983) Molecular Biology of the Cell, Garland pub. Inc. New York

**MRSPTU M.SC. (CLINICAL EMBRYOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

INTRODUCTION OF CLINICAL EMBRYOLOGY PRACTICAL

Subject Code: MCEMS1-105

**L T P C
0 0 2 1**

Duration: 30 Hrs.

Course Outcomes:

- Students will be able to understand about clinical embryology after completing this module,
- Students will understand the application and scope of clinical embryology
- The student will learn to solve the problems regarding reproduction and reproductive systems.
- The student will be introduced to the different techniques of clinical embryology

PRACTICALS:

1. To study permanent slides of spermatogenesis, oogenesis
2. T.S of ovary
3. T.S of sperm
4. To study development of embryo from permanent slides
5. Demonstration of male reproductive system with the h
6. Demonstration of female reproductive system

Recommended books

1. Balinsky, B.I and Fabian, B.C. (2012) An Introduction to Embryology, 5th Edition. CengagePublishers
2. Sastry, K.V. and Shukla, V. (2018) Developmental Biology. Rastogi Publications.
3. Mishra, S. (2010) Langman's Medical Embryology, South Asia Edition
4. Williams, Text Book of Endocrinology, 10th edition (2002), W.B. Saunders Publications

**MRSPTU M.SC. (CLINICAL EMBRYOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

**EMBRYOLOGY AND PHYSIOLOGY OF HUMAN REPRODUCTIVE SYSTEM
PRACTICAL**

Subject Code: MCEMS1-106

**L T P C
0 0 2 1**

Duration: 30 Hrs.

Course Outcomes:

- The student will be able to identify the key concepts of the structure and function of human reproductive system.
- The student will be able to build communication skills while involved in peer teaching of clinical *embryology*.
- The students will get a comprehensive overview of the morphology and functional reproductive system of the human body.
- The course will provide an insight into the implications of disruption of normal structure and function.

PRACTICALS:

1. To study menstrual cycle
2. To study diseases related to menstrual cycle
3. To study different months of human embryo
4. To study different types of pregnancy tests
5. Demonstration of Embryology Models
6. Histology Slides of Testes and Ovary

Reference Books

1. Guyton, Text Book of Medical Physiology, 12th edition(2011), Elsevier Publication
2. Prof .G.K.Pal, Text Book of medical Physiology, 2nd Edition(2015), Ahuja Publication
3. Indu Khurana, Medical Physiology, 1st Edition (2012), Elsevier Publication
4. A.K.Jain, Text Book of Physiology , 6th edition vol i&ii, Avichal publishing company, 2016
5. Williams, Text Book of Endocrinology , 10th edition (2002), W.B. Saunders Publications

SECOND SEMESTER

**IVF PROCEDURE: FERTILIZATION, EMBRYO PRODUCTION &
CRYOPRESERVATION TECHNIQUES**

Subject Code: MCEMS1-201

**L T P C
3 1 0 4**

Duration: 60 Hrs.

Course Objectives:

- After completing this module students will be able to know about clinical embryology lab techniques
- Application and scope

Course Outcomes:

The student will learn to solve the problems regarding reproduction and reproductive systems. The student will be introduced to the lab set up methods that's is useful in field of clinical embryology

UNIT-I (15 Hours)

Lab Set-up for IVF, Requirements and Protocols, Quality Control and Quality Assurance, Health and safety in the laboratory, Introduction to culture media, Handling and culture techniques, Preparation of media and buffer, Sequential culture media, Co-culture

UNIT –II (15 Hours)

Normal embryo development, abnormal embryo development, Metabolism of embryo, Grading of oocyte, Selection of embryo, Grading of embryo, Blastocyst culture –technique

UNIT –III (15 Hours)

Embryo transfer technique, USG guided embryo transfer, Embryo Reduction
Complication of IVF, Anesthesia, Patient Counseling, History of cryobiology, Physiology of cryobiology

UNIT –IV (15 Hours)

Cryoprotectant and its role, Lab Set-up for cryopreservation, Embryo freezing, Slow freezing technique, Vitrification of gamete of embryo, Recent development in cryobiology.

Recommended Books

1. David K. Gardner, Ariel,W, Coliin M. Howles, Textbook of Assisted reproductive Techniques, Vol.II ,5th Edition,2018
2. Pandey Manish R, The Techniques of IVF made easy with DVD-ROM, 1st Edition, Jaypee Brothers Medical Publisher
3. Chaitanya N., Sonal ,P., Practical Guide to Infertility Management & IVF, Jaypee Brothers Medical Publisher
4. Hirishakesh ,P., Manal on Advanced Infertility and Assisted Reproductive Techniques, Jaypee Brothers Medical Publisher 2013
5. Carol, T., Encyclopedia of Fertilty And Infertility, Viva Books Private Limited, 2010

REPRODUCTIVE DISORDERS AND HISTOLOGY

Subject Code: MCEMS1-202

**L T P C
3 1 0 4**

Duration: 60 Hrs.

Course Objectives:

The student will be able to identify the key concepts of the structure and function of human reproductive system and its disorder.

Course Outcomes:

The aim of this course is to provide students with a comprehensive overview of the morphology and functional anatomy of the human reproductive system. The course provides an insight to the abnormalities of reproductive system

UNIT-I (15 Hours)

Sexual differentiation & developmental abnormalities – male & female Menstrual disorders – Precocious, delayed or absent puberty

UNIT-II (15 Hours)

Amenorrhea Fertility disorders – Sexual dysfunction; Infertility; Spontaneous pregnancy loss
Pregnancy disorders – Pre-eclampsia, IUGR, Labour abnormalities

UNIT-III (15 Hours)

Endocrine disorders – Hyperprolactinemia Autoimmune disorders Genetic disorders (mutations and syndromes),

UNIT-IV (15 Hours)

Cancers and biomarkers – Testicular; Prostate; Ovarian; Endometrial; Cervical; Breast
Reproductive pathology,

Recommended books

1. Balinsky, B.I and Fabian, B.C. (2012) An Introduction to Embryology, 5th Edition. CengagePublishers
2. Sastry, K.V. and Shukla, V. (2018) Developmental Biology. Rastogi Publications.
3. Mishra, S. (2010) Langman's Medical Embryology, South Asia Edition

**MRSPTU M.SC. (CLINICAL EMBRYOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

INFERTILITY AND ITS CLINICAL MANAGEMENT, ANDROLOGY

Subject Code: MCEMS1-203

**L T P C
3 1 0 4**

Duration: 60 Hrs.

Course Objectives:

- The student will be able to identify the key concepts of the Physiology of Ovulation.
- The student will be able to know about the Hormonal control of reproduction

Course Outcomes:

The aim of this course is to provide students information about Physiology of Ovulation, Folliculogenesis and the lab set up methods that's is useful in field of clinical embryology

UNIT -I (15 Hours)

Physiology of Ovulation, Folliculogenesis, Physiology of Menses, Hormonal control of human, Natural Cycle, Various stimulation protocols, Ovarian Hyperstimulation syndrome (OHSS), Complication of stimulation, Monitoring of patients, Reproductive function and causes of subfertility, Investigating male and female patients

UNIT -II (15 Hours)

Infertility and its management, Ultrasound, Elderly Patients, reproduction, Miscarriage, Ectopic Pregnancies, Multiple Gestation, Heterotrophic Pregnancies, Oocyte Donation Programme, Surrogacy

UNIT -III (15 Hours)

Physiology of Sperm, Spermatogenesis, Male Factor, Lab Set-up for andrology, Sperm separation, Semen analysis, Semen analysis as per WHO criteria, Sperm morphology assessment according to Strict (Kruger) criteria. Sperm survival test, Grading of Sperm

UNIT -IV (15 Hours)

Sperm preparation for IUI, Sperm preparation for IVF, Semen preparation for IUI-Classical method, Standard method and Density gradient method, Semen cryopreservation-both neat and processed sample, Sperm freezing, Donor Sperm Programme

Recommended Books:

1. David K. Gardner, Ariel, W, Coliin M. Howles, Textbook of Assisted reproductive Techniques, Vol.II ,5th Edition, 2018
2. Pandey Manish R, The Techniques of IVF made easy with DVD-ROM, 1st Edition, Jaypee Brothers Medical Publisher
3. Chaitanya N., Sonal ,P., Practical Guide to Infertility Management & IVF, Jaypee Brothers Medical Publisher
4. Hirishekesh ,P., Manual on Advanced Infertility and Assisted Reproductive Techniques, Jaypee Brothers Medical Publisher 2013
5. Carol, T., Encyclopedia of Fertilty And Infertility, Viva Books Private Limited, 2010

CYTOGENETIC

Subject Code: MCEMS1-204

**L T P C
3 1 0 4**

Duration: 60 Hrs.

Course Objectives:

The student will be able to identify the key concepts of the molecular biology, chromosome structure, sex chromosome and different techniques of molecular biology.

Course Outcomes:

The aim of this course is to provide students information about molecular biology, chromosome and Genetic techniques that's is useful in field of clinical embryology

UNIT-I (15 Hours)

Biology of chromosomes: Metaphase chromosomes, Centromere, Kinetochore, Telomere & its maintenance Heterochromatin & Euchromatin, Sex determination: Sex chromosomes & Sex determining mechanisms, Dosage compensation in Man.

UNIT-II (15 Hours)

Cytogenetic implications and consequences of Structural changes and Numerical change, Role of genetics in infertility, Chromosomal and genetic analysis in IVF,

UNIT –III (15 Hours)

Genetic techniques, FISH, Preparation of blastomeres for FISH, CGH, Flow cytometry, Automated Karyotyping, Embryo biopsies Role of genetics in OATS, Genes and RPL (Recurrent pregnancy losses)

UNIT –IV (15 Hours)

Somatic cell geneti: Cell fusion, hybrid agents and mechanism of fusion, Heterokaryon-selective hybrids and chromosome segregation.

RECOMMENDED BOOK:

1. Edwin H. Mcconkey, 1993. Human genetics, the molecular revolution.
2. Peter J. Russel, 1998, Genetics.
3. Avers C.J., 1984, Genetics
4. Gardner, E.J., Simmons, M.J. & Snustad, P. Principles of Genetics, 1991, 1991, John Wiley & Sons Inc. New York.
5. Monroe W. Strickberger Genetics, 1985, Macmillan Publishing Company, New York.
6. Seth, P.K. & Seth, S. 1994, Human Genetics, New perspectives, Omega Scientific Publishers.
7. Strachan, Tom and Read, A.W. Human Molecular Genetics 2004, Garlandjd Science London, New York.

**IVF PROCEDURE: FERTILIZATION, EMBRYO PRODUCTION &
CRYOPRESERVATION TECHNIQUES PRACTICAL**

Subject Code: MCEMS1-205

**L T P C
0 0 4 2**

Duration: 60 Hrs.

Course Objectives:

- After completing this module students will be able to know about clinical embryology lab techniques
- Application and scope

Course Outcomes:

The student will learn to solve the problems regarding reproduction and reproductive systems. The student will be introduced to the lab set up methods that's is useful in field of clinical embryology

PRACTICALS

1. Introduction to lab
 - a. Lab ethics
 - b. Aseptic precaution
2. Introduction to instruments
 - a. Handling of instruments
 - b. Insemination technique
3. Identification of oocyte
 - a. Grading of oocyte
 - b. Insemination of oocyte
4. Denuding
5. Ferti-check on day 1
6. Classification of 2PN
7. Growth of embryo on day 2
8. Shifting of embryos
9. Quality of embryo on day 3
10. Grading of blastocyst
11. Selection of blastocyst for embryo transfer
12. Vitrification of blastocyst
13. Vitrification of cleaving embryos
14. Retrieval of vitrified embryos

REPRODUCTIVE DISORDERS AND HISTOLOGY PRACTICAL

Subject Code: MCEMS1-206

**L T P C
0 0 4 2**

Duration: 60 Hrs.

Course Objectives:

The student will be able to identify the key concepts of the structure and function of human reproductive system and its disorder.

Course Outcomes:

The aim of this course is to provide students with a comprehensive overview of the morphology and functional anatomy of the human reproductive system. The course provides an insight to the abnormalities of reproductive system

PRACTICALS

1. Histology of male reproductive system Testis, Epididymis, Ductus deferens and accessory reproductive glands of male; Seminal vesicles, Prostate gland, Cowper's gland
2. Histology of female reproductive system: Ovary, Oogenesis, Structure of Ovum and Corpus luteum
3. Study of Permanent slides: Spermatogenesis, Mammary gland and Placenta.

CYTOGENETIC PRACTICAL

Subject Code: MCEMS1-207

**L T P C
0 0 4 2**

Duration: 60 Hrs.

Course Objectives:

The student will be able to identify the key concepts of the molecular biology, chromosome structure, sex chromosome and different techniques of molecular biology.

Course Outcomes:

The aim of this course is to provide students information about molecular biology, chromosome and Genetic techniques that's is useful in field of clinical embryology

PRACTICALS

1. To study the human karyotype.
2. Genetic techniques, FISH, Preparation of blastomeres for FISH,CGH, Flow cytometry,
3. Chromosome mapping
4. To study the sex chromatin body in the human neutrophil cells.
5. To study the sex chromatin body in the human buccal mucosal cells

THIRD SEMESTER

MRSPTU M.SC. (CLINICAL EMBRYOLOGY)
SYLLABUS 2023 BATCH ONWARDS

ASSISTED REPRODUCTIVE TECHNIQUES

Subject Code: MCEMS1-301

L T P C
3 1 0 4

Duration: 60 Hrs.

Course Objective:

1. To provide a brief introduction to reproductive techniques
2. To provide practically and clinically useful application of reproductive techniques

Course Outcomes:

1. To develop an understanding regarding assisted reproductive techniques
2. To make students aware of recent advances in assisted reproductive techniques

UNIT-I (15 Hrs)

Semen analysis Ovulation induction; Oocyte retrieval; In vitro maturation In vitro fertilization ICSI, GIFT.

UNIT-II (15 Hrs)

Cryopreservation of gametes & embryos; Vitrification Embryo biopsy; Embryo hatching Pre-implantation genetic diagnosis (PGD) Stem cells & therapeutic cloning C.

UNIT-III (15 Hrs)

Lab Techniques – Principles & Instrumentation Basic instrumentation – pH meter; Centrifuges; Microscopes; Electrophoresis Genetic manipulation / Nucleic acid techniques – DNA & RNA isolation; PCR etc. SDS-PAGE & Western blotting Cell biology techniques – Cell culture; Transfection etc.

UNIT-IV (15 Hrs)

Immuno techniques – RIA; ELISA; CMIA Molecular Cytogenetics techniques – FISH; Karyotyping; Microarray; PRINS; QFPCR; Array CGH; MLPA etc

Reference Books:

1. Textbook of assisted reproductive techniques by David K Gardener, Ariel Weissman, Colin M Howles and Zeev Shoham
2. Advances in assisted reproductive technology by Nayana H Patel
3. Textbook of Assisted Reproduction by Gautam Nand Allahbadia, Baris Ata, Steven R. Lindheim, Bryan J. Woodward, Bala Bhagavath.

MRSPTU M.SC. (CLINICAL EMBRYOLOGY)
SYLLABUS 2023 BATCH ONWARDS

**REASRCH METHODOLOGY-QUALITY CONTROL, REASRCH ETHICS,
SCIENTIFIC WRITING**

Subject Code: MCEMS1-302

L T P C
3 1 0 4

Duration: 60 Hrs.

Course Objectives:

1. To define the type and quantity of data that need to be collected.
2. To organize, summarize, analyze the data and draw conclusions from it. To assess the strengths of the conclusions and evaluate their uncertainty

Course Outcomes:

In this course students will learn how to

1. Effectively collect and describe data
2. To use data to make inferences and conclusions about real world.

UNIT-I (15 Hrs)

Biostatistics Introduction to Biostatistics - scope & need for the application of statistical methods in medical and biological data Definition of different terms in statistical methods - Scale of measurements; Methods of data collection Presentation of data - statistical tables, diagrams and graphs; Needs for reduction of data - measures of average and location Measures of dispersion - Range, quartile deviation, mean deviation and standard deviation.

UNIT-II (15 Hrs)

Concepts of statistical population and sample - need for sampling studies, Simple procedures of random sampling; Methods of sampling Probability: Basics concepts and theorems of probability Standard error, estimation and testing the statistical significance; Test of significance: Normal deviate test (Z test); Student's t tests; Chi-Squared tests; F - Test and one way analysis of variance and multiple range tests; Two way analysis of variance and multiple range test; Non- Parametric statistical methods; Correlation - definition and application; Regression - definition and application; Statistical methods in Diagnostic Tests

UNIT-III (15 Hrs)

Current legislation and regulation in ART, India ,Requirement for licensing, accrediting and approving ART clinics ,National guidelines for accreditation of ART clinics in India ,Ethics consideration and legal issues ,Ethical policies ,Indian Society for Assisted Reproduction (ISAR)

UNIT-IV (15 Hrs)

Surrogacy- Ethical and legal issues □ □ Ethical frameworks and principles □ □ Relevant regulatory body, Role of ethics in health care Social and ethical responsibilities with regards to patient care □ □ Patient Consent

RECOMMENDED BOOKS

1. Gupta, PK 2005. Cell and Molecular Biology. Rastogi Publications. Meerut.
2. Singh, BD 2003. Biotechnology. Kalyani Publishers. New Delhi.
3. Pavia, D.L., Lampmann, N.G.M and Kris, G.S. 2001 introduction to spectroscopy, 3rd edn. Harcourt, New York.
4. Gupta, S.C., and Kapoor, V.K, 2001 fundamentals of Applied Statistics. Sultan Chand K Sons, 3 rd edn, Jan 2001.
5. Pillai, RSN and Bagavathi; V.2001 statistics. S Chand & Company Ltd, 2001

CLINICAL BIOCHEMISTRY

Subject Code: MCEMS1-303

**L T P C
3 1 0 4**

Duration: 60 Hrs.

Course Objectives:

To provide a brief understanding of biochemistry to apply it in clinical embryology.

Course Outcomes:

This course aims to provide information about clinical biochemistry techniques that is useful in field of clinical embryology

UNIT I (15 hrs)

General biochemistry – chemistry of carbohydrates, lipids, proteins

Nucleic acid – nucleotides, the structure of DNA & RNA

UNIT II (15 hrs)

Vitamins (general, classification) and Minerals

Water & electrolyte balance and body fluids

Acid base balance and pH

Free radicals and antioxidants

Detoxification and biotransformation of xenobiotics

Nutrition and environmental pollution

Bioenergetics

UNIT III (15 hrs)

Over view of Metabolism – metabolism of carbohydrates, lipids, proteins

Enzymology

Hormones

Hemoglobin and plasma proteins

Immunoglobulins, Lipoproteins

UNIT IV (15 hrs)

Advanced biochemistry: mechanisms of action of hormones, immunochemistry, biochemistry of AIDS and cancer, biochemistry Aging, Clinical laboratory practices

Reference Books:

1. Clinical biochemistry- Metabolic and clinical aspects by William J Marshal, Marta Lapsley, Andrew P Day, and Ruth M Ayling
2. Textbook of Clinical Biochemistry by Ramnik Sood
3. Textbook of Clinical Biochemistry by SS Haque

**MRSPTU M.SC. (CLINICAL EMBRYOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

ASSISTED REPRODUCTIVE TECHNIQUES PRACTICAL

Subject Code: MCEMS1-304

**L T P C
0 0 4 2**

Duration: 60 Hrs.

Course Objective:

1. To provide a brief introduction to reproductive techniques
2. To provide practically and clinically useful application of reproductive techniques

Course Outcomes:

1. To develop an understanding regarding assisted reproductive techniques
2. To make students aware of recent advances in assisted reproductive techniques

PRACTICALS

3. Set up of IVF lab: QA and AC for IVF lab, QA and QC practices, Precision of IVF procedure
4. Designing of IVF lab and its location in the clinic, Record keeping, Lab maintenance protocol, Roster of work
5. Introduction and maintenance of all instruments in IVF lab, Calibration of all instruments
6. Quality improvement techniques, Review national and international guidelines, Trouble shooting and its solution

Reference Books:

Practical guide in Assisted Reproductive Technology by Gita Ganguly Mukherjee, Gautam Khastgir and Sidhartha Chatterjee

CLINICAL BIOCHEMISTRY PRACTICAL

Subject Code: MCEMS1-305

**L T P C
0 0 4 2**

Duration: 60 Hrs.

Course Objectives:

1. To provide an introduction to students with the specific characteristics of a laboratory of clinical biochemistry
2. To understand the pathophysiology and molecular basis of the most prevalent diseases
3. To know the analytical methods commonly used in the clinical laboratory

Course Outcomes: Students completing the course should be able to frame a scientific question or problem and be able to undertake investigations and perform analyses that provide information about biochemical questions and help to solve biochemical problems.

Experiments:

1. Introduction to Clinical Biochemistry Laboratory
2. Buffer & pH
3. Urine Analysis
4. Blood Sugar
5. Urinary Proteins
6. Serum Electrolytes
7. HCG by ELISA
8. DNA- Isolation & Quantification
9. pH meter

Reference Books:

1. Practical Clinical Biochemistry- Methods and Interpretations by Ranjna Chawla
2. Practical Clinical Biochemistry by Harold Varley
3. Practical Clinical Biochemistry by Shruti Mohanty and Aparna B Varma

**REASRCH METHODOLOGY-QUALITY CONTROL, REASRCH ETHICS,
SCIENTIFIC WRITING PRACTICAL**

Subject Code: MCEMS1-306

**L T P C
0 0 8 4**

Duration: 120 Hrs.

Course Objectives: The course provides the theoretical insight and practical skills required to plan, implement, analyze, and report scientific findings in the area of urban planning and design.

Course Outcomes: After completion of this course, students will be able to
a student should be able to:

1. Explain and apply techniques for scientific writing and research methodology to prepare the writing of a scientific report.
2. Perform investigation using methods, explain and take position on the results as well as summarize related work
3. Apply the knowledge in scientific writing and research methodology and use the knowledge to write a scientific report.

PRACTICALS

1. Methods of data collection
2. measures of average and location Measures of dispersion - Range, quartile deviation, mean deviation and standard deviation
3. Methods of sampling Probability: Basics concepts and theorems of probability
Standard error, estimation and testing the statistical significance
4. Test of significance: Normal deviate test (Z test)
5. Student's t-tests; Chi-Squared tests
6. F - Test and one-way analysis of variance and multiple range tests;

Reference Books:

1. Research methodology and scientific writing by George Thomas
2. Research methodology by CR Kothari and Gaurav Garg

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF PHARMACY

SYLLABUS

FOR

M.SC. (OPTOMETRY)

(2 YEARS PROGRAMME)

2023 BATCH ONWARDS

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**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

SCHEME

1 st Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MOPTS1-101	Basic Sciences and Clinical Optometry	3	1	0	40	60	100	4
MOPTS1-102	Visual and Applied Optics	3	1	0	40	60	100	4
MOPTS1-103	Epidemiology and Community Eye Care	3	1	0	40	60	100	4
MOPTS1-104	Research Methodology and Biostatistics	3	1	0	40	60	100	4
MOPTS1-105	Ocular Disease and Diagnostics-I	3	1	0	40	60	100	4
MOPTS1-106	Visual and Applied Optics-Practical	0	0	4	60	40	100	2
MOPTS1-107	Ocular Diseases and Diagnostics-Practical	0	0	4	60	40	100	2
Total		15	5	8	320	380	700	24

2 nd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MOPTS1-201	Ocular Diseases and Diagnostics-II	3	1	0	40	60	100	4
MOPTS1-202	Advanced Contact Lens Studies –I	3	1	0	40	60	100	4
MOPTS1-203	Pediatric Optometry and Binocular Vision	3	1	0	40	60	100	4
MOPTS1-204	Low Vision and Geriatric Optometry	3	1	0	40	60	100	4
MOPTS1-205	Ocular Disease and Diagnostics-II - Practical	0	0	4	60	40	100	2
MOPTS1-206	Advanced Contact lens-I -Practical	0	0	4	60	40	100	2
MOPTS1-207	Pediatric and Geriatric Optometry-Practical	0	0	4	60	40	100	2
Total		12	4	12	340	360	700	22

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

3 rd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MOPTS1-301	Low Vision Care and Rehabilitation	3	1	0	40	60	100	4
MOPTS1-302	Recent Advancements in Optometry	3	1	0	40	60	100	4
MOPTS1-303	Advanced Contact Lens -II	3	1	0	40	60	100	4
MOPTS1-304	Vision Therapy	3	1	0	40	60	100	4
MOPTS1-305	Occupational Optometry	3	1	0	40	60	100	4
MOPTS1-306	Advanced Contact Lens II - Practical	0	0	4	60	40	100	2
MOPTS1-307	Low Vision Care and Rehabilitation- Practical	0	0	4	60	40	100	2
Total		15	5	8	320	380	700	24

4 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
MOPTS1-401	Internship and Dissertation	0	0	40	80	120	200	20
Total							200	20

The candidate shall undergo internship in relevant department. The internship report shall be submitted to the parent institute & Viva-Voce examination shall be conducted by external expert.
or

The candidates will be supervised by the concerned faculty & the project report will be submitted to the institute. The Viva-Voce examination shall be conducted by external expert.

Overall Marks / Credits

Semester	Marks	Credits
1 st	700	24
2 nd	700	22
3 rd	700	24
4 th	200	20
Total	2300	90

FIRST SEMESTER

MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS

BASIC SCIENCES AND CLINICAL OPTOMETRY

Subject Code: MOPTS1-101

L T P C
3 1 0 4

Duration: 60 (Hrs)

Course Outcomes:

Students will be able to Achieve Anatomical knowledge about

- The general structure and morphology of eye - physiology and anatomy of eye
- Ocular pathology
- Refractive errors
- The student will learn to solve problems related to various ocular pathological conditions and infections.

Unit: 1 (14 hrs)

Development of eye ball, blood supply of orbit, nerve supply of eye ball, Optic nerve, Oculomotor and Trochlear nerve, Trigeminal and Abducent nerve, Facial nerve, Ocular Adnexa, Lacrimal apparatus

Eye ball (Sclera, uveal tract, retina), Angle of anterior chamber, Crystalline lens. Movement of eyeball and extra ocular muscles, Autonomic Nervous System, Visual Pathway.

Unit: 2 (16 hrs)

Intra-ocular Pressure- Intra-ocular pressure: a dynamic equilibrium Tonography, Visual Adaptation:- Mechanisms of visual adaptation, Dark adaptation and regeneration of rhodopsin, Adaptation of photoreceptors, Visual Acuity:- Specifications of the stimulus (physical basis), Retinal anatomy, Physiologic factors, Acuity criteria, Measurement of ordinary visual acuity (minimum angle of resolution), Factors influencing visual acuity, Sinusoidal grating targets
Color Vision:- Color and the visible spectrum, Color mixing, metameric matches and complementary wavelengths, Neural encoding of color, Congenital & Acquired dyschromatopsia, The Central Visual Pathways:- The retino – geniculo- cortical pathway, visual field examination, structure and functions of lateral geniculate body, the primary visual cortex, extrastriate visual cortex, visual deprivation

Binocular Vision:- Normal adult psychophysics, Normal development of binocular vision, Mal development of binocular vision, Strabismus and amblyopia, Binocular vision in other animals

Unit: 3 (16 hrs)

Ocular pathology, microbiology and pharmacology

Infections, Inflammation and repair mechanisms, Allergic reactions in ocular tissues, Bacteria, Virus, Fungus and their features for differentiation, Common bacterial infections of the eye, Common fungal infections of the eye, Common viral infections of eye

Classification of Ophthalmic drugs, Sympathomimetics & Sympatholytics. Parasympathomimetics & Parasympatholytics, Diagnostic drugs used in optometry – Dyes and stains, Antibacterial, Antifungal agents, Steroid and Non-steroidal anti-inflammatory drugs.

Unit: 4 (14 Hrs.)

Clinical optometry

Diseases of lids, diseases of adnexa, diseases of orbit, diseases of lachrymal apparatus, diseases of conjunctiva, Refractive errors

MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS

Reference books-

1. Stephen J. Miller: Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
2. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth - Heinemann, 2007
3. Myron Yanoff and Jays Duker : Ophthalmology

MRSPTU

VISUAL AND APPLIED OPTICS

Subject Code: MOPTS1-102

L T P C
3 1 0 4

Duration: 60 (Hrs.)

Course Outcomes: On completion of course, students will

- Understand the concept emmetropia & ametropia
- Applying the various concepts of ophthalmic lens dispensing
- Applying the concept of spectacle frame selection
- Understanding basic and advanced techniques of pediatric dispensing
- Applying the concept of dispensing spectacle in special children

Unit: 1 (15 Hrs.)

Schematic and reduced eyes and their properties;

Optical constants of the eye and their measurement. Purkinje images. Corneal curvature and thickness. Keratometry and pachymetry. Indices of aqueous and vitreous;

Optical Defects of the Eye- Shape of Cornea, Shape & RI of the lens, Optical axis, Visual axis (angle alpha, Fixation axis (angle gamma), Aberration of the Optical system of eye, Depth of focus, Diffraction & resolving power.

Unit: 2 (15 Hrs)

Emmetropia, Emmetropization and ametropia, Axial versus spherical ametropia, Theories of Myopia, Myopia control Program

Accommodation- possible mechanism of accommodation-Schiener disc experiment- theories of accommodation- modern theory- changes in the lens during accommodation- the amplitude of accommodation- the measurement of the amplitude n of accommodation- depth of field, luminance and blur tolerance- amplitude of accommodation versus age, Accommodative and vergence disorder.

Presbyopia-near vision addition- estimate of addition-unequal near vision addition- effect of changing the spectacle distance – hypermetropia and accommodation.

Unit: 3 (15 Hrs)

Spectacle frame: Current frame materials- a) Plastics b) Metals

Frame types: Combination of frames-Half-eye frames, Mounts, Nylon-cord frame, Special purpose frames.

Frame measurements: The boxing system, The datum system, Comparison of the two systems, Lens position, Segment specification

Frame Selection: Fashion, Function, Feel, Conflicting needs, Price, Standard alignment, Frame availability in Indian market

Lens Selection: Ground rule for selection, Selection criteria, Facial Measurement, The PD, Visual axes, Measuring inter papillary distance using PD ruler, Common difficulties in measuring PDs, measuring monocular PD, Measuring near PD, Lenticular, Atoric, HI Index, Aspherical, Absorptive lenses, Coating

Measuring heights: Single vision, Multi focal, bi-focal, Progressive

Unit: 4 (15 Hrs)

Pediatric Dispensing: The changing image of spectacle, Age differences. Frame Selection-

MRSPTU M.SC. (OPTOMETRY)
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Technical Criteria, Fashion criteria, some tips on selection Lens Selection Technical Criteria- Communicating with kids, kids' corner, Facial measurement of the kids-PDs, Centers, Bi-focals, Dealing with problems: Dealing with clients, Common client problems, dealing with professional colleagues, Dealing with the laboratories, Soft skills and professional communication with Patient and Customers.

Special needs dispensing: Occupational dispensing, Hazards in the work place, Occupational health safety legislation, Visual Ergonomics, Visual hygiene

Sports and Industrial eye protection: Standards covering eye protection, Lens materials & impact resistance, Frame & eye protection.

Reference books:

1. System for Ophthalmic Dispensing -Irvin Borish
2. M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
3. HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.
4. H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK, 1982.
5. WJ Benjamin: Borish's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

EPIDEMIOLOGY AND COMMUNITY EYE CARE

Subject Code: MOPTS1-103

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Outcomes: The student will be able to

- Understand the concept of Epidemiology
- Apply concept of optometric Evaluation procedure
- Understand the concept of health planning management, policies and education
- Utilize the concept of Community health care services and implementation of vision 2020.
- Analyze the data as well as basic concept of evaluation of patient for clinical and research purposes

Unit: 1 (15 hrs)

Prevalence, incidence and distribution of visual impairment

Methodology: Basics of Epidemiology study methods, Types of study designs; Screening for visual disorders; Childhood blindness

Refractive errors and presbyopia

Unit: 2 (15 hrs)

Age-related cataract; Low Vision; Diabetic retinopathy Glaucoma

Age-related Macular Degeneration; Vitamin A deficiency; Corneal and external diseases; Prevention strategies

Unit: 3 (15 hrs)

Concept of Health and Disease; Principles of Epidemiology and Epidemiological Methods; Screening for Eye Disease, Refractive errors, Low Vision, Cataract, Diabetic retinopathy, Glaucoma, Amblyopia, Squint.

Unit: 4 (15 hrs)

Health Information and Basic Medical Statistics; Communication for Health Education; Health Planning and Management; Health care of community; How to plan and implement Vision 2020

Reference books:

1. MC Gupta, Mahajan BK, Murthy GVS, 3rd edition. Text Book of Community Medicine, Jaypee Brothers, New Delhi, 2002.
2. Epidemiology of eye disease: Johnson and Gordon

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

RESEARCH METHODOLOGY AND BIostatISTICS

Subject Code: MOPTS1-104

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Outcomes: On completion of the course, the students will

- Understand the basics of research types and methods of research
- Ability to write research proposal
- Apply the concept for writing the research articles
- Ability to apply the concepts for writing research articles
- Ability to apply research in evaluating the research materials

Unit: 1 (15 hrs)

Research Methodology – Definition of research, Characteristics of research, Steps involved in research process, Types of Research methods and methodology, Terminology used in quality control such as sensitivity, specificity, accuracy, precision, positive and negative predictive value.

Unit: 2 (15hrs)

Statistics, data, population, samples, parameters; Representation of Data: Tabular, Graphical, Measures of central tendency, Arithmetic mean, mode, median; Measures of dispersion, Range, mean deviation, variation, standard deviation, Standard error, Chi-square test

Unit: 3 (15 hrs)

Introduction and significance of Student's t-distribution: test for single mean, difference of means and paired t- test, F-distribution, one-way and two-way analysis of variance (ANOVA). Small sample test based on t-test, Z- test and F test; Confidence Interval; Distribution-free test

Unit: 4 (15 hrs)

Total Quality Management System

General Requirements for Standardization & Calibration of Clinical Laboratories: Introduction, Scope & Need of standardization, Quality Management requirement: testing & Calibration Procedures, Total Quality Assurance, Quality Control Charts & Systems. Quality Audit: Internal & External Audit, Accreditation & Certification NABL, ISO, CAP

Reference books:

1. Methods in Biostatistics by B.K Mahajan
2. Probability and Statistics by Murray
3. Epidemiology of Eye Diseases, by Gordon and Drawin
4. Research Methodology by SMIrani

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

OCULAR DISEASES AND DIAGNOSTICS-I

Subject Code: MOPTS1-105

L T P C
3 1 0 4

Duration: 60 (Hrs.)

Course Outcomes: On completion of course, students will

- Understand the concept of different Ocular diseases of anterior segment of Eye
- Apply the concept of anatomy & Physiology of Eye while understanding the Pathology of different ocular diseases
- Utilize the concept of clinical features of the diseases for the differential diagnosis of the anterior segment diseases
- Analyze the concept of clinical features of disease for management of anterior segment diseases
- Applying the concept of different Ocular diseases of anterior segment of Eye

UNIT: 1 (15 Hrs)

Refresher of anterior segment ocular diseases; Congenital anomalies, Inflammatory disorders; Degenerative conditions; Dystrophies, Structural Deformities; Oedema, Cysts and Tumors

UNIT: 2 (15 Hrs)

Refresher of glaucoma diagnosis and management

UNIT: 3 (15 Hrs)

Pre- and Post-operative management of anterior segment diseases.
Anterior segment diagnostics, Tonometry, HVF and Pentacam

UNIT-4 (15 Hrs)

Pachymetry, OCT, Gonioscopy, Cataract evaluation, Slit Lamp

Reference books:

1. Clinical Ophthalmology: Jack J Kanski
2. Diagnostics and imaging techniques in Ophthalmology: Amar Agarwal

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

VISUAL AND APPLIED OPTICS -PRACTICAL

Subject Code: MOPTS1-106

**L T P C
0 0 4 2**

Duration: 60 (Hrs)

Course Outcome:

- Students will learn to equip with a thorough knowledge of mirrors and lenses.
- Students will be exposed to various diagnostic techniques/instruments for assessment of vision

Experiments Related to:

1. Prism bar cover test (PBCT)
2. Cover and uncover test
3. Worth four dot test (WFDT)
4. Stenopic slit
5. Duchrome test
6. Negative reference point assessment (NRA)
7. Positive reference point assessment (PRA)
8. Near point of convergence (NPC) and near point of accommodation (NPA)
9. Ophthalmoscopy
10. Retinoscopy
11. Confrontation VFT
12. Schiottz tonometer
13. Krimsky test

Reference Books

1. IACLE modules 1 -10
2. Contact Lens Practice- Nathan Efron. Elsevier Sciences. Third Edition
3. Contact Lenses- Philips Stone
4. Fitting guide for Rigid & soft contact lens: A practical Approach: Slatt & Stein

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SYLLABUS 2023 BATCH ONWARDS**

OCULAR DISEASES AND DIAGNOSTICS-PRACTICAL

Subject Code: MOPTS1-107

L T P C

Duration: 30 (Hrs)

0 0 2 1

Course Outcomes: Students will learn

- To diagnose ocular diseases using various instruments and based on signs and symptoms about the diseases
- To manage the various ocular conditions

Experiments:

- Electroretinography (ERG)
- Electrooculogram (EOG)
- Visual evoked potential/ response (VEP/VER)
- Optical coherence tomography (OCT)
- Fundus photography

Reference books:

1. IACLE modules 1 -10
2. Contact Lens Practice- Nathan Efron. Elsevier Sciences. Third Edition
3. Contact Lenses- Philips Stone

Fitting guide for Rigid & soft contact lens: A practical Approach: Slatt & Stein

SECOND SEMESTER

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

OCULAR DISEASES AND DIAGNOSTICS-II

Subject Code: MOPTS1-201

**L T P C
3 1 0 4**

Duration: 60 (Hrs)

Course Objectives: On completion of the course, the students will

- Understand the concept of different Ocular diseases of posterior segment of Eye
- Apply the concept of anatomy & Physiology of Eye while understanding the Pathology of different ocular diseases
- Utilize the concept of clinical features of the diseases for the differential diagnosis of the ocular diseases
- Analyze the concept of clinical features of the diseases for the management of ocular diseases
- Apply the concept of different Ocular diseases of posterior segment of Eye

Course Outcomes: Students will learn disease and diagnosis procedure in ophthalmology and management as well as complication of the diseases in the eyes.

Unit: 1 (15 Hrs)

Refresher of posterior segment ocular diseases including; Congenital anomalies; Inflammatory disorders

Degenerative conditions & Dystrophies; Structural Deformities; Oedema, Cysts and Tumors

Unit: 2 (15 Hrs)

Diagnosis and therapeutics for Posterior Segment disease

Unit: 3 (15 Hrs)

Surgical treatment of posterior segment diseases.

Unit: 4 (15 Hrs)

Posterior segment Diagnostics: ERG, EOG, VEP, OCT, Fundus photography

Neuro optometric diseases and disorders

Reference books-

1. Clinical ophthalmology: Jack J Kanski
2. Diagnostics and imaging techniques in Ophthalmology: Amar Agarwal

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

ADVANCED CONTACT LENS STUDIES-I

Subject Code: MOPTS1-202

L T P C
3 1 0 4

Duration: 60 (Hrs)

Course Objectives: On completion of the course, the students will

- Understand about contact lens history, introduction, design and relation with struct
- Understand about RGP contact lens material and their property, their parameter
- Understand about RGP contact lens manufacturing techniques & fitting of RGP lenses
- Understanding and know about care maintenance and do's & don't of RGP contact lens
- Analyze the complication and their management of RGP contact lenses

Course Outcomes: Students will learn advance stage of disease in eye which can be corrected with the help of special types of contact lens.

Unit: 1 (15 Hrs)

- Anatomy and Physiology of the Cornea and related Structures; Contact Lens Material
- Microbiology, lens care and maintenance, tears and contact lenses, optics and lens designs

Unit: 2 (15 Hrs)

Clinical instrumentation in contact lens practice, Rigid gas permeable contact lens fitting

Unit: 3 (15 Hrs)

Soft contact lens fitting; Toric Contact lens fitting; Lens care regimen; Contact lens standards

Unit: 4 (15 Hrs)

- Lens checking: Soft and Rigid
- Contact lens complications
- **Special types of Contact lenses** – diagnosis, surgery, protective, therapeutic, sports, partially sighted

Reference books:

1. Contact lenses – Stone and Philips
2. IACLE modules

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

PEDIATRIC OPTOMETRY AND BINOCULAR VISION

Subject Code: MOPTS1-203

L T P C
3 1 0 4

Duration: 60 (Hrs)

Course Objectives: On completion of the course, the students will

- Understand the classification of strabismus
- Understand the concept of recording history in strabismus patients
- Understand the clinical features of convergent & divergent Strabismus, vertical & paralytic Strabismus
- Apply the concept of pediatric refraction
- Apply the concepts of diagnosis of pediatric anomalies

Course Outcomes: Students will achieve many pediatrics examinations and ability to co-operate the children's for eye examination binocular test also they learn.

Unit: 1 (10 Hrs)

- Refractive Development: Early Refractive Development
- Visually Guided control of Refractive State: Animal Studies
- Infant Accommodation and Convergence, Oculomotor Function: Conjugate Eye Movements of Infants
- Development of the Vestibuloocular and Optokinetic reflexes

Unit: 2 (10 Hrs)

- Spatial and Chromatic Vision, Front-end Limitations to Infant Spatial vision, Examination of two analyses
- Development of the Human Visual Field, Development of Scotopic Retinal Sensitivity
- Infant Colorvision, Orientation and Motion selective Mechanisms in Infants, Intrinsic Noise and Infant performance

Unit: 3 (15 Hrs)

- Binocular Vision: Development of interocular vision in Infants
- Stereopsis in Infants and its developmental relation to visual acuity
- Sensorimotor Adaptation and Development of the Horopter
- Two stages in the development of Binocular Vision and Eye Alignment
- Retinal and cortical Development
- Abnormal Visual Development
- Recent advancements in Infant Research

Unit: 4 (25 Hrs)

- Clinical Applications: Assessment of Child Vision and Refractive Error
- Refractive Routines in the Examination of Children, Cycloplegic Refraction
- Color Vision Assessment in Children, Dispensing for the Child patient
- Pediatric Contact Lens Practice, Dyslexia and Optometry Management

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- Electrodiagnostic Needs of Multiple Handicapped Children, Management Guidelines – Ametropia, Contant Strabismus
- Management Guidelines –Amblyopia, Accommodation and Vergence anomalies
- Nystagmus, Common genetic problems in Paediatric optometry
- Pediatric Ocular Diseases and Ocular Trauma in Children
- Myopia control, Clinical uses of prism

Reference books:

1. Clinical management of binocular vision Mitchell Scheiman and Bruce Wick
2. Applied concepts in vision therapy: Leonard Press
3. Pediatric optometry: Jerome K Rosner

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**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

LOW VISION AND GERIATRIC OPTOMETRY

Subject Code: MOPTS1-204

**L T P C
3 1 0 4**

Duration: 60 (Hrs)

Course Objectives: On completion of the course, the students

- Understand the basic definition and classification of Low Vision
- Analyze the various causes of Low Vision
- Understand how to do examination of a low vision Patient
- Apply various optical and non-optical devices for visual rehabilitation of a low vision Patient
- Understand the legal aspects of Low Vision in India, as well as applying case studies to for visual rehabilitation of a low vision Patient

Course Outcomes: Students will learn about the Low Vision Aids and Geriatric examination of eyes

Unit: 1 (15 Hrs)

- Elements Visual Disorders – Medical Perspective
- The Epidemiology of Vision Impairment and Vision Impairment in the pediatric population
- Ocular Diseases: Age – Related Cataract, Glaucoma, ARMD, Diabetic retinopathy, Corneal Disorders, Ocular Trauma
- Sensory Neuro-ophthalmology and Vision Impairment
- Refractive Disorders and Visual Disorders – The Functional Perspective
- Low Vision and Psychophysics, Visual Functioning in Pediatric Populations with Low Vision
- Perceptual correlates of Optical Disorders, Functional aspects of Neural Visual Disorders of the eye and Brain
- Visual Disorders and Performance of specific Tasks requiring vision

Unit: 2 (15 Hrs)

- Visual Disorders – The Psychosocial Perspective
- Developmental perspectives – Youth Vision, Impairment and Cognition
- Spatial orientation and Mobility of people with vision impairments
- Social skills Issues in vision impairment, Communication and language: Issues and concerns
- Developmental perspectives on Aging and vision loss, Vision and cognitive Functioning in old age
- Interactions of Vision Impairment with other Disabilities and sensory Impairments.
- Children with Multiple Impairments

Unit: 3 (15 Hrs)

- The Environment and Vision Impairment: Towards Universal Design
- Indian Disabilities act, Children’s Environments, Environments of Older people
- Outdoor environments, Lighting to enhance visual capabilities

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- Signage and way finding, Accessible Environments through Technology
- Vision Rehabilitation: In Western Countries, In Asia
- Personnel preparation in Vision Rehabilitation
- Psychological and social factors in visual Adaptation and Rehabilitation
- The Role of psychosocial Factors in adaptation to vision Impairment and Habilitation outcomes for Children and Youth

Unit: 4 (15 Hrs)

- The Role of psychosocial Factors in adaptation to vision Impairment and Habilitation outcomes for Adults and Older adults
- Social support and adjustment to vision Impairment across the lifespan
- The person – Environment perspective of vision impairment
- Associated Depression, Disability and rehabilitation
- Methodological strategies and issues in social research on vision Impairment and rehabilitation

Reference books:

1. Richard L. Brilliant: Essentials of Low Vision Practice, Butterworth-Heinemann, 1999
2. Helen Farral: optometric Management of Visual Handicap, Blackwell Scientific publications, 1991
3. A J Jackson, J S Wolffsohn: Low Vision Manual, Butterworth Heinnemann, 2007

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

OCULAR DISEASE AND DIAGNOSTICS-II (PRACTICAL)

Subject Code: MOPTS1-205

**L T P C
0 0 4 2**

Duration: 60 (Hrs)

Course Outcomes: Students will learn about the Advanced of examination, handling, interpretation of the reports and finding of the diseases in the case report

Experiments

- Refraction instruments (designs & features of standard test charts, trial frame & Phoropter units manual & automated)
- Slit lamp Biomicroscope (designs & features, application).
- Tonometers (designs & features, application)
- Anterior segment diagnostics- Corneal topography (videokeratography, Specular microscopy, Corneal Histerisis, Aberometry & Pentacam, ORB scan)
- Glaucoma diagnostics – Gonioscopy, computerized Visual field analysis(Perimetry)
- Electro diagnostics
- Electroretinography (ERG), Electrooculogram (EOG), Visual evoked potential/ response (VEP/VER), Optical coherence tomography (OCT), Fundus photography
- Lensometer (designs & features)
- Binocular indirect Ophthalmoscopy
- cataract evaluation
- Colour vision devices
- Ultrasonography
- SPECIAL INSTRUMENTS & TESTS: Brightness acuity test, Vision analyzer, Pupilometer, Video acuity test, Potential Acuity Meter, Abberometer

Reference books:

1. Optometric Instrumentation: David Hensen
2. Diagnostics and imaging techniques in Ophthalmology: Amar Agarwal
3. James Wolffsohn : Eye Essentials Ophthalmic Imaging
4. Mark Brezinski,: Optical Coherence Tomography: Principles and Applications
5. Benjamin F.Boyd : Wavefront analysis aberrometers and corneal topography
6. Arun D.singh: Ophthalmologic Ultrasound, An Issue of Ultrasound Clinics, vol 3

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

ADVANCED CONTACT LENS-I (PRACTICAL)

Subject Code: MOPTS1-206

L T P C
0 0 4 2

Duration: 60 (Hrs)

Course Outcomes: Students will learn about

- The contact lens, indication, contraindications and complication of contact lens
- The Removal and Insertion procedure
- The fitting of contact lens
- The selfcare of contact lenses
- The need of examination in pre and post fitting of contact lens.

Experiments

Anatomy and Physiology of the Cornea and related Structures

Latest trends in contact lens materials & manufacturing methods

Optics of contact lens & design

Microbiology, Lens Care and Maintenance

Tears and contact lenses

Clinical Instrumentation in contact lens practice

Rigid Gas Permeable corneal lens fitting

Soft contact lens fitting

Toric Contact lens fitting

Reference books:

1. IACLE modules 1 -10
2. Contact Lens Practice- Nathan Efron. Elsevier Sciences. Third Edition
3. Contact Lenses- Philips Stone
4. Fitting guide for Rigid & soft contact lens: A practical Approach: Slatt & Stein

PEDIATRIC AND GERIATRIC OPTOMETRY-PRACTICAL

Subject Code: MOPTS1-207

**L T P C
0 0 4 2**

Duration: 60 (Hrs)

Course Outcomes: Students will be able to learn about ocular examination of children and aged population through various diagnostic criteria and techniques

Experiments

- Assessment of Child Vision and Refractive Error
- Refractive Routines in the Examination of Children
- Cycloplegic Refraction
- Color Vision Assessment in Children
- Dispensing for the Child patient
- Pediatric Contact Lens Practice
- Dyslexia and Optometry Management
- Electrodiagnostic Needs of Multiple Handicapped Children
- Management Guidelines – Ametropia, Constant Strabismus
- Management Guidelines –Amblyopia
- Case history
- Assessment
- Application of devices.
- Rehabilitation.

Reference books:

1. Vision and Aging – A.J.ROSSENBLUM Jr. & M.W.MORGAN, Butterworth Heinemann 1993.
2. Low Vision principles & Practice- Christine Dickinson Butterworth-Heinemann, 1998
3. The art and Practice of Low Vision- Paul .B. Freeman & Randall. T. Jose, Butterworth-Heinemann, 1991

THIRD SEMESTER

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

LOW VISION CARE AND REHABILITATION

Subject Code: MOPTS1-301

L T P C
3 1 0 4

Duration: 60 (Hrs)

Course Objectives: On completion of the course, the students

- Understand the rehabilitation process of children and adults with vision impairment
- Understand the educational needs of school going children with vision impairment
- Utilize assistive devices for low vision patients
- Analyze the importance of color vision in low vision patients

Course Outcomes: Students will be able to learn the basic knowledge about the optics of Low Vision Aids.

Unit: 1 (16 hrs)

- Habilitation of Children and Youth with vision Impairment
- Rehabilitation of working –age Adults with Vision Impairment
- Rehabilitation of older Adults with Vision Impairment
- Functional consequences of vision Impairment
- Vision evaluation of Infants

Unit: 2 (14 hrs)

- Educational assessment of visual function in Infants and Children
- Functional Evaluation of the Adult
- Functional orientation and Mobility
- Functional Assessment of Low Vision for Activities of Daily living

Unit: 3 (16 hrs)

- Psychosocial assessment of adults with vision impairment
- Assistive Devices and Technology for Low Vision

Unit: 4 (14 hrs)

- Devices and Technology for Blind
- Vision and Reading - Normal Vs Low Vision
- Clinical Implications of color vision Deficiencies

Reference books-

The lighthouse handbook on vision impairment and Vision rehabilitation: Barbara Silverstone, Mary Ann Lang, Bruce Rosenthal, Faye.

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

RECENT ADVANCEMENTS IN OPTOMETRY

Subject Code: MOPTS1-302

L T P C
3 1 0 4

Duration: 60 (Hrs)

Course Objectives: On completion of the course, the students will be able to

- Know latest advancements in the field of optometry
- Understand how to use special types of contact lens
- Understand the Indications of these special types of contact lens

Course Outcomes: This will enable the students to keep abreast of latest developments in the field of Optometry and vision science. Students will learn about the contact lenses which will helps to treat the patient's degenerative condition

Unit: 1 (16 hrs)

Orthokeratology lenses, Rose k lenses

Unit: 2 (14 hrs)

Keratoprosthesis

Unit: 3 (16 hrs)

Amblyopic therapies, LVA, Lazy glasses for paralysis patients

Unit: 4 (14 hrs)

Latest articles published in Optometry and vision science journals will be discussed.

Reference books-

1. ICALE Module, A k Jain, Monica choudhary (optics and refraction)
2. Recent research papers

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

ADVANCED CONTACT LENS -II

Subject Code: MOPTS1-303

L T P C

Duration: 60 (Hrs)

3 1 0 4

Course objectives: On completion of the course, the students will be able to

- To know advancements in field of contact lenses
- To know about various procedures for insertion of lenses

Course Outcomes: This will enable the students to keep abreast of latest developments in the field of contact lenses. Students will learn about the contact lenses which will helps to treat the patient's conditions

UNIT I (15 Hrs)

Advanced contact lens

Extended and Continuous wear Lenses, Scleral Contact lenses, Bifocal and Multifocal contact lenses, Contact lens for abnormal ocular conditions, Contact lenses and Myopia control

UNIT II (15 hrs)

Eye disorders and Surgical/ non-surgical procedures

Orthokeratology, Keratoconus, Post keratoplasty contact lens fitting, Post refractive surgery contact lens fitting, Pediatric contact lens fitting

UNIT III (15 hrs)

Contact lenses for cosmetic purposes

Cosmetic and prosthetic contact lens fitting, ocular prosthesis

UNIT IV (15 hrs)

Legal issues and contact lenses

Legal issues related to surgical procedures of inserting contact lenses

Reference books:

1. IACLE Modules- 1- 10
2. Contact Lens Practice- Nathan Efron. Elsevier Sciences. Third Edition
3. Contact Lenses- Philips Stone
4. Fitting guide for Rigid & soft contact lens: A practical Approach: Slatt & Stein

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

VISION THERAPY

Subject Code: MOPTS1-304

L T P C
3 1 0 4

Duration: 60 (Hrs)

Course Objectives: On completion of the course, the students will be able to:

- Apply the concepts to classify different types of strabismus
- Apply the concepts to diagnosed the different neurological disorder leading to the visual disorder
- Apply the appropriate method to diagnosed the visual disorders
- Apply the concept for proper management of visual disorders

Course Outcomes:

Students will achieve knowledge about the vision therapy in various disorders and misalignments in eyes. They will learn about the various ophthalmic exercises to manage certain conditions

Unit -1 (10 hours)

Clinical Conditions; Strabismus and Amblyopia; Anisometropic / Isometropic, Refractive Amblyopia, Strabismic Amblyopia Hysterical Amblyopia, Form Deprivation Amblyopia; Differential diagnoses in childhood visual acuity loss; Strabismus, Esotropia- Infantile, Accommodative, Acquired, Microtropia, Sensory Convergence Excess, Divergence Insufficiency, Non-accommodative, Sensory Adaptations

Unit-2 (10 hours)

- Exotropia: Divergence Excess, Convergence Insufficiency, Basic Exotropia, Congenital, Sensory, Vertical Deviations, Non comitant Deviations (AV Syndrome; Duane's Retraction Syndrome; Brown's Syndrome; III, IV, VI nerve palsy, etc.)
- Differential diagnoses in strabismus
- Special clinical considerations, Anomalous Correspondence, Eccentric Fixation, Suppression, Motor Ranges, Stereopsis, Horror fusionalis /intractable diplopia

Unit-3 (20 Hours)

- Perception and Information Processing, Neurological /Psychological Ambient / focal systems, Visual perceptual midline, Parvo cellular / Magno cellular function, Perceptual Style (central, peripheral), Impact of colored filters, Attention, Intersensory and Sensorimotor Integration, Visual-auditory, Visual-vestibular, Visual-oral, Visual-motor, Visual-tactual, Performance indicators, Laterality and directionality, Visual requirements for academic success, Bilaterality, Gross and fine motor ability, Form perception/visual analysis, Spatial awareness, Visualization, Visual memory, Visual sequential memory, Form constancy, Visual speed and visual span, Visual sequencing
- Refractive conditions and visual skills, Refractive Conditions, Developmental influence on refraction & emmetropization, Aniseikonia, Myopia, Astigmatism, Hyperopia, Ocular Motor Function, Eye movements and reading, Pursuit dysfunctions, Nystagmus, Saccadic Dysfunctions, Accommodation, Role in myopia development, Role in computer-related

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asthenopia, Fusion in Non-Strabismic Conditions, Fixation disparity, Motor fusion, Sensory fusion

Unit-4 (20 hours)

- Special clinical conditions, Acquired brain injury (traumatic brain injury {TBI} and stroke), Developmental disabilities (Down Syndrome, Developmental delay, etc.), Visually induced balance disorders, Motor disabilities (Cerebral Palsy, ataxia, etc.), Behavioral disorders, Autism spectrum disorders, ADD /ADHD ,Autism, Dyslexia and specific reading disabilities, Learning Disabilities, Computer Vision Syndrome, Vision Therapy Concepts to Consider, Peripheral awareness: focal / ambient roles, Significant findings which are good or poor prognostic indicators of vision therapy and lens application, Development, rehabilitation, prevention, enhancement, Behavioral lens application, Yoked prism rationale for treatment and application, The relationship between the visual and vestibular systems, SILO/SOLI, Visual stress and its impact on the visual system, Role of posture in vision development, comfort and performance, Disruptive therapy: Discuss this type of therapy and how it can be used as a clinical therapeutic tool., Relationship of speech-auditory to vision, How television, reading, video gaming might restrict movement, computer work, nutrition, etc., impact vision?, Perceptual Style, e.g., spatial/temporal, central/peripheral

Reference books-

1. Clinical management of binocular vision Mitchell Scheiman and Bruce Wick
2. Applied concepts in vision therapy: Leonard Press
3. Pediatric optometry: Jerome K Rosner

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

OCCUPATIONAL OPTOMETRY

Subject Code: MOPTS1-305

L T P C
3 1 0 4

Duration: 60 (Hrs)

Course Objectives: This course deals with general aspects of occupational health, Visual demand in various jobs, task analyzing methods, visual standards for various jobs, occupational hazards, and remedial aspects through classroom sessions and field visit to the factories.

Course Outcomes: At the end of the course, the students will be knowledgeable in the following aspects:

- In visual requirements of jobs;
- In effects of physical, chemical and other hazards on eye and vision;
- To identify occupational causes of vision and eye problems;
- To be able to prescribe suitable corrective lenses and eye-protective wear and
- To set visual requirements, standards for different jobs.

Unit: 1 (15 hrs)

- Introduction to Occupational health, hygiene and safety, international bodies like ILO, WHO, National bodies etc.
- Acts and Rules - Factories Act, WCA, ESI Act

Unit: 2 (15 hrs)

- Electromagnetic Radiation and its effects on Eye
- Light – Definitions and units, Sources, advantages and disadvantages, standards colour – Definition, Colour theory, colour coding, colour defects, colour Vision tests

Unit: 3 (15 hrs)

- Occupational hazards and preventive/protective methods
- Task Analysis
- Industrial Vision Screening – Modified clinical method and Industrial Vision test
- Vision Standards – Railways, Roadways, Airlines

Unit: 4 (15 hrs)

- Occupational ocular Problems, Occupational hazards: Mechanical, chemical and radiations
- Occupational ocular problems in sports, driving, agriculture and industries, and their management

Reference books-

1. R V North: Work and the eye, Second edition, Butterworth Heinemann, 2001 Sports Vision – D.F.C. Loran, C.J. Mac Eween, Butterworth Heinemann
2. G Carson, S Doshi, W Harvey: Eye Essentials: Environmental & Occupational Optometry, Butterworth-Heinemann, 2008

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

ADVANCED CONTACT LENS II - PRACTICAL

Subject Code: MOPTS1-306

L T P C
0 0 4 2

Duration: 60 (Hrs)

Course Outcomes: This will enable the students to get practical knowledge about various types of contact lenses. Students will learn about the fitting of contact lenses which will help to treat the patient's conditions

Experiments

- 1) Extended and Continuous wear Lenses
- 2) Scleral Contact lenses
- 3) Bifocal and Multifocal contact lenses
- 4) Orthokeratology
- 5) Keratoconus
- 6) Post keratoplasty contact lens fitting
- 7) Post refractive surgery contact lens fitting
- 8) Pediatric contact lens fitting
- 9) Cosmetic and prosthetic contact lens fitting
- 10) Contact lens for abnormal ocular conditions
- 11) Contact lens and Myopia control
- 12) Legal issues and contact lenses
- 13) Ocular Prosthesis

Reference books:

1. IACLE Modules- 1- 10
2. Contact Lens Practice- Nathan Efron. Elsevier Sciences. Third Edition
3. Contact Lenses- Philips Stone
4. Fitting guide for Rigid & soft contact lens: A practical Approach: Slatt & Stein

**MRSPTU M.SC. (OPTOMETRY)
SYLLABUS 2023 BATCH ONWARDS**

LOW VISION CARE AND REHABILITATION- PRACTICAL

Subject Code: MOPTS1-307

L T P C
0 0 4 2

Duration: 60 (Hrs)

Course Outcomes: Students will learn about the use of various Low Vision Aids in ophthalmic diseases.

Experiments

- Attending in low vision care clinic and taking history.
- Determining the type of telescope and its magnification (Direct comparison method & calculated method)
- Determining the change in field of view with different magnification and different eye to lens distances with telescopes and magnifiers.
- Inducing visual impairment and prescribing magnification.
- Determining reading speed with different types of low vision aids with same magnification.

Reference books:

1. Christine Dickinson: Low Vision: Principles and Practice Low vision care, 4th edition, Butterworth-Heinemann, 1998
2. E Vaithilingam: practice of Low vision – A guidebook,
3. A J Jackson, J S Wolffsohn: Low Vision Manual, Butterworth Heinnemann, 2007

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF PHARMACY

SYLLABUS

FOR

DIPLOMA IN NURSING ASSISTANT

(2 YEARS PROGRAMME)

2023 BATCH ONWARDS

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**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

SCHEME

1 st Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
DNRAS1-101	Fundamental of Nursing (including first aid, emergency Nursing)	3	1	0	40	60	100	4
DNRAS1-102	Anatomy & Physiology	3	1	0	40	60	100	4
DNRAS1-103	Nutrition & Bio- Chemistry	3	1	0	40	60	100	4
DNRAS1-104	Nutrition & Biochemistry - Lab.	0	0	4	60	40	100	2
DNRAS1-105	Anatomy & Physiology -Lab	0	0	4	60	40	100	2
DNRAS1-106	Child Health Nursing	3	1	0	40	60	100	4
Total		12	4	8	280	320	600	20

2 nd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
DNRAS1-201	Psychology	3	1	0	40	60	100	4
DNRAS1-202	Sociology	3	1	0	40	60	100	4
DNRAS1-203	Community Health Nursing	3	1	0	40	60	100	4
DNRAS1-204	Midwifery Obstetrical Nursing	3	1	0	40	60	100	4
DNRAS1-205	Community Health Nursing - Lab	0	0	4	60	40	100	2
DNRAS1-206	Midwifery Obstetrical Nursing- Lab	0	0	4	60	40	100	2
Total		12	4	8	280	320	600	20

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

3 rd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
DNRAS1-301	Medical Surgical Nursing	3	1	0	40	60	100	4
DNRAS1-302	Operation Theater Techniques	3	1	0	40	60	100	4
DNRAS1-303	Mental Health Nursing	3	1	0	40	60	100	4
DNRAS1-304	Management of Nursing Services & Education	3	1	0	40	60	100	4
DNRAS1-305	Medical Surgical Nursing - Lab	0	0	4	60	40	100	2
DNRAS1-306	Operation Theater Techniques - Lab	0	0	4	60	40	100	2
Total		12	4	8	280	320	600	20

4 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
DNRAS1-401	Hospital Training	0	0	40	80	120	200	20
Total		0	0	40	80	120	200	20

Overall Marks / Credits

Semester	Marks	Credits
1 st	600	20
2 nd	600	20
3 rd	600	20
4 th	200	20
Total	2000	80

FIRST SEMESTER

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

FUNDAMENTAL OF NURSING

Subject Code: DNRAS1-101

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Outcomes:

- Demonstrate knowledge of general overall physiological principles associated with metabolic processes.
- Students will be able to learn the terminology of the subject and basic knowledge of cells.
- Students will be able to understand the basic of tissues, blood and to understand anatomy and physiology of human body.
- Students will be able to understand the basics of musculoskeletal system; cardiovascular system; cardiovascular system; aerobic and anaerobic program design.

UNIT-I (15 Hrs.)

Introduction to Nursing

Nursing: Definition, meaning, Nature, scope, principles and History of nursing.
Nurse: Definition and meaning, preparation of a nurse qualities personal, professional.
Ethics in nursing, Role and responsibilities of a nurse.
Health care agencies: Hospital and community, Types of Hospitals and their functions.
Holistic approach to nursing, Comprehensive nursing care.

UNIT-II (15 Hrs.)

Introduction to the sick and well

Bed and Bed Making
Maintenance of therapeutic environment
Psycho social Environment
Nursing Process and Nursing Care Plan
Recording and Reporting
Discharging a patient

UNIT-III (15 Hrs.)

Basic Nursing Care and Needs of the Patient

Hygienic Needs and physical needs
Elimination needs
Safety needs
Activity and Exercises
Physical Comforts
Moving, shifting and lifting of patient

UNIT-IV (15 Hrs.)

Therapeutic Nursing Care and Procedures Asepsis

Hand washing, hand scrubbing, use of mask, gown, gloves.
Disinfection techniques, sterilization techniques.
Autoclaving, boiling, flaming, ultra violet rays.

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

Introduction to Pharmacology

- Concept of pharmacology.
- Classification of drugs.
- Administration of drugs.
- General action of drugs.
- Nursing implications in administration of drugs

Introduction to First Aid

- Importance of first aid and rules of first aid.
- Concept of emergency.

First Aid in Emergency situations

- Fire, burns, fractures, accidents, poisoning, drowning, hemorrhages, insect bites, foreign bodies.
- Transportation of the injured.
- Bandaging and splinting.

Reference Books:

1. Lippincott Manual of Nursing Practice.
2. Fundamentals of Nursing (Ninth Edition)
3. Kozier and Erb's Fundamentals of Nursing (Tenth Edition)
4. Fundamentals of Nursing: The Art and Science of Nursing Care (Seventh Edition)

ANATOMY & PHYSIOLOGY

Subject Code: DNRAS1-102

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Outcomes:

- Apply concepts, knowledge, and correct terminology to describe anatomy and physiology related to the integumentary, muscular, skeletal, and nervous systems.
- Critically evaluate clinical and physiological data from direct observation and documented research.
- The Course is designed to enable students to acquire knowledge of the normal structure of various human body systems.
- The students will be able to understand the alterations in anatomical structures in disease and practice of nursing.

UNIT-I (15 Hrs.)

Introduction to anatomical terms, Organization of body cells, tissues, organs, systems, membranes and glands, Skeletal system:-

- Bones: types, structure, function
- Axial skeleton
- Appendicular skeleton
- Joints: classification, structure and function.

UNIT-II (15 Hrs.)

Muscular system

- Type, structure and functions.
- Position and action of chief muscles of the body.

Cardio Vascular system

- Blood: composition clotting and blood group, cross matching. Blood products and their use.
- Heart: position, structure, conduction system, Function and cardiac cycle.
- Blood Vessels: Structural differences and position of chief vessels
- Circulation of Blood: Systematic, pulmonary and portal circulation
- Blood pressure and pulse
- Lymphatic system: Lymph vessels, glands, ducts and lymph circulation, lymph tissues in the body, spleen.

UNIT-III (15 Hrs.)

Respiratory System

- Structure and functions of respiratory organs - Physiology of respiration.
- Characteristics of normal respiration and its deviations.

Digestive system

- Structure and function of organs of digestive and accessory organs.
- Process of digestion and absorption.
- Metabolism: meaning and metabolism of food constituents.

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

Excretory system

- Structure and functions of organs of urinary system
- Structure and functions of the skin
- Regulation of body temperature.
- Fluid and electrolyte balance.

UNIT-IV (15 Hrs.)

Nervous System

Type, structure and functions of neuron.

- Central Nervous System: Structure and functions.
- Autonomic Nervous System: Structure and functions.

Endocrine System

- Structure and functions of pituitary, pancreas, thyroid parathyroid, thymus and supra renal glands.

Sense Organs

- Structure and functions of eye, ear, nose and tongue.
- Physiology of vision, hearing and equilibrium.

Reproductive System

- Structure and functions of reproductive and accessory organs.
- Process of reproduction, menstrual cycle and menopause
- Reproductive health
- Structure and functions of male organ reproductive system.

Reference Books:

1. Singh (I), Anatomy & Physiology for Nurses, JP Brothers Publications, 2005.
2. Kathleen (JW), Ross & Wilson Anatomy and Physiology in Health and Illness, Churchill Livingstone Publication, Philadelphia, 8th Edition, 1999.
3. Tortora, Principles of Anatomy & Physiology, John Wiley & Sons, New York, 8th Edition, 2003.

NUTRITION & BIO-CHEMISTRY

Subject Code: DNRAS1-103

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Outcomes:

- Learn and understand the basic terms related to nutrition.
- The course is designed to assist the students to acquire knowledge of nutrition for maintenance of optimum health at different stages of life.
- The course is designed to assist the students to acquire knowledge about its application for practice of nursing.

UNIT-I (15 Hrs.)

Introduction

- Nutrition
- History
- Role of nutrition in maintaining health
- Nutritional problem in India
- National nutritional policy
- Factors affecting food and nutrition: Socio – economic, cultural, tradition, production, system of distribution, life style and food habits, etc.
- Role of food and its medicinal value.
- Classification of foods
- Food standards
- Elements of Nutrition: Macro and micro-Calorie, BMR

UNIT-II (15 Hrs.)

Classification by chemical composition and sources -

Carbohydrates.

- Proteins
- Fats
- Minerals
- Vitamins
- Water

Classification by predominant functions-

- Body building food
- Energy giving food
- Protective food

Classification by nutritive value -

- Cereals and millets.
- Pulses (Legumes).
- Vegetables.
- Nuts and oil seeds.
- Fruits
- Animal food.

UNIT-III (15 Hrs.)

Normal dietary requirements and deficiency diseases of each of the constituents of food

- The Calorie
- Nutritive value of food items and their measures used.
- Balanced diet.
- Method of calculating normal food requirements, influence of age, sex and activity.
- Factors affecting selection and planning of meals.
- Budgeting for food.
- Low-cost menu.
- Diseases caused by deficiency of protein, fat, carbohydrates, minerals and vitamins.

Preparation, preservation and storage of food

- Principles of cooking.
- Methods of food preparation and their effects on food and food constituents, advantages and limitation of each.
- Household methods of preserving and storing food.
- Commercially prepared food and its adulteration.
- Precautions in selection, preparation and storage of food.

UNIT-IV (15 Hrs.)

Introduction to Diet Therapy

- Methods of modifying diet in relation to calorie value, by increasing or decreasing of constituents.
- Diet and the patient
- Environmental, psychological and cultural factors in acceptance of diet by the patient.
- Serving of food.
- Feeding of helpless patients.
- Opportunities for teaching.

Community Nutrition

- Concept of community nutrition.
- Nutritional needs for special groups: infants, children, pregnant women, lactating mothers, old people etc.
- Nutrition education: needs and methods.
- Substitutes for non-vegetarian food.
- Methods of improving an ill-balanced diet.
- Food hygiene and laws related to food.

Reference Books:

1. Joshi (YK), Basics of Clinical Nutrition, Jaypee, Chennai, 2nd Edition, 2008.
2. Mahan (LK), Krause's Food, Nutrition, Diet & Therapy, Elsevier, 13th Edition, 2007.
3. Sri Lakshmi (B), Dietetics, New Age Int (P) Ltd., Publishers, Chennai, 5th Edition, 2007.
4. Vasudevan (DM), Text Book of Biochemistry, J.P.Brothers Publication New Delhi, 3rd Edition, 2001.
5. Lehninger, Principles of Biochemistry, Worth Publishers, New York, 3rd Edition, 2002.
6. Striyer (L), (1988). Biochemistry, Freeman & Company, New York, 3rd Edition, 1988.

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

NUTRITION AND BIOCHEMISTRY (PRACTICAL)

Subject Code: DNRAS1-104

L T P C

Duration: 60 Hrs.

0 0 4 2

Course objectives:

- Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells.
- The scope of the subject is providing biochemical facts.
- The students will be able to understand principles to understand metabolism of nutrient molecules in physiological and pathological conditions.
- It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.

Course Outcomes:

- Understand the catalytic role of enzymes, importance of enzyme inhibitors design of new drugs, therapeutic and diagnostic applications of enzymes.
- Understand the metabolism of nutrient molecules in physiological and pathological conditions.
- Understand the genetic organization of mammalian genome and functions of DNA.

PRACTICALS

- Demonstration of various parts of body.
- Blood pressure estimation
- Demonstration of various bones and joints.
- To study circulatory system from charts and transverse section of veins.
- Examination of blood film from various blood cells.
- Demonstration of cell and tissues of body.

Reference Books:

1. Joshi (YK), Basics of Clinical Nutrition, Jaypee, Chennai, 2nd Edition, 2008.
2. Mahan (LK), Krause's Food, Nutrition, Diet & Therapy, Elsevier, 13th Edition, 2007.
3. Sri Lakshmi (B), Dietetics, New Age Int (P) Ltd., Publishers, Chennai, 5th Edition, 2007.
4. Vasudevan (DM), Text Book of Biochemistry, J.P. Brothers Publication New Delhi, 3rd Edition, 2001

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

ANATOMY AND PHYSIOLOGY LAB

Subject Code: DNRAS1-105

L T P C

Duration: 60 Hrs.

0 0 4 2

Course Outcomes:

- The course is a strenuous survey of human anatomy that parallels anatomical characteristics of other animals.
- The course focuses on anatomical terminology.
- The course will help the students to understand the anatomical identification of human body system.
- The course will help the students to understand the physiological processes of human body systems.

PRACTICALS

- Demonstration of parts of Digestive system.
- Demonstration of various parts of body.
- Blood pressure estimation.
- Demonstration of various bones and joints.
- To study circulatory system from charts and transverse section of veins.
- Examination of blood film from various blood cells
- Demonstration of cell and tissues of body
- To study circulatory system from charts and transverse section (TS) of artery and veins

Reference Books:

1. Singh (I), Anatomy & Physiology for Nurses, JP Brothers Publications, 2005.
2. (JW), Ross & Wilson Anatomy and Physiology in Health and Illness, Churchill Livingstone Publication, Philadelphia, 8th Edition, 1999.
3. Tortora, Principles of Anatomy & Physiology, John Wiley & Sons, New York, 8th Edition, 2003.

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

CHILD HEALTH NURSING

Subject Code: DNRAS1-106

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Outcomes:

This course is designed for developing an understanding of the modern approach to

- Child- care,
- Identification of health-related issues of neonates and children
- Prevention and treatment of health problems of neonates and children
- Nursing management of common health problems of neonates and children.

UNIT-I (15 Hrs.)

• **Introduction Modern concepts of childcare:**

Internationally accepted rights of the child, National policy and legislations in relation to child health and welfare, National programmes related to child health and welfare, Agencies related to welfare services to the children, Changing trends in hospital care preventive, promotive and curative aspects of child health, Child morbidity and mortality rates, Difference between adult and child, Hospital environment for a sick child, Impact of hospitalization on child and family, child health nurse in caring for a hospitalized child.

UNIT-II (15 Hrs.)

• **The Healthy Child:**

Principles of growth and development, Factors affecting growth and Development, Growth and development from birth to adolescence, The needs of normal children through the stages of development and parental guidance, Nutritional needs of children & infants: Breast feeding, exclusive breast feeding supplementary /artificial feeding and weaning, Baby friendly hospital concept, Value of play and selection of play materials Preventive immunization programme and cold chain, Preventive Paediatrics Care of under-five & under five clinics /well baby clinics.

UNIT-III (15 Hrs.)

• **Nursing care of aneonate:**

Nursing care of a normal newborn /essential newborn care, Neonatal resuscitation, Nursing management of a low birth baby, Kangaroo mother care Nursing management of common neonatal disorders Organization of neonatal unit. Identification of common congenital malformations. Integrated management of neonatal and childhood illnesses (IMNCI).

UNIT-IV (15 Hrs.)

• **Nursing management in common childhood diseases:**

Nutritional deficiency disorders, Respiratory disorders and infections Gastro intestinal infections, infestations and congenital disorders, Cardiovascular problems: congenital defects and Rheumatic fever, Rheumatic heart disease, Genitourinary disorders: Acute glomerulo nephritis, Nephrotic syndrome, Wilms tumor, infections and congenital disorders. Neurological infections and disorders, convulsions, Epilepsy, meningitis hydrocephalus, Spina bifida. Hematological disorders: Anemia's, Thalassemia, ITP Leukemia, Hemophilia. Endocrine disorders: Juvenile diabetes mellitus, Orthopedic disorders: Clubfoot, Hip dislocation Fracture, Management of behavioral & social problems in children.

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

Reference Books:

1. Whaley & Wongs, Nursing Care of Infants & Children, Mosby, Philadelphia.
2. Marlow, Textbook of Paediatric Nursing, Harecourt (India) Ltd.
3. Nelson, Textbook of Paediatrics, Harecourt India private Ltd.
4. Parthasarathy, IAP Textbook of Paediatrics, Jaypee Brothers Medical Publishers, New Delhi.
5. Hockenberry, Wong's Maternal Child Nursing Care, Mosby.

MRSPTU

SECOND SEMESTER

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

PSYCHOLOGY

Subject Code: DNRAS1-201

L T P C

Duration:60 (Hrs.)

3 1 0 4

Course Objectives:

- This course is designed to assist the students to knowledge of fundamentals of psychology and develop an insight into behavior of self and others. Further it is aimed at helping them to practice the principles of mental hygiene for promoting mental health in nursing practice.

Course Outcomes:

- Understand how psychology was developed and became the field of science as we know it now.
- Understand basic psychological processes like sensation & perception, states of consciousness and learning.
- Students will be able to know how complex is human mind and each individual is unique.

UNIT-I (15 Hrs.)

Introduction: History and origin of science of Psychology, Definitions and scope of Psychology, Relevance to Nursing, Methods of Psychology.

Biology of behavior: Body mind relationship – Modulation process in Health and illness.

Genetics and behavior: Heredity and environment.

Brain and Behavior: Nervous system, Neurons and synapse, Association Cortex, Rt and Lt Hemispheres , Psychology of Sensations, Muscular and glandular controls of behavior, Nature of behavior of an organism / integrated responses.

UNIT-II (15 Hrs.)

Cognitive Processes: Attention: Types, determinants, Duration, and Degree, alterations.

Perception: Meaning, Principles, factors affecting, errors. Learning Nature: Types, learner and learning, factors influencing, laws and theories, process, transfer, study habits.

Memory: Meaning, types, nature, factors influencing, development theories methods of memorizing and forgetting.

Thinking: Types and levels, stages of development, Relationship with language and communication.

Intelligence: Meaning, Classification, Uses, theories.

Aptitude: Concept, types, Individual differences and variability, Psychometric assessments of cognitive, Processes. Alterations in cognitive processes, Applications.

UNIT-III (15 Hrs.)

Motivation and Emotional Processes: Motivation: Meaning, Concepts, Types, Theories, Motives and behavior, Conflict and frustration, conflict resolution.

Emotions & Stress: Emotion: Definition, components, Changes in emotions, theories, emotional adjustments, emotions in health and illness. **Stress:** Stressor, cycle, effect, adaptation & Coping.

Attitude: Meaning, nature, development, factors affecting. Behavior and attitudes. Attitudinal Change □ Psychometric assessments of emotions and attitudes. Alterations in emotions Applications.

Personality: Definitions, topography, factors affecting personality, types, theories.

Psychometric assessments of personality. Alterations in personality Applications.

UNIT-IV (15 Hrs.)

Developmental Psychology: Psychology of people at different ages from infancy to old age. Psychology of vulnerable individuals – Challenged, women, sick, etc. Psychology of groups.

Mental hygiene and mental Health: Concepts of mental hygiene and mental health.

• Characteristics of mentally healthy person.

Warning signs of poor mental health Promotive and Preventive mental health strategies and services. Ego Defense mechanisms and implications. Personal and social adjustments. Guidance and Counseling Role of nurse.

Psychological assessment & tests: Types, development, Characteristics, Principles, Uses, Interpretations, and role of nurse in psychological assessment.

References Books:

1. Morgon (CT), Introduction to Psychology, Tata McGraw Hill, New Delhi, 20th edition, 2003.
2. Atkinson (RL), Hilgard's Introduction to psychology, Harcourt college publishers, Philadelphia, 13th edition, 2000.
3. Shelley, Taylor's Health Psychology, Tata McGraw hill publishing co. Ltd, Sidney, 6th Edition 2006.
4. Santrock (JW), Educational Psychology, Tata McGraw Hill Pub. Co. Ltd., Sidney 2006.
5. Fernald (L.D) Introduction to Psychology A.I.T.B.S. Pub. New Delhi 2006.
6. Mangal (SK), Advanced Educational Psychology, Pentice Hall of India, New Delhi, 2nd Edition, 2006.
7. Gross (R), Psychology for Nurses and Allied Health Professionals, Hodder Arnold, London, 2007.

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

SOCIOLOGY

Subject Code: DNRAS1-202

L T P C

Duration:60 (Hrs.)

3 1 0 4

Course Objectives:

- This course is designed to introduce the concepts of sociology related to community and social institutions in India and its relationship with health, illness and nursing.

Course Outcomes:

- Articulate a sociological perspective.
- Apply sociological theories to understand social phenomena.
- Critically evaluate explanations of human behaviour and social phenomena.
- Apply scientific principles to understand the social world.
- Evaluate the quality of social scientific methods and data.

UNIT-I (15 Hrs.)

Introduction: Definition of Sociology, Nature and Scope of the Importance and application, discipline of sociology in Nursing.

Individual & Society: Society and Community, Nature of Society, Difference between society and community, Process of socialization and individualization, Personal disorganization

Culture: Nature of culture, Evolution of culture, Diversity and uniformity of Culture, Culture and socialization, Transcultural society, Influence on health and disease.

UNIT-II (15 Hrs.)

Biodiversity and its conservation: Introduction Definition: Genetics, species and ecosystem diversity, Bio geographical, classification of India Value of Biodiversity: Consumptive use, Productive use, Social, ethical, aesthetic and option values, Bio diversity at global, national and local levels. India has a mega-diversity nation. Hot-spots of biodiversity, Threats to bio-diversity: habitat loss, poaching of wild life, man, wild life conflicts, Endangered and endemic species of India. **Social groups and processes:** The meaning and classification of groups, Primary & Secondary Group, In-group V/s. Outgroup, Class Tribe, Caste, Economic, Political, Religious groups, Mob, Crowd, Assimilation & Isolation Social Issues.

UNIT-III (15 Hrs.)

Social Issues and environment: From unsustainable to sustainable development, Urban problems and related to energy, Water conservation, Rain water harvesting.

Resettlement and rehabilitation of people: its problems and concern.

Environmental ethics: Issues and possible solutions, climate change, Global warming, acid rain, ocean layer depletion, Nuclear accident and Holocaust waste and reclamation.

Family and Marriage: Family – Functions, Types-Joint, Nuclear, Blended and extended family: Characteristics The Modern Family – Changes, Problems – Dowry etc., Welfare Services Changes & legislations on family and marriage in India – marriage acts Marriage: health status, Family welfare programmes.

Forms and functions of marriage, Marriage and family problems in India Family.

UNIT-IV (15 Hrs.)

Social Change: Nature and process of social Change, Factors influencing social change:
Cultural change, Cultural lag.

Introduction to Theories of social change: Linear, Cyclical, Marxian, Functional, **Social organization and social system:** Social organization: elements, types, Voluntary associations, social system: Definition and Types of social system.

Social Control: Nature and process of social control, Political, Legal, Religious.

Social Problems: Social disorganization, Control & planning: Poverty, housing, illiteracy, food supplies, prostitution, rights of women & children.

Vulnerable groups: Elderly, handicapped, minority groups and other marginalized groups, child labour, child abuse, delinquency and crime, substance abuse, HIV/ AIDS – Value Education, Social Welfare programmes in India.

Reference Books:

1. Bhushan (V), Introduction to Sociology, Kitab Mahan, 2002.
2. Madan (GR), Indian Social Problems, Allied Publishers, Chennai.
3. Mehta (SA), Study of Rural Sociology in India, Chand & Co.
4. Ogbern (F), Handbook of Sociology, Eurasoa Publishing, New Delhi.
5. Majmudar (DN), An Introduction to Social Anthropology, Asia Publishing House, Bombay.
6. Indrani (TK), Textbook of Sociology for Nurses, Jaypee Brothers, New Delhi, 2006.

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

COMMUNITY HEALTH NURSING

Subject Code: DNRAS1-203

L T P C

Duration:60 (Hrs.)

3 1 0 4

Course Objectives:

- This course is designed for students to appreciate the principles of promotion and maintenance of Health.

Course Outcomes:

- To promote health and efficiency
- Prevention and control of diseases and disabilities
- Need-based health care to prolong the life

UNIT-I (15 Hrs.)

Introduction: Community health Nursing, Definition, concepts and dimensions of health, Promotion of health, Maintenance of health.

Determinants of health: Eugenics, Environmental studies: - Definition, Scope and Importance – Need for public services. Environment and Environmental Pollution:

Definition, Causes, Effects and control measure of Physical, Air, Light, Soil, Marine, Thermal, Nuclear pollution, Ventilation, Water (Water resources : Use and Over utilization of surface and ground water, floods, drought, conflicts over water, Dams – Benefits and problems) - Housing, Sanitation, Noise, Climatic change, Heat waves and its Impact on health.

UNIT-II (15 Hrs.)

Solid waste management: -Causes, effects and control measures of Urban and Industrial waste - Disposal of waste disposal of dead bodies.

Communication: Infrastructure facilities and linkages-Forestation, Use and over exploitation, Deforestation, case studies, timber extraction, mining, dams and their effects on forests and tribal people. Mineral Resources Use and exploitation, Environmental effects of extracting and using mineral resources, case studies.

Acts regulating the environment: National Pollution Control Board including Acts on Air and Water. Role of individual in prevention of pollution, pollution case studies.

Bacterial and viral: Agents, host, carries and immunity. -Arthropods and Rodent Food hygiene: Production preservation, Purchase, preparation, consumption, World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer – pesticides problems, water logging, salinity, case studies. Acts regulating food hygiene-Prevention of food. Adulteration Act, drugs and cosmetics Act, Wild life protection Act, Forest conservation Act, Issues involved in enforcement of environmental legislation and public awareness.

UNIT-III (15 Hrs.)

Socio – Cultural: Customs – taboos, Marriage System, Family Structure.

Status of Special groups: females, Children, elderly, challenged groups and sick persons, Lifestyle, Hygiene, Physical activity ,Recreation and sleep, Sexual Life, Spiritual life philosophy, Self reliance Dietary Pattern, Education Occupation. **Financial Management:** Income, Budget, Purchasing Power, Security.

Forest resources: Use and overexploitation, Deforestation, Case studies

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

Timber extraction, Mining, Dams and their effects on forest and tribal people.

Energy Resources: Growing energy needs Renewable and Non-renewable energy resources, use of alternate energy sources, case studies.

Land resources: Land as a resource, Land degradation, Man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable life styles.

UNIT-IV (15 Hrs.)

Ecosystem: Concept of an ecosystem, Structure & Function of an Ecosystem producers, consumers and decomposers. Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids Introduction, types, characteristics, structure and functions of the following ecosystems:

Forest ecosystem, Grass land ecosystem, desert ecosystem, aquatic ecosystem (ponds, streams, lakes, river, ocean, estuaries), Disaster Management: Floods, Earth quake, cyclone and Landslides.

Epidemiology: Definition, concept, aims, scope, uses and terminology used in epidemiology. Dynamics of disease

Transmission: epidemiological triad, Morbidity and mortality: measurements. Levels of Prevention. Methods of Epidemiology, Descriptive Analytical: Epidemic investigation of an outbreak, Experimental.

Demography: Definition, Concepts and Scope. Methods of collection, analysis and interpretation of demographic data. Demographic rates and ratios.

Reference Books:

1. Park (JE), Textbook of Preventive and Social Medicine, Bhanarsida Bhanot Publishers, Jabalpur, 19th Edition, 2007
2. Stanhope (M), Public Health Nursing: Population- Centered Health care in the Community, Elsevier, 7th Edition, 2008
3. Rao (KS), Introduction to Community Health Nursing, S.I. Publications, Chennai, 1989
4. T.N.A.I., A Community Health Nursing Manual, New Gian Offset Press, New Delhi, 1989

MIDWIFERY OBSTETRICAL NURSING

Subject Code: DNRAS1-204

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

This course is designed for students to appreciate the concepts and principles of midwifery and obstetrical nursing. It helps them to acquire knowledge and skills in rendering nursing care to normal and high risk pregnant woman during antenatal, natal and post natal periods in hospitals and community settings.

UNIT-I (15 Hrs.)

Introduction to midwifery and obstetrical Nursing: Introduction to concepts of midwifery and obstetrical Nursing, Trends in midwifery and obstetrical nursing, Historical perspectives & current trends, Legal and ethical aspects in midwifery, Preconception care and preparing for parenthood, Role of nurse in midwifery and obstetrical care, National policies and legislations in relation to maternal health and welfare, Maternal morbidity, mortality and fertility rates Perinatal morbidity and mortality rates.

Review of anatomy and physiology of female reproductive system and fetal development: Female pelvis – general description of the bones joints, ligaments, planes of the pelvis diameters of the true pelvis, important landmarks, and variations in pelvis shape.

UNIT-II (15 Hrs.)

Female organs of reproduction- external genitalia, internal, genital organs and their anatomical relations, musculature—blood-supply, nerves, lymphatic, pelvic cellular tissue, pelvic peritoneum Physiology of menstrual cycle, Human sexuality, Fetal development, Review of Genetics.

Assessment and management of pregnancy (ante-natal): Normal pregnancy,

Physiological changes during pregnancy: Reproductive system, Cardio vascular system, Respiratory system, Urinary system, Gastro intestinal system, metabolic changes, skeletal changes, Skin changes, Endocrine system.

Psychological changes: Discomforts of pregnancy, Diagnosis of pregnancy, Signs, Differential diagnosis, Confirmatory tests.

UNIT-III (15 Hrs.)

Ante-natal care: Objectives, Assessment: History and physical examination, Antenatal Examination, Modalities of diagnostics: invasive, non-invasive, ultrasonic, cardio tomography, NST, CST. Signs of previous child-birth.

Relationship of foetus to uterus and pelvis: Lie, Attitude, Presentation, Position paravaginal examination.

Per vaginal examination, Assessment of fetal wellbeing, Screening and assessment for high risk: Risk approach.

Education for child-birth, Preparation for safe confinement

Psycho-social and cultural aspects of pregnancy: Adjustment to pregnancy, Unwed mother, Single parent, Teenage pregnancy, Sexual violence, Substance use and Adoption.

**MRSPTU DIPLOMA IN NURSING ASSISTANT
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UNIT-IV (15 Hrs.)

Assessment and management of intra-natal period, Assessment and management of women during post natal period, Assessment and management of normal neonates, High-risk pregnancy - assessment & management, Abnormal Labour – assessment and management, Assessment and management of High risk newborn, Pharmaco-therapeutics in Obstetrics, Family Welfare Programme.

Reference Books:

1. Fraser (DM), Myles Textbook of Midwives, Churchill Livingstone, 14th Edition, 2003
2. Dutta (DC), Textbook of Obstetrics, New Central Book Agency.
3. Lowdermilk, Maternity Nursing, Mosby, 7th Edition.
4. Willams, Obstetrics, McGrawhill, 22nd Edition.
5. Bobak, Maternity Nursing Care, Elsevier.
6. Maternity & Child Health Nursing Care for the childbearing family, LWW, 5th edition.
7. Wong, Maternity Child Nursing Care, Mosby, 3rd Edition.

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

COMMUNITY HEALTH NURSING - LAB

Subject Code: DNRAS1-205

L T P C

Duration: 60 (Hrs.)

0 0 4 2

Course Objectives:

The program vocational learning outcomes for this program are Communicate therapeutically with clients and members of the health care team. Assess clients across the life span, in a systematic and holistic manner. Plan safe and competent nursing care, based upon a thorough analysis of available data and evidence-informed practice guidelines.

Course Outcomes:

- Define the practice of community-based nursing
- Examine the impact of culture, socioeconomic status, lifestyle, environment and violence on the health of a community.
- Determine at risk populations and role of community nurse
- Develop holistic approaches to performing a community-needs assessment.

Practicals

1. Visit to a local area to document environmental asserts – reiver / forest / grassland / hill/ mountain.
2. Visit to all local polluted site – urban / rural / industrial / agriculture.
3. Study of common plants, insects, birds.
4. Study of simple ecosystems – pond, river, hill slopes, etc.

**MRSPTU DIPLOMA IN NURSING ASSISTANT
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MIDWIFERY OBSTETRICAL NURSING - LAB

Subject Code: DNRAS1-206

L T P C

Duration: 60 (Hrs.)

0 0 4 2

Course Objectives:

This course is designed for students to appreciate the concepts and principles of midwifery and obstetrical nursing. It helps them to acquire knowledge and skills in rendering nursing care to normal and high risks pregnant woman during antenatal, natal and post natal periods in hospitals and community settings.

Course Outcomes:

- Review the anatomy and physiology of female reproductive system and apply this knowledge in obstetrics and gynaecological nursing practice.
- Describe the physiology of menstrual cycle, fertilization and development of ovum, physiological and psychological adaptation during pregnancy and relationship of the changes to diagnostic procedures and management of pregnancy, labour and puerperium
- Describe the common drugs used in obstetrics and their effects during pregnancy, labour and puerperium.
- Discuss the common obstetrical and gynaecological problems facing women during childbearing and postmenopausal period.

Practicals:

- Assessment of pregnant women
- Assess woman in labour
- Carry out per- vaginal examinations
- Conduct normal deliveries
- Perform episiotomy and suture it
- Resuscitate newborns
- Assist with Cesarean Sections
- MTP and other surgical procedures
- Provide nursing care to post natal mother and baby
- Counsel and teach mother and family for parent hood
- Provide nursing care to newborn at risk

THIRD SEMESTER

MEDICAL SURGICAL NURSING

Subject Code: DNRAS1-301

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

The purpose of this course is to acquire knowledge and develop proficiency in caring for patients with medical and surgical disorders in varieties of health care settings and at home.

Course Outcomes:

- Practice within the nurse's legal scope of practice, in accordance with the policies and procedures of the practice setting.
- Demonstrate responsibility and accountability for the quality of nursing care provided to patients and their families while demonstrating responsibility for continued competence, reflection, self-analysis and self-care.

UNIT-I (15 Hrs.)

Nursing management of patient with disorders of Ear Nose and throat

Review of anatomy and Physiology of the Ear Nose and Throat ,Nursing Assessment-History and physical assessment, Etiology, pathophysiology, clinical manifestations, diagnosis, treatment modalities and medical & surgical nursing management of Ear Nose and Throat disorders; External ear - deformities otalgia, foreign bodies and tumors _ Middle ear impacted wax, Tympanic membrane perforation, otitis media, otosclerosis, mastoiditis, tumours _ Inner ear - Meniere's disease, labyrinthitis, ototoxicity, tumours_ Upper airway infections-common cold, sinusitis, rhinitis, pharyngitis, tonsillitis and adenoiditis, peritonsillar abscess, laryngitis. Upper respiratory airway-epistaxis, Nasal obstruction.

UNIT-II (15 Hrs.)

Nursing management of patient with disorders of eye: Review of anatomy and physiology of the eye –Nursing assessment-History and physical Assessment, Etiology, pathophysiology, clinical manifestations, diagnosis, treatment modalities and medical & surgical nursing management of eye disorders. Blindness, National blindness control program.

UNIT-III (15 Hrs.)

Nursing management of patient with Neurological disorders: Review of anatomy and physiology of the neurological system, Nursing assessment-History and physical and neurological assessment and Glasgow coma scale, Etiology, pathophysiology, clinical manifestations, diagnosis, treatment modalities and medical & surgical nursing management of neurological disorders, Congenital malformation, Headache, Head injuries, Spinal Injuries.

UNIT-IV (15 Hrs.)

Nursing management of patient with disorders of female reproductive system:

Review of anatomy and physiology of the female reproductive system, Nursing Assessment History and physical assessment, Breast self-examination, Etiology, pathophysiology, clinical manifestations, diagnosis, treatment modalities and medical & surgical nursing management of disorders of female reproductive system, Vaginal disorders; infections, discharges, fistulas, Vulvar Disorders : cysts, tumours Diseases of breasts, Nursing management of patient with Burns, reconstructive and cosmetic surgery, Nursing management of patient with oncological conditions.

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

Recommended Books:

1. Brunner (V), Medical Surgical Nursing, LWW, 10th Edition.
2. Black, Medical Surgical Nursing: Clinical Management for positive outcomes, Elsevier, 7th Edition.
3. Willams, Understanding Medical Surgical Nursing, Jaypee, 3rd Edition.
4. Timby, Introductory Medical Surgical Nursing, LWW, 9th Edition.
5. Lewis, Medical Surgical Nursing Assessment & Management of Clinical Problems, Elsevier 7th edition.
6. Ignatavicius, Critical Thinking for Collaborative Care, Elsevier, 5th Edition.

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

OPERATION THEATER TECHNIQUES

Subject Code: DNRAS1-302

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives: This course is designed to prepare OT nurses with specialized knowledge and skills in assisting for various surgical procedures and practicing infection control measures.

Course Outcomes:

On completion of this course the student will:

1. Demonstrate the skill in assisting different operative procedures.
2. Apply nursing process in pre-operative, operative and post-operative stages.
3. Demonstrate skill in organization of tasks, time, motion, equipment, supplies, materials and resources.
4. Demonstrate knowledge and principles of sterilization and disinfection
5. Participate with other surgical team members,

UNIT I (15 HRS)

OPERATION THEATER TABLE ORGANIZATION AND INFECTION CONTROL

Equipment's and amenities • Different types of tables and accessories • Organization of table and equipment's nurses role and responsibilities

Environment: - Cleaning, disinfecting O.R. Area, equipments, Air conditioning system, • Aseptic techniques – Handwashing, use of mask, gowning, gloving, head cover • Sterilization: - Preparing and packing of instruments, dressing materials, linen, suture materials, drainage tubes and catheters, care of electro-medical equipments – Handling and storing of sterilized material, equipments, instruments. • Collection of various specimens for laboratory tests • Bio-Medical Waste Management: - Universal standards and its application in O.R. Nursing. – Nurses Role and Responsibility

UNIT II (15 HRS)

PREPARATION AND ASSISTING FOR VARIOUS SURGICAL PROCEDURES

Setting up of operation room and table • Setting up of trays and trolleys for various surgical procedures • Part preparation for surgical procedures • Positioning and drapping according to the surgical procedures. • Incisions for various surgical procedures • Minor surgeries-surgical instruments and suturing materials • Major surgeries-surgical instruments and suturing materials:
o General, Gynaeco o Obstetrics, o Orthopaedics, o Plastic and Reconstructive surgery, o Ophthalmic, o Head and Neck, o ENT o Cardio-Thoracic, o Neuro, o Paediatric o Dental. • Laser and robotic surgery • Records and reports Nurses role and responsibilities

UNIT III (15 HRS)

OPERATING MICROSCOPES, SUTURE MATERIAL & NEEDLES, ENDOSCOPIES, BANDAGE, SPLINTS, CASTS AND TRACTION

Operating microscopes- Types • Accessories • Attachments, • Uses • Disinfection • Maintenance and storage.

Suture material and needles- Types • Uses • Disinfection • Storage

Endoscopies - Definition • Types • Uses • Maintenance and storage • Preparation of patients • Nurses role and responsibilities

Bandages- Types • Uses • Preparation • Maintenance and storage

UNIT IV (15 HRS)

a. RECOVERY ROOM/SURGICAL INTENSIVE CARE UNIT

Set up and organisation • Management of patient • Reporting and recording • Transportation of patient Nurses role and responsibility

b. FLUID THERAPY

Fluid and electrolytes • Blood and blood components • Plasma and plasma • Allergies and reactions
• High risk patients • Management of anaphylactic shock • Records and reports

Recommended Books:

1. Nursing Assistants book by Pamela J. Carter
2. The Handbook for Nursing Associates and Assistant Practitioners by Gillian Rowe
3. The Nursing Associate's Handbook of Clinical Skills by Ian Peate

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

MENTAL HEALTH NURSING

Subject Code: DNRAS1-303

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

- This course is designed for developing an understanding of the modern approach to mental health, identification, prevention and nursing management of common mental health problems with special emphasis on therapeutic interventions for individuals, family and community.

Course Outcomes

- Practice within the nurse's legal scope of practice, in accordance with the policies and procedures of the practice setting.
- Demonstrate responsibility and accountability for the quality of nursing care provided to patients and their families while demonstrating responsibility for continued competence, reflection, self-analysis and self-care.

UNIT-I (15 Hrs.)

Introduction: Perspectives of Mental Health and Mental Health Nursing; Evolution of Mental Health Services, treatments and Nursing practices, Prevalence and incidence of mental health problems and disorders, Mental Health Act, National Mental Health Policy in vis National health Policy, National Mental health Programme, Mental Health Team, Nature and scope of Mental Health nursing, Role and function of Mental Health Nurse in various settings and factors affecting the level of nursing practice. Concepts of normal and abnormal behaviour.

UNIT-II (15 Hrs.)

Principles and Concepts of Mental Health Nursing: Definition: Mental Health nursing and terminologies used Classification of mental disorders: ICD Review of personality development, defense mechanisms Maladaptive behavior of individuals and groups: stress, crisis and disaster(s), Etiology: Bio – psycho – social factors, Psychopathology of mental disorders: Review of structure and functions of brain, limbic system and abnormal neuro Transmission Principles of Mental, Health Nursing practice, Standards of Mental, Health Nursing practice.

UNIT-III (15 Hrs.)

Assessment of Mental health status: History taking, Mental status examination, Mini mental status examination, Neurological examination: Review Investigations: Related Blood chemistry, EEG, CT, & MRI, Psychological Tests, Role and responsibilities of nurse, **Therapeutic communication and nurse- patient relationship:** Therapeutic communication: Types, techniques, characteristics, Types of relationship, Ethics and responsibilities, Elements of nurse patient contract, Review of technique of IPR – Johari window, Goals, phases, tasks, therapeutic techniques, Therapeutic impasse and its interventions.

UNIT-IV (15 Hrs.)

Treatment modalities and therapies used in mental disorders: Psycho Pharmacology, Psychological therapies, nursing management of patients with Schizophrenia, and other psychotic disorders. Nursing management of patients with mood disorders. Nursing management of patients with neurotic, stress related and somatization disorders, nursing management of patients with substance use disorders, nursing management of Childhood and adolescent disorders including mental deficiency, Legal issues in mental health nursing.

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

Recommended Books:

1. A guide to mental health and psychiatric nursing by R Sreevani
2. A textbook of psychiatric nursing by Bimla Kapoor
3. Textbook of mental health nursing I and II by Bharat Pareek

MRSPTU

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

MANAGEMENT OF NURSING SERVICES & EDUCATION

Subject Code: DNRAS1-304

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

- The course is designed to enable to student to acquire understanding of management of clinical and community health nursing services, Nursing Educational programme.

Course Outcomes:

- Understand the principles and functions of management
- Understand the elements and process of management.
- Appreciate the management of nursing services in the hospital and community.
- Apply the concepts, theories and techniques of organizational behaviour and human relations. Develop skills in planning and organizing in service education.

UNIT-I (15 Hrs.)

Introduction to Management in Nursing:- Definition, Concepts & theories, Functions of Management, Principles of Management, Role of a Nurse as a Manager.

Management Process:- Planning; mission, Philosophy, Objectives & Operational plan, Staffing: Philosophy staffing study, norms, activities, patient Classification system, Scheduling.

Human resources, Management; recruiting, selecting, development, retaining, Promoting, Superannuation. Budgeting: - Concept, Principles, types cost, benefit analysis and audit.

Material Management: Equipment & Supplies, Directing (Leading) Process. Controlling: Quality Management, Program evaluation Review Technique (PERT), Bench marking,

Activity Plan (Gantt chart).

UNIT-II (15 Hrs.)

Management of Nursing Services in the Hospital & Community Planning: Human Resource Management, Budgeting proposal, projecting requirements for staff, equipment and supplies, Material Management, procurement, inventory control, auditing and maintenance in: Hospital & Patient care units, Emergency and disaster Management. Directing & Leading: Delegation, Participatory Management. Controlling: Nursing rounds / Visits, Nursing protocols manuals. Quality Assurance model, Documentation. Records & reports performance appraisal.

UNIT-III (15 Hrs.)

Organizational Behavior and Human Relations:-Concept and theories of Organizational Behaviors, Review of Channels of Communication, Leadership styles, Review of Motivation concepts and theories Group dynamics Techniques of: Communication and Interpersonal relationships. Human Relations, Public Relations in Context of Nursing, Relations with Professional associations & employees Unions & Collective bargaining.

In service Education: Nature & Scope of in service education program, Organization of in service education, Principles of adult learning, planning for in service education program, techniques, Methods & Evaluation of staff education programme, Preparation of Report.

**MRSPTU DIPLOMA IN NURSING ASSISTANT
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UNIT-IV (15 Hrs.)

Management of Nursing educational institutions: Establishment of Nursing, Educational institution INC norms and guidelines, Co – ordination with: Regulatory bodies, Accreditation, Affiliation, Philosophy / Objectives, Organization,

Nursing as a Profession: Nursing as a Profession, Professional ethics, Practice Standards for Nursing, INC Consumer Protection act, Legal Aspects in Nursing,

Professional Advancement: Continuing Education, Career Opportunity Collective bargaining, Membership with Professional, Organizations, national & International. Participation in research activities. Publications, Journals, News Papers etc.

Reference Books:

1. Basavanthappa (BT), Nursing Administration, Jaypee Brother, New Delhi, 2002.
2. Stanhope (M), Public Health Nursing: Population-centered Health Care in the Community, Elsevier, 7th Edition, 2008.
3. T.N.A.I., A Community Nursing Manual, New Gian Offset Press, New Delhi, 1989

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

MEDICAL SURGICAL NURSING - LAB

Subject Code: DNRAS1-305

L T P C

Duration: 60 (Hrs.)

0 0 4 2

Course Outcomes:

At the end of the course, students will be able to: Appreciate the trends & issues in the field of Medical – Surgical Nursing as a specialty. Apply concepts & theories related to health promotion. Appreciate the client as a holistic individual. Perform physical, psychosocial assessment of Medical – Surgical patients.

Experiments:

- Perform examination of ear, nose and throat
- Assist with diagnostic procedures Assist with therapeutic
- Procedures: Instillation of drops
- Perform/ assist with irrigations
- Perform examination of eye
- Assist with diagnostic procedures
- Assist with therapeutic procedures
- Apply eye bandage
- Apply eye drops
- Perform neurological examination
- Use Glasgow coma scale
- Assist with gynaecological examination

**MRSPTU DIPLOMA IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

OPERATION THEATER TECHNIQUES - LAB

Subject Code: DNRAS1-306

L T P C

Duration: 60 (Hrs.)

0 0 4 2

Course Outcomes:

At the end of the course, students will be able to learn operation theatre techniques for assisting various surgical procedures and practice infection control measures

Experiments:

- i. Neurological assessment; Glasgow coma scale
- ii. Pulse oximetry
- iii. Arterial B P monitoring
- iv. Venous access, ABG collection monitoring
- v. Oxygen administration, Suctioning, Respiratory therapy, Tracheotomy toilet
- vi. Airway Management a) Application of Oro Pharyngeal Airway b) Oxygen therapy c) CPAP (Continuous Positive Airway Pressure) d) Care of Tracheostomy e) Endotracheal Intubation
- vii. Care of intercostals drainage
- viii. Nebulisation
- ix. Chest physiotherapy
- x. Monitoring of critically ill patients – clinically & with monitors, CRT (Capillary Refill Time), ECG
- xi. Gastric Lavage
- xii. Setting of Ventilators
- xiii. Assessment of Neonates: Identification & assessment of risk factors, APGAR Score
- xiv. Admission & discharge of critically ill patients
- xv. OG (Orogastric) tube insertion
- xvi. Thermoregulation – management of thermoregulation & control, Use of hypothermia machines
- xvii. Administration of Drugs: I/M, IV injection, IV Cannulation & fixation infusion pump, Calculation of dosages, Monitoring fluid therapy.
- xviii. Administration of Blood and its components.
- xix. Procedures for prevention of infections: Hand washing, disinfections & sterilization, surveillance, fumigation. Collection of specimens related to critical care.
- xx. Burns: assessment, calculation of fluid-crystalloid and colloid
- xxi. Maintenance of intake and output chart.
- xxii. Wound dressing and prevention of contractures xxiv. Rehabilitation

Reference books

1. Nursing Assistants book by Pamela J. Carter
2. The Handbook for Nursing Associates and Assistant Practitioners by Gillian Rowe
3. The Nursing Associate's Handbook of Clinical Skills by Ian Peate

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF PHARMACY

SYLLABUS

FOR

SKILL CERTIFICATE COURSE IN NURSING ASSISTANT

(1 YEAR PROGRAMME)

2023 BATCH ONWARDS

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**MRSPTU SKILL CERTIFICATE COUSE IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

SCHEME

1 st Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
CNRAS1-101	Fundamental of Nursing (including first aid, emergency Nursing)	3	1	0	40	60	100	4
CNRAS1-102	Anatomy & Physiology	3	1	0	40	60	100	4
CNRAS1-103	Nutrition & Bio- Chemistry	3	1	0	40	60	100	4
CNRAS1-104	Psychology	3	1	0	40	60	100	4
BMNCC0-041	Drug Abuse: Problem, Management and Prevention	2	0	0	100	00	100	0
CNRAS1-105	Anatomy & Physiology -Lab	0	0	4	60	40	100	2
CNRAS1-106	Nutrition & Biochemistry - Lab.	0	0	4	60	40	100	2
Total		14	4	8	380	320	700	20

2 nd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
CNRAS1-201	Community Health Nursing	3	1	0	40	60	100	4
CNRAS1-202	Midwifery Obstetrical Nursing	3	1	0	40	60	100	4
CNRAS1-203	Medical Surgical Nursing	3	1	0	40	60	100	4
CNRAS1-204	Child and Mental Health Nursing	3	1	0	40	60	100	4
CNRAS1-205	Midwifery Obstetrical Nursing- Lab	0	0	4	60	40	100	2
CNRAS1-206	Medical Surgical Nursing – Lab	0	0	4	60	40	100	2
CNRAS1-207	Child and Mental Health Nursing - Lab	0	0	4	60	40	100	2
Total		12	4	12	340	360	700	22

FIRST SEMESTER

FUNDAMENTAL OF NURSING

Subject Code: CNRAS1-101

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Outcomes:

- Demonstrate knowledge of general overall physiological principles associated with metabolic processes.
- Students will be able to learn the terminology of the subject and basic knowledge of cells.
- Students will able to understand the basic of tissues, blood and to understand anatomy and physiology of human body.
- Students will able to understand the basics of musculoskeletal system; cardiovascular system; cardiovascular system; aerobic and anaerobic program design.

UNIT-I (15 Hrs.)

Introduction to Nursing

Nursing: Definition, meaning, Nature, scope, principles and History of nursing.
Nurse: Definition and meaning, preparation of a nurse qualities personal, professional.
Ethics in nursing, Role and responsibilities of a nurse.
Health care agencies: Hospital and community, Types of Hospitals and their functions.
Holistic approach to nursing, Comprehensive nursing care.

UNIT-II (15 Hrs.)

Introduction to the sick and well

Bed and Bed Making
Maintenance of therapeutic environment
Psycho social Environment
Nursing Process and Nursing Care Plan
Recording and Reporting
Discharging a patient

UNIT-III (15 Hrs.)

Basic Nursing Care and Needs of the Patient

Hygienic Needs and physical needs
Elimination needs
Safety needs
Activity and Exercises
Physical Comforts
Moving, shifting and lifting of patient

UNIT-IV (15 Hrs.)

Therapeutic Nursing Care and Procedures Asepsis

Hand washing, hand scrubbing, use of mask, gown, gloves.
Disinfection techniques, sterilization techniques.
Autoclaving, boiling, flaming, ultra violet rays.

Introduction to Pharmacology

Concept of pharmacology.
Classification of drugs.
Administration of drugs.
General action of drugs.
Nursing implications in administration of drugs

Introduction to First Aid

Importance of first aid and rules of first aid.
Concept of emergency.

First Aid in Emergency situations

Fire, burns, fractures, accidents, poisoning, drowning, hemorrhages, insect bites, foreign bodies.
Transportation of the injured.
Bandaging and splinting.

Reference Books:

1. Lippincott Manual of Nursing Practice.
2. Fundamentals of Nursing (Ninth Edition)
3. Kozier and Erb's Fundamentals of Nursing (Tenth Edition)
4. Fundamentals of Nursing: The Art and Science of Nursing Care (Seventh Edition)

ANATOMY & PHYSIOLOGY

Subject Code: CNRAS1-102

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Outcomes:

- Apply concepts, knowledge, and correct terminology to describe anatomy and physiology related to the integumentary, muscular, skeletal, and nervous systems.
- Critically evaluate clinical and physiological data from direct observation and documented research.
- The Course is designed to enable students to acquire knowledge of the normal structure of various human body systems.
- The students will able to understand the alterations in anatomical structures in disease and practice of nursing.

UNIT-I (15 Hrs.)

Introduction to anatomical terms, Organization of body cells, tissues, organs, systems, membranes and glands, Skeletal system:-

- Bones: types, structure, function
- Axial skeleton
- Appendicular skeleton
- Joints: classification, structure and function.

UNIT-II (15 Hrs.)

Muscular system

- Type, structure and functions.
- Position and action of chief muscles of the body.

Cardio Vascular system

- Blood: composition clotting and blood group, cross matching. Blood products and their use.
- Heart: position, structure, conduction system, Function and cardiac cycle.
- Blood Vessels: Structural differences and position of chief vessels
- Circulation of Blood: Systematic, pulmonary and portal circulation
- Blood pressure and pulse
- Lymphatic system: Lymph vessels, glands, ducts and lymph circulation, lymph tissues in the body, spleen.

UNIT-III (15 Hrs.)

Respiratory System

- Structure and functions of respiratory organs
- Physiology of respiration.
- Characteristics of normal respiration and its deviations.

Digestive system

- Structure and function of organs of digestive and accessory organs.
- Process of digestion and absorption.
- Metabolism: meaning and metabolism of food constituents.

**MRSPTU SKILL CERTIFICATE COUSE IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

Excretory system

- Structure and functions of organs of urinary system
- Structure and functions of the skin
- Fluid and electrolyte balance.

UNIT-IV (15 Hrs.)

Nervous System

Type, structure and functions of neuron.

- Central Nervous System: Structure and functions.
- Autonomic Nervous System: Structure and functions.

Endocrine System

- Structure and functions of pituitary, pancreas, thyroid parathyroid, thymus and supra renal glands.

Sense Organs

- Structure and functions of eye, ear, nose and tongue.
- Physiology of vision, hearing and equilibrium.

Reproductive System

- Structure and functions of reproductive and accessory organs.
- Process of reproduction, menstrual cycle and menopause
- Structure and functions of male organ reproductive system.

Reference Books:

1. Singh (I), Anatomy & Physiology for Nurses, JP Brothers Publications, 2005.
2. Kathleen (JW), Ross & Wilson Anatomy and Physiology in Health and Illness, Churchil Livingston Publication, Philadelphia, 8th Edition, 1999.
3. Tortora, Principles of Anatomy & Physiology, John Wiley & Sons, New York, 8th Edition, 2003.

NUTRITION & BIO-CHEMISTRY

Subject Code: CNRAS1-103

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Outcomes:

- Learn and understand the basic terms related to nutrition.
- The course is designed to assist the students to acquire knowledge of nutrition for maintenance of optimum health at different stages of life.
- The course is designed to assist the students to acquire knowledge about its application for practice of nursing.

UNIT-I (15 Hrs.)

Introduction

- Nutrition
 - History
 - Concepts
- Role of nutrition in maintaining health
- Factors affecting food and nutrition: Socio – economic, cultural, tradition, production, system of distribution, life style and food habits, etc.
- Role of food and its medicinal value.
- Elements of Nutrition: Macro and micro-Calorie, BMR

UNIT-II (15 Hrs.)

Classification by chemical composition and sources -

- Carbohydrates.
- Proteins
- Fats
- Minerals
- Vitamins
- Water

Classification by nutritive value -

- Cereals and millets.
- Pulses (Legumes).
- Vegetables.
- Nuts and oil seeds.
- Fruits
- Animal food.
- Fats and oils
- Sugar and jiggery.
- Condiments and spices.
- Miscellaneous food

UNIT-III (15 Hrs.)

Normal dietary requirements and deficiency diseases of each of the constituents of food

- The Calorie
- Nutritive value of food items and their measures used.
- Balanced diet.
- Method of calculating normal food requirements, influence of age, sex and activity.

UNIT-IV (15 Hrs.)

Introduction to Diet Therapy

- Methods of modifying diet in relation to calorie value, by increasing or decreasing of constituents.
- Diet and the patient
- Environmental, psychological and cultural factors in acceptance of diet by the patient.
- Serving of food.
- Feeding of helpless patients.

Community Nutrition

- Concept of community nutrition.
- Nutritional needs for special groups: infants, children, pregnant women, lactating mothers, old people etc.
- Substitutes for non-vegetarian food.
- Methods of improving an ill-balanced diet.

Reference Books:

1. Joshi (YK), Basics of Clinical Nutrition, Jaypee, Chennai, 2nd Edition, 2008.
2. Mahan (LK), Krause's Food, Nutrition, Diet & Therapy, Elsevier, 13th Edition, 2007.
3. Sri Lakshmi (B), Dietetics, New Age Int (P) Ltd., Publishers, Chennai, 5th Edition, 2007.
4. Vasudevan (DM), Text Book of Biochemistry, J.P.Brothers Publication New Delhi, 3rd Edition, 2001.
5. Lehninger, Principles of Biochemistry, Worth Publishers, New York, 3rd Edition, 2002.
6. Strieler (L), (1988). Biochemistry, Freeman & Company, New York, 3rd Edition, 1988.

**MRSPTU SKILL CERTIFICATE COUSE IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION

Subject Code: BMNCC0-041

**L T P C
2 0 0 0**

Duration: 30Hrs.

UNIT-I (6 Hours)

Meaning of Drug Abuse: Meaning: Drug abuse, Drug dependence and Drug addiction. Nature and extent of drug abuse in India and Punjab.

UNIT-II (8 Hours)

Consequences of Drug Abuse: Individual: Education, Employment, Income. Family: Violence. Society: Crime. Nation: Law and Order problem.

UNIT-III (8 Hours)

Prevention of Drug Abuse: Role of Family: Parent-child relationship, Family support, supervision, shipping values, active scrutiny. School: Counselling, Teacher as role-model, Parent-teacher-health professional coordination, Random testing on students.

UNIT-IV (8 Hours)

Treatment and Control of Drug Abuse: Medical Management: Medication for treatment and to reduce withdrawal effects. Psychological Management: Counselling, Behavioural and Cognitive therapy. Social Management: Family, Group therapy and Environmental intervention. Treatment: Medical, Psychological and Social Management. Control: Role of Media and Legislation.

Recommended Books:

1. Ram Ahuja, 'Social Problems in India', Rawat Publications, Jaipur, 2003.
2. 'Extent, Pattern and Trend of Drug Use in India', Ministry of Social Justice and Empowerment, Govt. of India, 2004.
3. J.A. Inciardi, 'The Drug Crime Connection', Sage Publications, Beverly Hills, 1981.
4. T. Kapoor, 'Drug Epidemic among Indian Youth', Mittal Publications, New Delhi, 1985.
5. Kessel, Neil and Henry Walton, 'Alcoholism, Harmond Worth', Penguin Books, 1982.
6. Ishwar Modi and Shalini Modi, 'Addiction and Prevention', Rawat Publications, Jaipur, 1997.
7. 'National Household Survey of Alcohol and Drug Abuse', Clinical Epidemiological Unit, All India Institute of Medical Sciences, New Delhi, 2003 &2004.
8. Ross Coomber and Others, 'Key Concept in Drugs and Society', Sage Publications, New Delhi, 2013.
9. BhimSain, 'Drug Addiction Alcoholism, Smoking Obscenity', Mittal Publications, New Delhi, 1991.
10. Ranvinder Singh Sandhu, 'Drug Addiction in Punjab: A Sociological Study', Guru Nanak Dev University, Amritsar, 2009.
11. Chandra Paul Singh, 'Alcohol and Dependence among Industrial Workers', Shipra, Delhi, 2000.
12. S. Sussman and S.L. Ames, 'Drug Abuse: Concepts, Prevention and Cessation', Cambridge University Press, 2008.
13. P.S. Verma, 'Punjab's Drug Problem: Contours and Characteristics', Vol. LII, No. 3, P.P. 40-43, Economic and Political Weekly, 2017. 1
14. 'World Drug Report', United Nations Office of Drug and Crime, 2016.
15. 'World Drug Report', United Nations Office of Drug and Crime, 2017.

PSYCHOLOGY

Subject Code: CNRAS1-104

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Objectives:

- This course is designed to assist the students to knowledge of fundamentals of psychology and develop an insight into behavior of self and others. Further it is aimed at helping them to practice the principles of mental hygiene for promoting mental health in nursing practice.

UNIT-I (15 Hrs.)

Introduction: History and origin of science of Psychology, Definitions and scope of Psychology, Relevance to Nursing, Methods of Psychology.

Biology of behavior: Body mind relationship – Modulation process in Health and illness.

Genetics and behavior: Heredity and environment.

Brain and Behavior: Nervous system, Neurons and synapse, Psychology of Sensations, Muscular and glandular controls of behavior, Nature of behavior of an organism/integrated response.

UNIT-II (15 Hrs.)

Cognitive Processes: Attention: Types, determinants, Duration, and Degree, alterations.

Perception: Meaning, Principles, factors affecting, errors. Learning Nature: Types, learner and learning, factors influencing, laws and theories, process, transfer, study habits.

Memory: Meaning, types, nature, factors influencing, development theories methods of memorizing and forgetting.

Aptitude: Concept, types, Individual differences and variability, Psychometric assessments of cognitive, Processes. Alterations in cognitive processes, Applications.

UNIT-III (15 Hrs.)

Motivation and Emotional Processes: Motivation: Meaning, Concepts, Types, Theories, Motives and behavior, Conflict and frustration, conflict resolution.

Emotions & Stress: Emotion: Definition, components, Changes in emotions, theories, emotional adjustments, emotions in health and illness.

Stress: Stressor, cycle, effect, adaptation & Coping.

Personality: Definitions, topography, factors affecting personality, types, theories.

UNIT-IV (15 Hrs.)

Developmental Psychology: Psychology of people at different ages from infancy to old age. Psychology of vulnerable individuals – Challenged, women, sick, etc. Psychology of groups.

Mental hygiene and mental Health: Concepts of mental hygiene and mental health.
•Characteristics of mentally healthy person.

Warning signs of poor mental health Promotive and Preventive mental health strategies and services. Ego Defense mechanisms and implications. Personal and social adjustments. Guidance and Counseling Role of nurse.

Psychological assessment & tests: Types, development, Characteristics, Principles, Uses, Interpretations, and role of nurse in psychological assessment.

**MRSPTU SKILL CERTIFICATE COUSE IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

References Books:

1. Morgon (CT), Introduction to Psychology, Tata McGraw Hill, New Delhi.
2. Atkinson (RL), Hilgard's Introduction to psychology, Harcourt college publishers, Philadelphia.
3. Shelley, Taylor's Health Psychology, Tata McGraw hill publishing co. Ltd, Sidney.
4. Santrock (JW), Educational Psychology, Tata McGraw Hill Pub. Co. Ltd., Sidney.
5. Fernald (L.D) Introduction to Psychology A.I.T.B.S. Pub. New Delhi.
6. Mangal (SK), Advanced Educational Psychology, Pentice Hall of India, New Delhi.
7. Gross (R), Psychology for Nurses and Allied Health Professionals, Hodder Arnold, London.

MRSPTU

ANATOMY & PHYSIOLOGY LAB

Subject Code: CNRAS1-105

L T P C

Duration: 60 Hrs.

0 0 4 2

Human Anatomy & Physiology – Practical

- Demonstration of various parts of body
- Demonstration of cell and tissues of body
- Demonstration of parts of Digestive system.
- Demonstration of various parts of circulatory system
- Examination of blood film for various blood cells from stained slides
- Blood pressure estimation
- Demonstration of structural differences between skeletal, smooth and cardiac muscles
- Demonstration of various bones and joints.
- To study circulatory system from charts and transverse section (TS) of artery and vein.

**MRSPTU SKILL CERTIFICATE COUSE IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

NUTRITION & BIOCHEMISTRY LAB

Subject Code: CNRAS1-106

L T P C

Duration: 60 Hrs.

0 0 4 2

- To visit Clinical biochemistry laboratory observe and learn about various tests are being performed in clinical biochemistry laboratory.
- To practice Blood sample collection as per sample draw pattern.
- Basics of various routine laboratory tests performed e.g. determination of blood sugar levels, Liver function tests, renal function tests, and Urine sugar and protein level.
- To understand briefly the interpretation of various tests report to know about critical alerts.
- To visit Blood Gas Analysis laboratory and learn to analyze blood.

SECOND SEMESTER

**MRSPTU SKILL CERTIFICATE COUSE IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

COMMUNITY HEALTH NURSING

Subject Code: CNRAS1-201

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Objectives:

- This course is designed for students to appreciate the principles of promotion and maintenance of Health.

UNIT-I (15 Hrs.)

Introduction: Community health Nursing, Definition, concepts and dimensions of health, Promotion of health, Maintenance of health. a) Characteristics of a healthy individual, b) Health assessment of infant preschool, school going, adolescent adult, antenatal woman, postnatal, woman, and elderly.

b) Qualities and functions of Community Health Community Health Nurse. Steps of nursing process; community identification, population composition, health and allied resources, community assessment, planning & conducting community nursing care services.

UNIT-II (15 Hrs.)

Family Health Nursing Care a) Family as a unit of health b) Concept, goals, objectives c) Family health care services d) Family health care plan and nursing process. Family health services – Maternal, child care and family welfare services. f) Roles and function of a community health nurse in family health service

Family Health Care Settings Home- Purposes, Principles b) Planning and evaluation Demonstration c) Bag technique d) Clinic: Purposes, type of clinics and their functions e) Function of Health personnel in clinics

UNIT-III (15 Hrs.)

Principles of Epidemiology and Epidemiological methods

Definition and aims of epidemiology, communicable and non-communicable diseases.

a) Basic tools of measurement in epidemiology, b) Uses of epidemiology c) Disease cycle d) Spectrum of disease e) Levels of prevention of disease f) Disease transmission – direct and indirect g) Immunizing agents, immunization and national immunization schedule h) Control of infectious diseases. i) Disinfection.

Demography: Definition, Concepts and Scope. National family Welfare Policy - National family Welfare Programme - Role of a nurse in the family planning programme.

UNIT-IV (15 Hrs.)

Health care delivery system a) Health care concept and trends

b) Health care services - Public sector, Rural, Urban

c) Indigenous systems of medicine Ayurvedha, yoga, unani, siddha and homeopathy (AYUSH)

d) Voluntary health services

e) National Health Programmes

f) Nurse role in health care services

Specialized community health services nurse's role

a) RCH (reproductive health and child care)

b) National Health Mission (rural/ urban)

c) Emergency ambulance services.

d) Government health insurance schemes

e) Occupational health nursing (including Homes for the health care providers)

f) Geriatric nursing

**MRSPTU SKILL CERTIFICATE COUSE IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

- g) Care of differently abled- Physical and mental
- i) Rehabilitation nursing

Reference Books:

1. Park (JE), Textbook of Preventive and Social Medicine, Bhanarsida Bhanot Publishers, Jabalpur.
2. Stanhope (M), Public Health Nursing: Population- Centered Health care in the Community, Elsevier.
3. Rao (KS), Introduction to Community Health Nursing, S.I. Publications, Chennai.
4. T.N.A.I., A Community Health Nursing Manual, New Gian Offset Press, New Delhi.

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MIDWIFERY OBSTETRICAL NURSING

Subject Code: CNRAS1-202

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Objectives:

- This course is designed for students to appreciate the concepts and principles of midwifery and obstetrical nursing. It helps them to acquire knowledge and skills in rendering nursing care to normal and high-risk pregnant woman during antenatal, natal and post-natal periods in hospitals and community settings.

UNIT-I (15 Hrs.)

Introduction to midwifery and obstetrical Nursing: Introduction to concepts of midwifery and obstetrical Nursing, Trends in midwifery and obstetrical nursing, Historical perspectives & current trends, Legal and ethical aspects in midwifery, Preconception care and preparing for parenthood, Role of nurse in midwifery and obstetrical care, Maternal morbidity, mortality and fertility rates Perinatal morbidity and mortality rates.

UNIT-II (15 Hrs.)

Female organs of reproduction- external genitalia, internal, genital organs and their anatomical relations, musculature—blood- supply, nerves, lymphatic, pelvic cellular tissue, pelvic peritoneum Physiology of menstrual cycle, Human sexuality, Fetal development, Review of Genetics.

Assessment and management of pregnancy (ante-natal): Normal pregnancy, Physiological changes during pregnancy: Reproductive system, Cardio vascular system, Respiratory system, Urinary system, Gastro intestinal system, Metabolic changes, Skeletal changes, Skin changes, Endocrine system.

Psychological changes: Discomforts of pregnancy, Diagnosis of pregnancy, Signs, Differential diagnosis, Confirmatory tests.

UNIT-III (15 Hrs.)

Ante-natal care: Objectives, Assessment: History and physical examination, Antenatal Examination, Modalities of diagnostics: invasive, non-invasive, ultrasonic, cardio tomography, NST, CST. Signs of previous child-birth.

Education for child-birth, Preparation for safe confinement

Psycho-social and cultural aspects of pregnancy: Adjustment to pregnancy, Unwed mother, Single parent, teenage pregnancy, Sexual violence, Substance use, Adoption.

UNIT-IV (15 Hrs.)

Assessment and management of intra-natal period, Assessment and management of women during post-natal period, Assessment and management of normal neonates, High-risk pregnancy -assessment & management, Abnormal Labour – assessment and management, Assessment and management of High-risk new-born.

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SYLLABUS 2023 BATCH ONWARDS**

Reference Books:

1. Fraser (DM), Myles Textbook of Midwives, Churchill Livingstone.
2. Dutta (DC), Textbook of Obstetrics, New Central Book Agency.
3. Lowdermilk, Maternity Nursing, Mosby.
4. Willams, Obstetrics, McGrawhill, 22nd Edition.
5. Bobak, Maternity Nursing Care, Elsevier.
6. Maternity & Child Health Nursing Care for the childbearing family, LWW, 5th edition.
7. Wong, Maternity Child Nursing Care, Mosby.

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MEDICAL SURGICAL NURSING

Subject Code: CNRAS1-203

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Objectives:

- The purpose of this course is to acquire knowledge and develop proficiency in caring for patients with medical and surgical disorders in varieties of health care settings and at home.

UNIT-I (15 Hrs.)

Nursing management of patient with disorders of Ear Nose and throat

Review of anatomy and Physiology of the Ear Nose and Throat, Nursing Assessment-History and physical assessment, Etiology, pathophysiology, clinical, manifestations, diagnosis, treatment, modalities and medical & surgical nursing management of Ear Nose and Throat disorders; External ear - deformities otalgia, foreign bodies and tumors Middle ear impacted wax, Tympanic, membrane perforation, otitis media, otosclerosis, mastoidities, tumours Inner ear - Meniere's disease, labyrinthitis, ototoxicity, tumours

Upper airway infections: common cold, sinusitis, pharyngitis, tonsillitis and adenoiditis, peritonsil, laryngitis. Upper respiratory airway-epistaxis, Nasal obstruction.

UNIT-II (15 Hrs.)

Nursing management of patient with disorders of eye: Review of anatomy and physiology of the eye –Nursing assessment -History and physical Assessment, Etiology, pathophysiology, clinical manifestations, diagnosis, treatment modalities and medical & surgical nursing management of eye disorders. Blindness, National blindness control program.

UNIT-III (15 Hrs.)

Nursing management of patient with Neurological disorders: Review of anatomy and physiology of the neurological system, Nursing Assessment-History and physical and neurological assessment and Glasgow coma scale, Etiology, pathophysiology, clinical manifestations, diagnosis, treatment modalities and medical & surgical nursing management of neurological disorders, Congenital malformation, Headache, Head injuries, Spinal Injuries.

UNIT-IV (15 Hrs.)

Nursing management of patient with disorders of female reproductive system: Review of anatomy and physiology of the female reproductive system, Nursing Assessment-History and physical assessment

Vulvar Disorders: Cysts, tumours Diseases of breasts, nursing management of patient with Burns, reconstructive and cosmetic surgery, nursing management of patient with oncological conditions.

Recommended Books:

1. Brunner (V), Medical Surgical Nursing, LWW, 10th Edition.
2. Black, Medical Surgical Nursing: Clinical Management for positive outcomes, Elsevier, 7th Edition.
3. Willams, Understanding Medical Surgical Nursing, Jaypee, 3rd Edition.
4. Timby, Introductory Medical Surgical Nursing, LWW, 9th Edition.
5. Lewis, Medical Surgical Nursing Assessment & Management of Clinical Problems, Elsevier 7th edition
6. Ignatavicius, Critical Thinking for Collaborative Care, Elsevier, 5th Edition.

CHILD AND MENTAL HEALTH NURSING

Subject Code: CNRAS1-204

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Objectives:

- This course is designed for developing an understanding of the modern approach to child- care, identification, prevention and nursing management of common health problems of neonates and children.

UNIT-I (15 Hrs.)

Introduction Modern concepts of childcare: Internationally accepted rights of the child, National policy and legislations in relation to child health and welfare, National programmes related to child health and welfare, Changing trends in hospital care preventive, promotive and curative aspects of child health, Child morbidity and mortality rates, Difference between adult and child, Hospital environment for a sick child, Impact of hospitalization on child and family, child health nurse in caring for a hospitalized child.

UNIT-II (15 Hrs.)

The healthy child: Principles of growth and development, Factors affecting growth and development, Growth and development from birth to adolescence, The needs of normal children through the stages of development and parental guidance, Nutritional needs of children & infants: Breast feeding, exclusive breast feeding supplementary /artificial feeding and weaning, Baby friendly hospital concept, Value of play and selection of play materials. Nursing care of a normal new-born /essential new-born care, Neonatal resuscitation, nursing management of a low birth baby, Kangaroo mother care, nursing management of common neonatal disorders Organization of neonatal unit

UNIT-III (15 Hrs.)

Introduction: Perspectives of Mental Health and Mental Health Nursing; Evolution of Mental Health Services, treatments and Nursing practices, Prevalence and incidence of mental health problems and disorders, Mental Health Act, Nature and scope of Mental Health nursing, Role and function of Mental Health Nurse in various settings and factors affecting the level of nursing practice.

UNIT-IV (15 Hrs.)

Treatment modalities and therapies used in mental disorders: Psycho Pharmacology, Psychological therapies, nursing management of patients with Schizophrenia, and other psychotic disorders. Nursing management of patients with mood disorders, Nursing management of patients with neurotic, stress related and somatization disorders, Nursing management of patients with substance use disorders, nutritional deficiency disorders, Respiratory disorders and infections Gastro intestinal infections, infestations and congenital disorders, Cardiovascular problems: congenital defects and Rheumatic fever, Rheumatic heart disease, Genitourinary disorders:

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Reference Books:

1. Whaley & Wongs, Nursing Care of Infants & Children, Mosby, Philadelphia.
2. Marlow, Textbook of Paediatric Nursing, Hare court (India) Ltd.
3. Nelson, Textbook of Paediatrics, Hare court India private Ltd.
4. Parthasarathy, IAP Textbook of Paediatrics, Jaypee Brothers Medical Publishers, New Delhi.
5. Hockenberry, Wong's Maternal Child Nursing Care, Mosby.

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**MRSPTU SKILL CERTIFICATE COUSE IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

MIDWIFERY OBSTETRICAL NURSING LAB

Subject Code: CNRAS1-205

L T P C

Duration: 60 Hrs.

0 0 4 2

- Assessment of pregnant women
- Assess woman in labour
- Carry out per- vaginal examinations
- Conduct normal deliveries
- Perform episiotomy and suture it
- Resuscitate new-borns
- Assist with Cesarean Sections
- MTP and other surgical procedures
- Provide nursing care to post-natal mother and baby
- Counsel and teach mother and family for parent hood
- Provide nursing care to new born at risk

**MRSPTU SKILL CERTIFICATE COUSE IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

MEDICAL SURGICAL NURSING LAB

Subject Code: CNRAS1-206

L T P C

Duration: 60 Hrs.

0 0 4 2

- Perform examination of ear, nose and throat
- Assist with diagnostic procedures Assist with therapeutic
- Procedures Instillation of drops
- Perform/ assist with irrigations
- Perform examination of eye
- Assist with diagnostic procedures
- Assist with therapeutic procedures
- Apply eye bandage
- Apply eye drops
- Perform neurological examination
- Use Glasgow coma scale
- Assist with gynaecological examination

**MRSPTU SKILL CERTIFICATE COUSE IN NURSING ASSISTANT
SYLLABUS 2023 BATCH ONWARDS**

CHILD AND MENTAL HEALTH NURSING LAB

Subject Code: CNRAS1-207

L T P C

Duration: 60 Hrs.

0 0 4 2

- Taking Paediatric history
- Physical examination and assessment of children
- Administration of oral, IM, IV medicine/ Fluids
- Calculation of fluid requirements
- Prepare different strengths of IV fluid
- Apply restrains
- Administer O2 inhalation by different methods
- Give baby bath
- Feed children by Katori spoon etc.
- Collect specimens for common investigation
- Assist with common diagnostic procedures
- Teach mothers/parents
- Care of baby in incubator/warmer
- Care of child on ventilator
- Endotracheal suction
- Chest physiotherapy

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



**FACULTY OF PHARMACY
SYLLABUS
FOR
PG DIPLOMA IN PHARMACOVIGILANCE
(1 YEAR PROGRAMME)
2023 BATCH ONWARDS**

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**MRSPTU PG DIPLOMA IN PHARMACOVIGILANCE
SYLLABUS 2023 BATCH ONWARDS**

SCHEME

1 st Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
GPHCS1-101	Outline of Clinical Trials and Clinical Research	3	1	0	40	60	100	4
GPHCS1-102	Pharmacovigilance and clinical data management	3	1	0	40	60	100	4
GPHCS1-103	Basics of pharmacy, drug discovery and development	3	1	0	40	60	100	4
GPHCS1-104	Pharmacokinetics and BA/BE studies	3	1	0	40	60	100	4
GPHCS1-105	Pre-clinical studies	3	0	0	40	60	100	3
GPHCS1-106	Clinical research lab	0	0	2	40	60	100	1
Total		15	4	2	240	360	600	20

2 nd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
GPHCS1-201	Ethical and regulatory considerations	3	0	0	40	60	100	3
GPHCS1-202	Pharmacology and Medical Writing	3	0	0	40	60	100	3
GPHCS1-203	Pharmacology lab	0	0	4	40	60	100	2
GPHCS1-204	Case studies/Technology landscape/ Dissertation/ Apprenticeship or Internship or Training	0	0	24	0	200	200	12
Total		6	0	28	120	380	500	20

FIRST SEMESTER

OUTLINE OF CLINICAL TRIALS AND CLINICAL RESEARCH

Subject Code: GPHCS1-101

**L T P C
3 1 0 4**

Duration: 60 Hrs.

Course Objectives: The target of the course is to make understanding of essential concepts of meaning of clinical trials, clinical research, and clinical terminology. Further to give outline of the documentations in clinical research.

Course Outcomes:

- Appreciate the effect of pharmaceuticals science in clinical use of drugs and new drug development
- Understand the drug development of preclinical phase
- Understand various phases of clinical trials
- Understand the significance of purpose of placebo response and placebo controls in clinical trials

Unit: 1 (10 Hrs)

Clinical Research I: Introduction to clinical research, Conditions for worldwide clinical research, Clinical trial phases, The process of transformation into a positive objective, Obtainable Infrastructure, benefits of India, Landmark Year 2005, Why clinical research is progressively popular in India, International collaboration and future challenges.

Unit: 2 (20 Hrs)

History & Background: Stories behind the ethical research, Tuskegee Syphilis Study (1932-1972), Outcome of Tuskegee Syphilis Study, Belmont Report 1979, Nazi Experiments (1940-1945), Outcome of Nazi Experiments, Nuremberg Code (1947), Sulfanilamide Disaster (1937), Willowbrook study (1956), Thalidomide Disaster (1962), Outcome of Thalidomide Disaster, Ethics.

Good clinical practice (ICH GCP E6), Clinical trial materials (Documentation, Investigational drugs, logistical materials)

Unit: 3 (15 Hrs)

Introduction to ICH, ICH-GCP Guideline & its advancement : ICH definition, need to harmonize Structure of ICH, Different parties of ICH, Various ICH Guidelines, GCP, ICH-GCP (E6) Guidelines, The Principles of ICH-GCP Investigator Sponsor, Clinical Trial Protocol & Protocol Amendment(s), Investigator's Brochure, Essential Documents to Conduct a Clinical Trial, Integrated Addendum to ICH-GCP E6(R2) Indian GCP Structure & Contents, GCP implementation

Unit: 4 (15 Hrs)

Clinical drug development phases

Investigational new drug development

Abbreviated New Drug Development

Hatch Waxman Act- application for drug development

Phase 0 studies

Phase I and subtype studies (single ascending, multiple ascending, dose escalation, methods, food effect studies, drug – drug interaction, PK end points)

Phase II studies (proof of concept or principle studies to establish efficacy)

Phase III studies (Multi ethnicity, multinational, registration studies)

Phase IV studies (Post marketing authorization studies; pits and practices?) 30 Bridging studies and pilot studies Requirements in clinical research

**MRSPTU PG DIPLOMA IN PHARMACOVIGILANCE
SYLLABUS 2023 BATCH ONWARDS**

Recommended books

1. Handbook of clinical research. Julia Lloyd and Ann Raven Ed. Churchill Livingstone c.
2. Principles of Clinical Research edited by Giovanna di Ignazio, Di Giovanna and Haynes.

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**MRSPTU PG DIPLOMA IN PHARMACOVIGILANCE
SYLLABUS 2023 BATCH ONWARDS**

PHARMACOVIGILANCE AND CLINICAL DATA MANAGEMENT

Subject Code: GPHCS1-102

**L T P C
3 1 0 4**

Duration: 60 Hrs.

Course objective: To enrich the understanding of clinical data management procedure in clinical research which sponsor, CRO and Hospital use for clinical trials. To know the latest technology of clinical data management used in clinical trials

Course outcome:

- Describe the procedures for clinical trial data collection and data management to ensure optimal quality data and outline the various quality management issues in clinical trials.
- Outline the various data management issues in clinical trials
- Discuss the evaluation and interpretation of clinical trials results

Unit-I (15hrs)

Introduction to Pharmacovigilance and safety monitoring

- a. Scope, definition and aims of Pharmacovigilance
- b. Adverse drug reactions - Classification, mechanism, predisposing factors, causality assessment [different scales used]
- c. Reporting, evaluation, monitoring, preventing & management of ADRs
- d. Global and Indian Pharmacovigilance System

Post-Marketing Methodologies in Pharmacovigilance Sources and Documentation of Individual Case Safety Reports (ICSRs) Medical dictionary (MedDRA) and Medical aspects in Pharmacovigilance Medical Information System Special cases in Pharmacovigilance Standard operating procedures in Pharmacovigilance

Unit-II (15hrs)

Safety Monitoring in Clinical Trials: Pharmacovigilance Database and Signal Detection Tools Risk –benefit assessment and management in Pharmacovigilance Compliance monitoring and Pharmacovigilance inspections Ethics Committee – Schedule Y

Pharmacovigilance communications

Case triage Case entry Case processing

Global regulatory requirements and guidelines in Pharmacovigilance

Regulatory submissions (E2b, MHRA, FDA) Periodic Safety Update Reports (PSUR,s) For Marketed Drugs (ICH E2C) Schedule Y - ICMR

Unit-III (15hrs)

Introduction to CDM, Computer system validation (CSV), Clinical Data Management flow, Data Management team, Roles and responsibilities of key team members and sponsor, SOPs of data management, review and authorization. CRF design, Procedure for CRF design, elements of CRF, data points to be captured in individual CRFs. Database design and build, Introduction to data base design and build, data base design, data base validation. Clinical data entry process, Data entry screen validation, data entry process, symbols, data entering. Electronic clinical trials, advancement in drug discovery, CTRI, clinical trial for biological products and medical devices
Quality control of clinical data, Terminology and definitions, quality control process, data errors and quality measurement, responsibilities, operational QC, data management matrix

Unit-IV (15hrs)

Electronic data and lab data loading, electronic data interchange-Architecture for EDI, Advantages of using EDI, barriers to implementation, positives and negatives, Lab data loading Roles and responsibilities of lab loader technician, helpdesk, study coordinator, loading lab data, electronic/lab file contents, typical problems, lab data findings, Quality Assurance, SOPs for processing lab data, taking lab data seriously. Database lock and data transfer, Introduction to data base lock, minimum standards, procedure, errors found after database closure, freezing the data base, best practices, recommended Standard Operating Procedures. Introduction to data transfer, procedure, best practices.

Recommended books

1. Handbook of Research on Information Technology Management and Clinical Data Administration in Healthcare Hardcover – Import, 15 June 2009 by Ashish N. Dwivedi (Editor)
2. Clinical Data Management edited by R K Rondels, S A Varley, C F Webbs. Second Edition, Jan 2000, Wiley Publications
3. Elementary Statistical Quality Control, Volume 25, Burr, I. W. (1979), New York: Marcel Dekker, Inc.
4. Handbook for good clinical research practice WHO Library Catalogue.
5. Fundamentals of Clinical Research: Bridging Medicine, Statistics and Operations, Antonella Bacchieri and Giovanni Della Cioppa, Springer.

**MRSPTU PG DIPLOMA IN PHARMACOVIGILANCE
SYLLABUS 2023 BATCH ONWARDS**

BASICS OF PHARMACY, DRUG DISCOVERY AND DEVELOPMENT

Subject Code: GPHCS1-103

**L T P C
3 1 0 4**

Duration: 60 Hrs.

Course objectives: To enrich the understanding of pharmacology, drug discovery procedure in clinical research which sponsor, CRO and Hospital use for patient protection. To know the importance of drug discovery in clinical trials

Course outcome:

- Demonstrate an awareness of the current approaches to global drug discovery and their advantages and limitations.
- Demonstrate an understanding of the steps involved in the drug discovery and design process
- Demonstrate an awareness of the important contributions the different discipline areas make to the drug discovery and development process.
- Demonstrate the ability to use evidence-based approaches to guide decision making during the drug discovery and development process.

Unit-I (15 hrs)

History of Pharmacy, Indian Pharmaceutical industry, Drugs-sources, nomenclature, classification, Pharmacopoeias, Formulary, Codex. Branches of Pharmacy: Pharmacognosy, Pharmaceutical chemistry, Quality Assurance, Pharmaceutics, Pharmacology, Pharmacy Management and Pharmacy Practice. Pharmaceutical Manufacturing-Quality Assurance and Quality Control.

Unit-II (15 hrs)

Drug Regulatory Environment-Pharmaceutical Legislation in India, Drug regulatory authorities, International Conference on Harmonization, Good Practices and Quality Management, Drug Master File.

Unit-III (15 hrs)

Drug Discovery & Development. History of drug development, Drug Discovery Pipeline, Drug Discovery Process. Approaches to Drug Discovery: Synthetic/medicinal chemistry, combinatorial synthesis, Natural Product, In Silicon approach or CADD, QSAR, Discovery Genomics.

Unit-IV (15 hrs)

Personalized medicines, High throughput screening. Manufacturing and packaging Manufacturing-Multitasking machines Packaging-cGMP, USP requirements on containers and closures, Quality Control, Inhalation drug products, drug products for injection, drug products for ophthalmic, liquid based oral and topical drug products, post approval packaging changes.

PHARMACOKINETICS AND BA/BE STUDIES

Subject Code: GPHCS1-104

**L T P C
3 1 0 4**

Duration: 60 Hrs.

Course objective: This course is designed to impart fundamental knowledge on bioavailability

Course outcome:

- Define bioavailability and discuss various method of bioavailability enhancement.
- Acquired knowledge about bioequivalence study.

Unit: 1 (15 Hrs)

Bioavailability/Bioequivalence Studies: Basic Definitions, Requirements of Bioavailability and Bioequivalence study, Study Design, Bio statistical procedure, Bio-analytical method and Method validation, submission of study to the regulatory, Bioequivalence and Pharmacokinetics.

Unit: 2 (15 Hrs)

Guidelines of Bioavailability (BA)/Bioequivalence (BE) Studies: USFDA Guideline- Introduction, Background, Methods to document BA and BE, Comparison of BA measures in BE studies, Documentation of BA and BE, Special topics, General pharmacokinetic study design and data handling. Overview of International BABE Guidelines: Therapeutic Goods Administration (TGA) guideline, Therapeutic Product Directorate (TPD) guideline, European Agency for Evaluation of medicinal Products (EMA) guideline.

Unit: 3 (15 Hrs)

Conduct of Bioequivalence Study: Role of different departments involve in bioequivalence study (Business development, Screening department, Clinical department, Bio-analytical department etc), life span of bioavailability and bioequivalence study (BABE study), day to day activity during the study

Unit: 4 (15 Hrs)

Operations in BABE: Role of medical writing in BA/BE studies, role of quality assurance and quality control in BA/BE studies, waiver of BA/BE studies, role of project management and business development in BA/BE studies, Form 44.

Recommended books

1. Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi.
2. Biopharmaceutics and Pharmacokinetics; By Robert F Notari
3. Applied biopharmaceutics and pharmacokinetics, Leon Shargel and Andrew B.C.YU 4th edition, Prentice-Hall International edition, USA
4. Bio pharmaceutics and Pharmacokinetics-A Treatise, By D. M. Brahmankar and Sunil B. Jaiswal, Vallabh Prakashan Pitampura, Delhi
5. Pharmacokinetics: By Milo Gibaldi Donald, R. Mercel Dekker Inc. 6. Hand Book of Clinical Pharmacokinetics, By Milo Gibaldi and Laurie Prescott by ADIS Health Science Press

**MRSPTU PG DIPLOMA IN PHARMACOVIGILANCE
SYLLABUS 2023 BATCH ONWARDS**

PRE-CLINICAL STUDIES

Subject Code: GPHCS1-105

**L T P C
3 0 0 3**

Duration: 45 Hrs.

Course objective: To enrich the understanding of pre-clinical drug discovery procedure in clinical research and to know the importance of Preclinical studies and various procedure used in clinical trials

Course outcome:

- Explain the regulatory requirements for conducting clinical trial
- Describe in detail about various types of clinical trial designs
- Explain the responsibilities of key players involved in clinical trials
- Describe the documentational requirements for Clinical trials

Unit-I (15hrs)

Experimental animals used, Equipments used in ATC, Sterilization techniques, media for animal cell culture. Cell culture and cell lines, concepts in mammalian and non-mammalian culture, applications of cell culture, Assessment of preclinical data, assessment of cost benefit and risk ratio.

Unit-II (10hrs)

History of toxicity, relationship between dose and toxicity, types of toxicity, factors influencing toxicity, toxins, toxicity studies, special toxicity studies, in vitro models, in situ methods, in vivo models

Unit-III (10hrs)

Good Laboratory Practices, ICMR-GLP guidelines, FDA-GLP guidelines, Organization and personnel, facilities, equipment, testing facilities operation, test and control studies, protocol for and conduct of a non-clinical laboratory study, records and reports, disqualification of testing facilities, OECD-GLP guidelines, quality assurance program, facilities, test systems, test and reference items, Standard Operating Procedures, Performance of the study, reporting of study results, storage and retention of records and materials.

Unit-IV (10hrs)

Drug action, mechanism of drug action, dose-response relationship, therapeutic index, undesirable effects, disease modeling—hypertension, asthma, acidity, arthritis, cancer, addiction, autoimmune diseases, pain, epilepsy, inflammation.

**MRSPTU PG DIPLOMA IN PHARMACOVIGILANCE
SYLLABUS 2023 BATCH ONWARDS**

CLINICAL RESEARCH LAB

Subject Code: GPHCS1-106

**L T P C
0 0 2 1**

Duration: 30 Hrs.

Course objective: Accomplish more noteworthy harmonization overall for the turn of events and endorsement of safe, successful, and excellent medicine in the most asset proficient way

Course outcome:

- Distinguish the basic components of informed Consent and methodologies for executing informed consent for clinical exploration
 - Describe the various types of clinical studies and the method used to appropriate design.
 - Discuss the collections, evaluation, and reporting of adverse event data in clinical trial.
1. **To prepare and submit Informed Consent Process (ICF) for the following population**
 - Geriatric Patients
 - Paediatric patients
 - Psychiatric patients
 - Unconscious patients
 2. **To prepare and submit dummy patient information sheet (PIS) for the below mentioned population**
 - Geriatric Patients
 - Paediatric patients
 - Psychiatric patients
 - Unconscious patients
 3. To prepare and submit the standard operating procedures (SOP) for procurement and storage filing of Investigational product (IP)
 4. To prepare and submit e-CRF (Electronic Case Report Form) for dummy clinical data

Recommended book

1. John G. Brock-Utne, Clinical Research: Case Studies of Successes and Failures, Publisher; Springer
2. Duolao Wang and Ameet Bakhai, Clinical Trials: A Practical Guide to Design, Analysis, and Reporting, Publisher; Remedica
3. Stephen P. Glasser, Essentials of Clinical Research, Publisher; Springer
4. Deborah Rosenbaum and Michelle Dresser, Clinical Research Coordinator Handbook, Publisher; Interpharm/CRC
5. Evan DeRenzo and Joel Moss, Writing Clinical Research Protocols: Ethical Considerations, Publisher; Elsevier
6. Guidelines: ICH, USFDA, Drugs and Cosmetics Act, EMA

SECOND SEMESTER

**MRSPTU PG DIPLOMA IN PHARMACOVIGILANCE
SYLLABUS 2023 BATCH ONWARDS**

ETHICAL AND REGULATORY CONSIDERATIONS

Subject Code: GPHCS1-201

**L T P C
3 0 0 3**

Duration: 45 Hrs.

Course objectives: The objective of the course is to understand the ethics of clinical trials, evolution of regulatory control, regulatory aspects, regulatory guidelines in clinical research.

Course outcome:

- Use a methodical structure for assessing the morals of a clinical exploration convention
- Identify, define and consider ethical issues in the conduct of human subject research.
- Apply proper codes, guidelines, and different records administering the moral lead of human subject exploration to their own examination
- Investigate the ethical requirement of fair subject determination and its application

Unit: 1 (20 Hrs)

Evolution of Regulatory Control: European Medicines Agency (EMA) Vaccine Act, Biological Control Act, Pure food drugs act, Food and Drug Administration (FDA), Kefauver Harris amendments act, Waxman Hatch act, Code of federal regulations, Prescription Drug User Fee Amendments (PDUFA) International Council for Harmonisation (ICH)

Declaration of Helsinki: Introduction to World Medical Association & Declaration to Helsinki (DOH) History of development of ethical principles for medical research involving human subject's General principles of DOH, Risks, Burdens and Benefits, Vulnerable Groups and Individuals, Scientific Requirements and Research Protocols

Unit: 2 (10 Hrs)

Regulatory Aspects of Different Regions Investigational New Drug (IND), New Drug Application (NDA), Abbreviated New Drug Application (ANDA), Paper NDA Market authorization holders (MAH), its procedures Regulation of medical devices Regulation of vaccines Safety Report filing Regulation of Complementary Medicine Regulation of non-prescription drugs

Unit: 3 (15 Hrs)

Ethics in Clinical Research Evolution of ethics in clinical research: Thalidomide disaster, Tuskegee experiment, Nuremberg Code, Declaration of Helsinki, Belmont report Establishment of Council for International Organizations of Medical Sciences (CIOMS), National Institutes of Health (NIH) and Indian Council of Medical Research (ICMR) guidelines Compensation to subjects/patients for clinical trial related injuries.

PHARMACOLOGY AND MEDICAL WRITING

Subject Code: GPHCS1-202

L T P C

Duration: 45 Hrs.

3 0 0 3

Course objective: This subject will give a potential chance to understand about the drug with regard to classification, adverse effects, uses, dose, route of administration, precautions, contraindications and interaction with other drugs. In this subject, aside from general pharmacology, drugs acting on autonomic nervous system, central nervous system, cardiovascular system, blood and blood forming agents and renal system will be taught.

Course outcome:

- Upon completion of the subject student shall be able to (Know, do, appreciate) Comprehend the pharmacological aspects of drugs falling under the above-mentioned sections
- Handle and carry out the animal experiments
- Appreciate the importance of pharmacology subject.

Unit: 1 (10 Hrs)

General Pharmacology and mechanism of drugs action

- a) Introduction, definitions and scope of pharmacology
- b) Routes of administration of drugs
- c) Pharmacokinetics (absorption, distribution, metabolism and excretion)
- d) Pharmacodynamics
- e) Factors modifying drug effects

Pharmacology of drugs acting on ANS

- a) Adrenergic and antiadrenergic drugs
- b) Cholinergic and anticholinergic drugs
- c) Neuromuscular blockers
- d) Mydriatics and miotics
- e) Drugs used in myasthenia gravis
- f) Drugs used in Parkinsonism

Unit: 2 (15 Hrs)

Pharmacology of drugs acting on cardiovascular system

- a) Anti-hypertensives
- b) Anti-anginal drugs
- c) Anti-arrhythmic drugs
- d) Drugs used for therapy of Congestive Heart Failure
- e) Drugs used for hyperlipidemias

Pharmacology of drugs acting on Central Nervous System

- a) General and local anesthetics
- b) Sedatives and hypnotics
- c) Anticonvulsants
- d) Analgesic and anti-inflammatory agents
- e) Psychotropic drugs

Unit: 3 (10 Hrs)

Pharmacology of Drugs acting on Respiratory tract

- a) Bronchodilators
- b) Mucolytics
- c) Expectorants
- d) Antitussives
- e) Nasal Decongestants

Pharmacology of Hormones and Hormone antagonists

- a) Thyroid and Anti-thyroid drugs
- b) Insulin, Insulin analogues and oral hypoglycemic agents
- c) Sex hormones and oral contraceptives

Chemotherapy of microbial diseases

- a) Anti- tubercular agents, Antifungal agents, antiviral drugs, anti-leprotic drugs.
- b) Chemotherapy of protozoal diseases, Anthelmintic drugs.
- c) Chemotherapy of cancer.

Unit: 4 (10 Hrs)

1. **Introduction of medical writing:** Understand the term medical writing, different types of medical writing, qualities required in medical writing
2. **Writing process:** Steps in the writing process: prewriting strategies, drafting, revising and refining
3. **Researching for the content:** Internet research, journals and medical databases
4. **Copyrights and plagiarism:** Copyrights and plagiarism
5. **Basic rules of writing:** The fundamental components of writing, the fundamentals of grammar, and general principles of writing.
6. **Scientific writing:** Scientific reviews, writing research papers for journals, case reports and drug monographs
7. **Regulatory writing:** Medical writing in clinical research, study designs, ICH, GCP, Roles of IRB/IEC, The role of investigators and Pharmacovigilance

**MRSPTU PG DIPLOMA IN PHARMACOVIGILANCE
SYLLABUS 2023 BATCH ONWARDS**

PHARMACOLOGY LAB

Subject Code: GPHCS1-203

**L T P C
0 0 4 2**

Duration: 60 Hrs.

Course objective: At the end of the course the students will be equipped with the basics knowledge about, Medicine which would lay the foundation for their courses in the next semester.

Course outcome:

- Knowledge: defining, listing and recognizing the drugs.
- Understanding, characterizing, explaining, identifying and locating the various drugs that are useful in treatment and management of diseases.
- Performing, demonstrating, implementing and applying the concept of basic pharmacology which help in appropriate diagnosis and treatment of systematic diseases.
- Analyzing, categorizing, comparing and differentiating type of drugs.

List of Practical's:

1. Practical based on General Pharmacology
 - a. Mechanisms or drug action
 - b. Dose–response relationship
 - c. Pharmacokinetics of drug absorption, distribution, biotransformation, excretion and toxicity, Factors influencing drug metabolism of drug action

2. Study of different doses forms.
 - a. Introduction to Drug Doses
 - b. Introduction to Routes
 - c. Calculation of Drug Dose

3. Experimental and Clinical Pharmacology Practical
 - a. Animal Care, and Sex Determination
 - b. Animal Handling

**MRSPTU PG DIPLOMA IN PHARMACOVIGILANCE
SYLLABUS 2023 BATCH ONWARDS**

**CASE STUDIES/TECHNOLOGY LANDSCAPE/ DISSERTATION/ APPRENTICESHIP
OR INTERNSHIP OR TRAINING**

Subject Code: GPHCS1-204

**L T P C
0 0 24 12**

Course objective: This will solidify students' knowledge in training and helps them improve skills in lacking areas. Projects generate a real-life situation that truly reflect the actual needs of the professional environment. The projects are designed and planned to meet the professional needs related to problem solving, strategic planning, simulating research environments, data acquisition, collation, statistical analysis and reporting/presentation

Course outcome:

- Case studies/training is an observational procedure in which a person is able to learn practically from their theoretical knowledge.
- This would provide practical knowledge to the student

Contents

The student shall write a case study or Dissertation or submit a Project Work on any area/topic pertaining to Pharmacovigilance and clinical research. The research proposals submitted by the students shall be examined by a committee of teachers teaching the course. The committee shall work under the Chairmanship of the Course Coordinator, who shall also allot a supervisor to each student or a group of students to carry his project work. The topic may include:

1. Case Studies: a. Adverse Drug Reaction Reporting: Analyzing the impact of different reporting systems on pharmacovigilance practices. b. Drug Safety Monitoring: Investigating the role of pharmacovigilance in detecting and managing safety concerns in clinical trials. c. Signal Detection and Risk Assessment: Examining case studies to identify emerging safety signals and assessing their potential risks. d. Real-world Evidence in Pharmacovigilance: Analyzing the use of real-world data to enhance drug safety surveillance and post-marketing studies.
2. Technology Landscape: a. Digital Health Technologies in Clinical Research: Exploring the use of wearables, mobile apps, and electronic health records in data collection and monitoring patient safety. b. Artificial Intelligence in Pharmacovigilance: Assessing the applications of AI, natural language processing, and machine learning algorithms in adverse event detection and signal management. c. Blockchain in Drug Safety: Investigating the potential benefits of blockchain technology in enhancing data integrity, traceability, and transparency in pharmacovigilance processes.
3. Dissertation Topics: a. Impact of Regulatory Changes on Pharmacovigilance Practices: Analyzing the implications of evolving regulatory requirements on drug safety surveillance and reporting. b. Comparative Analysis of Pharmacovigilance Systems: Evaluating the strengths and weaknesses of different pharmacovigilance systems across various countries or regions. c. Patient Engagement in Pharmacovigilance: Investigating strategies to improve patient involvement in adverse event reporting and enhancing medication safety. d. Pharmacovigilance in Precision Medicine: Exploring the challenges and opportunities of pharmacovigilance in personalized medicine approaches.
4. Apprenticeship/Internship/Training: a. Contact pharmaceutical companies, clinical research organizations (CROs), or regulatory agencies to inquire about apprenticeship or internship

**MRSPTU PG DIPLOMA IN PHARMACOVIGILANCE
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opportunities in pharmacovigilance and clinical research. b. Look for training programs or courses offered by renowned institutions or organizations specialized in pharmacovigilance and clinical research, such as the Drug Information Association (DIA) or Society for Clinical Research Sites (SCRS).

MRSPTU



**CENTRAL
UNIVERSITY OF
PUNJAB &
MAHARAJA RANJIT
SINGH PUNJAB
TECHNICAL
UNIVERSITY,
BATHINDA**

**Post-Graduate
Diploma
in
Intellectual
Property Rights**

ABOUT THE PROGRAMME:

Intellectual Property Rights (IPR) has gained importance in interdisciplinary domains as one of the most important specializations in educational context to strengthen the horizons of any professional in this competitive field. Particularly in the recent era, this branch has been at the intersection of education, industry, business and commercialization. With the advent of latest technologies like artificial intelligence, Internet of Things, reinventing the traditional knowledge and multidisciplinary involvement of various sectors, it has become essential to get acquainted with various laws and policies that control the landmark changes in different disciplines. Post Covid- also, the urge for IPR based commercialization has been increased and IPR has been a connecting link between all stakeholders involving students, scientists, researchers, industrialists, entrepreneurs etc. Hence the career perspective of various skilled individuals can be strengthened with this kind of specialized programme in IPR, offered by two premier institutes of the region i.e. Central University of Punjab and Maharaja Ranjit Singh Punjab Technical University, Bathinda.

ABOUT THE INSTITUTIONS:

Central University of Punjab, Bathinda

The Central University of Punjab was established in 2009 by an Act of Parliament. The University is accredited with 'A+' grade by NAAC in the second cycle of Accreditation in 2023. It has secured 81st, 85th, 87th and 95th rank in NIRF in the years 2022, 2021, 2020 and 2019 respectively in the University category. It was ranked 26th in the Pharmacy category of NIRF in 2022. The university has a mission to provide a wide range of instructional and research facilities across disciplines, promote innovation in teaching and research, and cross-pollinate new ideas, technologies and worldview. It has 31 departments and 11 schools in Sciences, Technology, Education, Humanities, Social Sciences and Law disciplines along with 4 Centres & 3 Chairs (Sri Guru Gobind Singh Chair, Satguru Baba Ram Singh Chair & Baba Saheb B. R. Ambedkar Chair. It offers 44 PG and 29 PhD programmes, besides four certificate and two diploma courses in these disciplines. Despite the locational disadvantage, the University in a true sense is a multi-cultural mini India as it has students from 29 states, faculty from 25 states and non-teaching staff from 12 states. The University has been a forerunner in terms of research projects and publications amongst the newly established Central Universities which is evident from the Faculty to Projects and Faculty to Publications Ratio.

Maharaja Ramjit Singh Punjab Technical University, Bathinda

MRSPTU is an affiliating Technical University, established by Govt. of Punjab vide Punjab Act No. 5 of 2015 notified through Punjab Government Gazette-Extraordinary (Regd. No.

CHD/0092/2015-2017) notification No. 5- Leg./2015 dated 12th February 2015 and registered u/s 2(f) and approved u/s 12B by UGC. With spontaneous upswing in demand for quality Technical Education, the University was established to mitigate regional imbalance in distribution of temples of quality technical education in the State, for exponential socio-economic growth of the Malwa region, to bridge the gap between demand and supply of employable technical human resource. The University presently caters 51 affiliated and 5 constituted college located in Barnala, Bathinda, Faridkot, Fatehgarh Sahib, Fazilka, Ferozepur, Mansa, Moga, Patiala, Sangrur and Sri Muktsar Sahib districts. The objectives of MRSPTU are to provide, upgrade and promote quality technical education, training and research, to create strong innovation ecosystem and a conducive environment for the pursuit of outcome driven industry-academia interaction. The University is accredited by NAAC and featured among Beginner band in ARIIA ranking and is also a member of the Association of India Universities. With students from 23 states, it presently offers >70 academic programmes at UG, PG and Doctoral level with implementation of CBCS and OBE practices. MRSPTU is frontrunner in providing consultancy in various areas and leading the research linked with regional and societal issues. With spontaneous upswing in demand for quality Technical Education, the University was established to mitigate regional imbalance in distribution of temples of quality technical education in the State, for exponential socio-economic growth of the Malwa region, to bridge the gap between demand and supply of employable technical human resource. The University presently caters affiliated and 5 constituted college located in Punjab. The objectives of MRSPTU are to provide, upgrade and promote quality technical education, training and research, to create strong innovation ecosystem and a conducive environment for the pursuit of outcome driven industry-academia interaction. The University is accredited by NAAC and featured among Beginner band in ARIIA ranking and is also a member of the Association of India Universities. With students from 23 states, it presently offers >70 academic programmes at UG, PG and Doctoral level with implementation of CBCS and OBE practices. MRSPTU is frontrunner in providing consultancy in various areas and leading the research linked with regional and societal issues.

PROGRAMME OUTCOMES:

1. Understanding the concept and types of IPRs.
2. Getting knowledge of procedures and legal provisions associated with different types of IPRs.
3. Gaining awareness about the legal framework for IPR protection at national and international level.
4. Recognizing the value of IPRs as a strategy for commercial advantages and its protection.
5. Developing a knowledge base in relation to IPR to add value in the career profile.

6. Developing skilled individuals with knowledge of IPR through multidisciplinary interaction.

OTHER DETAILS:

Programme Level and Duration: One Year [Two Semester] Diploma

Eligibility: Undergraduate in any discipline.

Mode of Operation: Jointly by CUPB and MRSPTU faculty members

Dissertation/Project work under joint supervision of faculties from both institutions.

Fees sharing: 50:50

Admission: By CUPB

Programme coordinators are to be appointed from both universities to ensure the smooth execution of the programme.

Award of Diploma: To be awarded jointly at CUPB

Total No. of Seats: 15

Programme Fee: Decided by Fee Committee of CUPB and MRSPTU

PG Diploma in Intellectual Property Rights (1 year) Scheme

SEMESTER 1st		Contact Hrs./wk			Credits
Subject Code	Subject Name	L	T	P	
PGDIP 101	Introduction to Intellectual Property Rights	3	1	0	4
PGDIP 102	Patent Law	3	1	0	4
PGDIP 103	Industrial, Layout Design Law, and Trademark Law	3	1	0	4
PGDIP 104	Law of Copyright and Allied Rights	3	1	0	4
PGDIP 105	Protection of Traditional Knowledge, Plant Varieties, Geographical Indications	3	0	0	3
PGDIP 106	Intellectual Property Rights Practical I	0	0	2	1
	TOTAL	15	5	0	20

SEMESTER 2nd		Contact Hrs./wk			Credits
Subject Code	Subject Name	L	T	P	
PGDIP 201	Trade Secrets and Competition Law	3	0	0	3
PGDIP 202	Management of IPRs, Technology Transfer/licensing	3	0	0	3
PGDIP 203	Intellectual Property Rights Practical II	0	0	4	2
PGDIP 204	Case studies/Technology landscape/ Dissertation/Empirical Research/ Apprenticeship or Internship or Training in any one of the following: Patent Information centers, Patent Facilitation center, Law firms, IPR cell in academic institute or industry, Technology transfer office/Incubation Centre or any other institution/organization	0	0	24	12
	TOTAL	6	0	28	20

PG Diploma in Intellectual Property Rights (One Year) Syllabus

SEMESTER 1

Introduction to Intellectual Property Rights

Subject code:	L T P C	Contact hrs. 60
PGDIP 101	3 1 0 4	

Course objectives: The course is designed to provide comprehensive knowledge to the students regarding the general principles of IPR, concept and theories: national and international, and emerging issues

Course Learning Outcomes [CLOs]: Students will be able to:

- Understand the importance of intellectual property rights
- Compare various national and international IPR regime
- Learn challenges in IPR

Unit 1: General Introduction to Intellectual Property Rights **15hrs [CLO 1]**

- Theories on concept of Property i.e. Public vs. Private, Tangible vs. Intangible,
- Origin and Development of Intellectual Property Rights
- Meaning, Nature, Need and Forms of Intellectual Property Rights

Unit 2: International IPR regime **15hrs [CLO 2]**

- The WIPO Convention, 1967
- The TRIPS Agreement, 1994
- World Intellectual Property Organization (WIPO): Functions and Membership
- GATT Agreement 1947

Unit 3: National Dimension of IPR **15hrs [CLO 2]**

- Overview of Major Intellectual Property Rights Laws in India
- Authorities: Department for Promotion of Industry and Internal Trade,
- Office of Controller General of Patents, Designs and Trademarks
- National IPR Policy 2016
- Scheme For "Building Awareness on Intellectual Property Rights (IPR)" For Micro, Small And Medium Enterprises (MSMEs) under National Manufacturing Competitiveness Program (NMCP)

Unit 4: Emerging Issues in IPR **15hrs [CLO 3]**

- Human rights

- Challenges to implementation of IPR in India
- Criticisms of intellectual property rights

Suggested books

- W. R. Cornish, Intellectual Property: Patents, Copyright, Trade Marks and Allied Rights (Sweet & Maxwell, 2003)
- V.K.Ahuja, Intellectual Property Rights in India (Lexis Nexis, Butterworths, Wadhwa, Nagpur, 2017)
- S.K. Verma, Intellectual Property Rights: A Global Vision (ILI, New Delhi, 2004)
- N.S. Gopalakrishnan and T.G. Ajitha, Principles of Intellectual Property, (Eastern Book Company, 2nd edn., 2014)

Patent Law		
Subject code:	L T P C	Contact hrs. 60
PGDIP 102	3 1 0 4	

Course objectives: The course is designed to provide comprehensive knowledge to the students regarding Indian position of the Patent Law (1970), Historical development, Procedure for granting a patent and infringement.

Course Learning Outcomes [CLOs]: Students will be able to

- Learn the Patents Act and patent rights
- Understand the procedure to obtain IPRs and learn the functioning of patent office
- Learn about the patent infringement and its remedies

Unit 1: Patents Act **10hrs [CLO 1]**

- Patents Act 1970, amendments and its applicable rules
- Patentable subject matter, Patentability criteria, non-patentable inventions

Unit 2: Patent rights **20hrs [CLO 1]**

- Rights and obligations of patentee
- Procedure for granting a patent and obtaining patents
- Grounds for opposition
- Working of Patents, Compulsory License
- Acquisition, Surrender, Revocation, restoration
- Transfer of patent rights

Unit 3: Office of the Controller of Patent **10hrs [CLO 2]**

- Powers of Controller of Patents
- Register of patent

- Patent agent and his powers
- Provisions and conditions for Compulsory License

Unit 4: Infringement and Enforcement

20hrs [CLO 3]

- Jurisdiction
- Infringement proceedings
- Criteria of infringement: direct, contributory, and induced
- Modes of infringement (doctrine of colourable variation) - onus of proof
- Official machinery, controller, powers and functions
- Defenses of infringement
- Remedies for infringement and passing off: Civil remedies and criminal remedies

Suggested books

- Intellectual Property law in India by Justice P.S. Narayana
- An Introduction to Intellectual Property Rights by J.P.Mishra
- Law of Intellectual Property rights by Dr. S.R. Myneni
- An Introduction to Cyber Laws by Dr. J.P.Mishra

Law of Industrial Designs and Trademark Law

Subject code:	L T P C	Contact hrs. 60
PGDIP 103	3 1 0 4	

Course objectives: This course provides students with a comprehensive understanding of intellectual property protection through trademarks and industrial designs. Exploring national and international trade agreements, students grasp their significance in safeguarding rights. They gain insights into trademark and industrial design frameworks, laws, registration procedures, and enforcement mechanisms, enhancing their ability to navigate intellectual property law effectively.

Course Learning Outcomes [CLOs]: Students will be able to

- Understand the historical development and fundamental concepts of trademarks, including their nature, kinds, and significance in commerce.
- Acquire knowledge about national and international legal frameworks.
- Analyze the legal provisions and procedures related to trademarks and industrial designs, evaluate the implications of trademark infringement and explore various remedies available under the law for enforcement and protection.
- Apply the learned concepts to real-world scenarios, fostering a deeper understanding of intellectual property protection in commercial contexts.

Unit 1: Fundamentals of Intellectual Property (IP) Law (12 hours) [CLO 1]

- Historical development of trademark and industrial design concepts
- Introduction to IP laws, both national and international
- Meaning, nature, and types of trademarks and industrial designs
- Objectives, definitions, and concepts of trademarks and industrial designs
- False trade descriptions and their implications
- Overview of protection mechanisms for trademarks and industrial designs
- Understanding the overlap between trademarks and industrial designs

Unit 2: International Framework for IP Protection (12 hours) [CLO 2]

- Overview of International Trademark Regimes
- The role and influence of key international agreements and conventions:
 - Paris Convention 1883
 - Madrid Agreement 1891
 - Nice Agreement 1957
 - Vienna Agreement 1973
- Comparative analysis of international IP frameworks for trademarks and industrial designs

Unit 3: National Legal Framework: Trademarks Act, 1999 (12 hours) [CLO 2]

- Understanding the structure and function of the Registrar of Trademarks
- Statutory authorities governing trademarks and industrial designs in India
- Selection criteria for trademarks and industrial designs
- Registration procedures for trademarks and industrial designs
- Effects of registration, assignment, and transmission of trademark rights
- Grounds for refusal of registration: Absolute and relative grounds

Unit 4: Enforcement and Protection Mechanisms (12 hours) [CLO 3]

- Duration, removal, and restoration of trademark and industrial design rights
- Examination of registered and unregistered trademark and design rights
- Infringement of trademark and design rights
- Available remedies for trademark and design infringements
- Case studies and practical applications of enforcement mechanisms

Unit 5: Application and Practice (12 hours) [CLO 4]

- Practical application of trademark and industrial design laws
- Analysis of real-world cases and scenarios
- Interactive sessions and workshops for deeper understanding
- Discussion on suggested books and additional reading materials for further exploration
- Q&A sessions and review of key concepts

Suggested book

- The Designs Act, 2000
- The Semiconductor Integrated Circuits Layout-Design Act, 2000.
- S. Venkataraman, Understanding Design Law (Universal Law Publishing Co. Pvt. Ltd, New Delhi, 2008).
- Trade Marks Act, 1999
- Bansal, Law of Trade Marks in India with introduction to Intellectual Property Laws (Institute of Constitutional and Parliamentary Studies, New Delhi, 2009)
- D.P. Mittal, Trade Marks, Passing Off & Geographical Indications of Goods: Law and Procedure (Taxmann Allied Services, New Delhi, 2002)
- K.C. Kailasam, R.Vedaraman, Law of Trade Marks Including International Registration under Madrid Protocol & Geographical Indications (Wadhwa& Co., Nagpur, 2017)

Law of Copyright and Allied Rights

Subject code:	L T P C	Contact hrs. 60
PGDIP 104	3 1 0 4	

Course objectives: The course is designed to acquaint the students with basic terminology of Copyright and protection of the rights related to it and penalties for its violations

Course Learning Outcomes [CLOs]: Students will be able to

- Learn various treaties associated with copyright
- Understand the fundamental of copyrights
- Learn the process of licensing a copyright
- Understand the ownership, judiciary, infringement of copyright and its remedies

Unit 1: Introduction to concept of Copyright

15hrs [CLO 1]

- Historical evolution of concept of copyright and development of copyright laws

- International treaties and conventions: Marrakesh Treaty, 2013 Berne Convention, 1886 Beijing Treaty, 2012 Rome Convention, 1961
- WIPO Copyright Treaty (WCT) 1996, WIPO Performances and Phonograms Treaty, 1996
- Universal Copyright Convention, 1952.

Unit 2: Fundamentals of Copyright **15hrs [CLO 2]**

- Copyright – Concept of Originality and Idea vs Expression dichotomy
- Subject matter of Copyright: original Literary, Drama, musical works, sound Records,
- Cinematograph films
- Copyright as an Economic, Human and Moral rights

Unit 3: Law related to Copyright & its licensing and Registration in India **15hrs [CLO 3]**

- Procedure for registration: e-filing facility
- Ownership and Assignment of Copyright
- Term of Copyright, License: Voluntary/Statutory/Compulsory
- Effects of Copyright registration and its protection outside India, International Copyright
- Copyright Office and Appellate Board, Copyright Societies

Unit 4: Infringement of Copyright and Remedies **15hrs [CLO 4]**

- Limitations and Exceptions: Fair Dealing
- Infringement and Remedies and Reliefs- Civil/Criminal/Administrative Injunction- Anton Piller
- Judiciary and Copyright
- Copyright in the Commercial world

Suggested books

- Copyright Act, 1957
- P. Narayanan, Law of Copyright and Industrial Designs (Eastern Law House Ltd., New Delhi, 2017)
- H.K. Saharay, Iyengar's Commentary on the Copyright Act (Universal Law Publishing, 2016)
- Alka Chawla, Copyright and Related Rights: National and International Perspectives (Macmillan India Ltd., Delhi, 2007)

- Padmanabhan, Intellectual Property Rights Infringement and Remedies (Lexis Nexis, 2012)

Protection of Traditional Knowledge, Plant Varieties, Geographical Indications		
Subject code: PGDIP 105	L T P C 3 0 0 3	Contact hrs. 45

Course objectives: The course aims to equip students with a comprehensive understanding of the legal frameworks and mechanisms for safeguarding traditional knowledge, plant varieties, and biotechnological inventions. The course will also delve into the legal regimes governing plant variety protection and the role of plant patents. Furthermore, students will examine the complex landscape of biotech inventions, including patentability criteria, ethical considerations, and the interplay between biotechnology and traditional knowledge.

Course Learning Outcomes [CLOs]: Students will be able to

- Understand the challenges and opportunities associated with the protection of traditional knowledge, including issues of cultural heritage and intellectual property rights.
- Gain insight into the knowledge and skills required to recognize and document traditional knowledge and plant varieties.
- Navigate the intricacies of protecting traditional knowledge, plant varieties, and biotech inventions in a globalized and innovation-driven world.
- Develop the skills to analyze and resolve complex issues and conflicts that arise in the protection of traditional knowledge, plant varieties, and biotech inventions.

Unit 1: Introduction

15hrs [CLO 1]

- Meaning and Scope of traditional Knowledge
- Interface between IP and traditional Knowledge
- Need and Significance of protection
- International instruments on Traditional Knowledge
- Developments in WIPO.

Geographical Indications

- Objectives of Geographical Indications goods
- Evolution and Meaning of concept of geographical indications
- Geographical Indications of Goods (Registration and Protection) Act, 1999
- Difference between a geographical indication and a trademark
- Classification of goods for Geographical Indications

- Prohibited geographical indications
- Registration of geographical indications
- Lisbon Agreement 1958

Unit 2: Recognition and Documentation

10hrs [CLO 2]

- Recognition and Documentation of Traditional Knowledge
- Various databases
- Traditional Knowledge Digital Library "TKDL"
- AYUSH Systems of Medicines
- Biodiversity Register

Unit 3: Statutory Protection of Traditional knowledge and Plant Varieties **12hrs [CLO 3]**

- Traditional Knowledge as Property
- Nature of Property in genetic Resources and associated traditional Knowledge
- Ownership in Traditional Knowledge: Nature and Elements of Ownership
- Exclusivity and Protection
- Benefit Sharing
- Protection of Plant Varieties and Farmer's rights act 2001
- GM Corps
- Objectives of Plant Varieties Act
- Registration of Plant Varieties
- Duration and effect of Registration
- Infringement, Offences, Remedies

Unit 4: Biotechnological and Pharmaceutical Innovations

8hrs [CLO 4]

- Introduction: Basic concept
- Protection of Biological Inventions
- Plant Patent Protection in India
- Biotech Patents in India
- Research and Development in Biotechnology
- NCE, Vaccine, Antibodies, GM

- Issues faced by biotech inventions under IPR laws – Budapest Treaty: NBA

Suggested books

- The Protection of Plant Varieties and Farmers' Rights Act, 2001
- S.R. Reddy and V.K. Reddy, Biodiversity, Traditional Knowledge and Intellectual Property Rights (Scientific Publishers, 2016)
- S Bala Ravi, "Effectiveness of Indian Sui Generis Law on Plant Variety Protection and its Potential to Attract Private Investment in Crop Improvement", Journal of Intellectual Property Right (2004)

Intellectual Property Rights Practical I

Subject code:	L T P C	Contact hrs. 30
PGDIP 106	0 0 2 1	

Course objectives: The course is designed to provide comprehensive knowledge and hands-on experience and practical understanding of the processes and procedures involved in managing intellectual property rights. This includes practical knowledge of conducting patent searches, drafting patent applications, filing trademarks, and copyright registrations.

Course Learning Outcomes [CLOs]: Students will be able to

- apply their knowledge of intellectual property rights in practical scenarios.
- have the skills to analyze and assess the value of intellectual property assets.
- to analyze business objectives, identify potential IP assets, and create strategies for protection, commercialization, and enforcement.

Suggested practicals

- Group discussion and video module on introduction to trademark and global significance
- Hands-on workshop on conducting patent search, drafting patent application, design registration and filing trademarks
- Learning about techno-legal strategy to protect intellectual property to avoid intellectual crimes and plagiarism
- Case studies on trademarks
- Hands-on workshop on industrial design registration
- Hands-on workshop on layout registration
- **Seminar/Journal club/ Assignments-** Students are expected to submit THREE written assignments (1500 – 2000 words) on the topics given to them covering the areas dealt in theory class.

- Abuse of Dominant position
- Unfair Trade Practices
- Bid Rigging
- Predatory Pricing
- Tying

Unit 4: Authorities and Enforcement of Competition Law

10hrs [CLO 4]

- Competition Commission of India
- Constitution of Commission
- Powers and Functions of the commission
- National Company Law Appellate Tribunal
- Judicial Review by the High Court and the NCLAT
- Merger Control Regulations
- Interface between Competition Law and IPRs
- Approaches to Competition Law
- Welfare measures

Suggested books

- "Trade Secret Law in a Nutshell" by Sharon Sandeen and Elizabeth Rowe
- "Trade Secrets: A Practitioner's Guide" by Trevor Cook and Mark Anderson
- "Trade Secrets: Law and Practice" by David W. Quinto and Stuart H. Singer
- Abir Roy, Competition Law in India: A Practical Guide, (Kluwer Law International, 2016).
- Avtar Singh, Law of Consumer Protection; Principles and Practice, (Eastern Book company, 2005).
- D.P. Mittal, Competition; Law and Practice, (Taxmann Publications, 2011).
- Dhall. Vinod (ed.), Competition Law Today, (Oxford University Press, Delhi, 2007)

- Technical Disclosures
- Patent Pooling
- Patent Trolling
- Brand Management: Brand and Pricing Strategies
- Patent Mining
- Patent Landscaping and Patent Mapping

Unit 4: Strategic Management and Valuation of Intellectual Property 15 hrs [CLO 4]

- Defensive & Offensive Strategies
- Intellectual Asset Management
- Intellectual Property Audit
- Identification & Grouping of Intangible Assets into Bundles
- Intangible Asset Management Plan
- Value Maximization Strategies
- Value Extraction Strategies
- Licensing Process and Management
- Need for IP Valuation
- Approaches of IP Valuation: Cost Approach, Income Approach, Market Approach
- Methods of IP Valuation – "25% Rule" Method, Industry Standards Method, Ranking Method, Surrogate Methods, Disaggregation Methods, Monte Carlo Method, Real Options Methods, The CAV Method, Market Value Method
- Collateralization of IPA

Technology transfer

- Technology transfer bottlenecks
- Data analysis and handling
- Industrial Management
- Technology Transfer Agreements
- Technology Transfer
- Commercialization
- Modes of Licensing

- Grant Interpretation
- Termination and Royalty Clauses
- Intellectual Property Issues in the Sale of Business
- IPR and Corporate Transaction
- Legal Auditing of Intellectual Property
- Challenges in IPR, biopiracy, social issues in IPR

Suggested books/recommendation

- Intellectual Property Rights: A Managerial Perspective" by Prabuddha Ganguli and Moushami P. Joshi
- "Intellectual Property Management: A Primer" by Punita Bhargava
- Intellectual Property: Patents, Copyrights, Trademarks, and Allied Rights" by P. Narayanan

Intellectual Property Rights Practical II

Subject code:	L T P C	Contact hrs. 30
PGDIP 203	0 0 2 1	

Course objectives: The course is designed to provide comprehensive knowledge about business goals, identify valuable IP assets, and create strategies for protection, commercialization, and enforcement of intellectual property rights.

Course Learning Outcomes [CLOs]:

- Students will gain competence in managing intellectual property rights in real-world situations.
- Students will be able to handle licensing agreements, technology transfer processes, and enforcement actions.
- Students will have the skills to navigate challenges such as infringement disputes, IP valuation, and trade secret protection.

Suggested practicals

- Hands-on Training on Patentability Assessment
- Group Discussion on IP Valuation of Patent
- Case studies on infringement disputes
- Case Studies on Biodiversity
- Case studies on Biotechnology and Pharmaceutical [plant/animal/ microbial] and/or Law

- **Seminar/Journal club/ Assignments-** Students are expected to submit THREE written assignments (1500 – 2000 words) on the topics given to them covering the areas dealt in theory class.

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Project Work/ Dissertation

Subject code:	C	Contact hrs. 24
PGDIP 204	12	

Case studies/Technology landscape/ Dissertation/ Empirical Research/ Apprenticeship or Internship or Training in any one of the following: Patent Information centers, Patent Facilitation center, Law firms, IPR cell in academic institute or industry, Technology transfer office/Incubation Cell or any related institution/organization.

Jointly under the supervision of faculty members of CUPB and MRSPTU as per the basic domain of the candidate.

MRSPTU B.COM (E-COMMERCE) SYLLABUS 2018 BATCH ONWARDS

Semester 3rd		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BCOM2-301	Corporate Accounting - I	4	0	0	40	60	100	4
BCOM2-302	Company Law	4	0	0	40	60	100	4
BCOM2-303	Money, Banking & International Trade	4	0	0	40	60	100	4
BCOM2-304	Operation Research	4	0	0	40	60	100	4
BCOM2-305	Human Resource Management	4	0	0	40	60	100	4
BCOM2-306	Indian Economic Problems	4	0	0	40	60	100	4
	Total	24	0	0	240	360	600	24

Semester 4th		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BCOM2-401	Corporate Accounting - II	4	-	-	40	60	100	4
BCOM2-402	Cost Accounting - I	4	-	-	40	60	100	4
BCOM2-403	Fundamentals of Corporate Finance	4	-	-	40	60	100	4
BCOM2-404	Fundamentals of Digital Marketing	4	-	-	40	60	100	4
BCOM2-405	E-Commerce Technology	4	-	-	40	60	100	4
BCOM2-406	Digital Marketing Lab	-	-	2*2	60	40	100	2
	Total	20		4	260	340	600	22

MRSPTU B.COM (E-COMMERCE) SYLLABUS 2018 BATCH ONWARDS

Semester 5th		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BCOM2-501	E- Commerce Strategy and Application	4	0	0	40	60	100	4
BCOM2-502	Business Auditing	4	0	0	40	60	100	4
BCOM2-503	Corporate Tax Planning	4	0	0	40	60	100	4
BCOM2-504	Banking Law and Practices	4	0	0	40	60	100	4
BCOM2-505	Internet and Web Designing	2	0	2*2	40	60	100	4
BCOM2-506	Seminar on Training Report	-	-	-	60	40	100	2
	Total	18	0	4	260	340	600	22

Semester 6th		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BCOM2-601	Software Engineering	4	-	-	40	60	100	4
BCOM2-602	Cyber Law	4	-	-	40	60	100	4
BCOM2-603	Database Management System	4	-	-	40	60	100	4
BCOM2-604	International trade	4	-	-	40	60	100	4
BCOM2-605	Data Visualization Lab	-	-	2*2	60	40	100	2
BCOM2-606	Major Project	-	-	-	60	40	100	4
	Total	16	0	4	280	320	600	22

QUESTION PAPER PATTERN END SEMESTER EXAMINATION

Time Allowed: 3 Hrs.

Maximum Marks: 60

The question paper shall consist of three sections of 20 marks each.

1. Section A is compulsory. It consists of 10 parts of two marks each and covers the whole syllabus. Question should be numbered as 1(a) to 1(j).
2. Section B consist of 5 questions of 5 marks each with atleast 1 question from each unit. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Human Values & Professional Ethics (for all Courses)

Time Allowed: 3 Hrs.

Maximum Marks: 60

The question paper shall consist of three sections.

For Human Values: The question paper will be set in English, Hindi and Punjabi

1. Section A is compulsory. It consists of 10 parts of one marks each objective type questions and covers the whole syllabus. Question should be numbered as 1(a) to 1(j).
2. Section B contains short type question. It consists of 5 questions of 4 marks each with atleast 1 question from each unit. The student has to attempt all questions.
3. Section C contains descriptive type questions. There will be five questions. Each question contains two parts. The students have to attempt any one part from each question. Each part carries six mark

CORPORATE ACCOUNTING-I

Subject Code: BCOM2-301

**L T P C
4 0 0 4**

Duration: 45 Hrs.

Course Objectives: To develop students' knowledge of accountancy, particularly in relation to company accounts through a more in-depth and broader study of its contents.

UNIT-I (12 Hrs.)

Concept and Scope of Corporate Accounting; Share Capital and its Types; Shares: Types, Issue, Forfeiture and Re-Issue of Forfeited Shares; Buy Back of Shares; Book Building; Sweat Equity; Employee Stock Option Scheme; Rights Issue; Bonus Shares; Redemption of Preference Shares.

UNIT-II (12 Hrs.)

Debentures: Types, Issue and Redemption of Debentures; Underwriting of Shares and Debentures Including Firm Underwriting; Calculation of The Liability of the Underwriter; Sub underwriting; Broker and Brokerage; Acquisition of Business and Profit Prior to Incorporation.

UNIT-III (10 Hrs.)

Goodwill: Meaning; Types; Factors Determining Goodwill; Need for Valuation of Goodwill; Methods for the Valuation of Goodwill. Valuation of Shares: Need and Methods.

UNIT-IV (11 Hrs.)

Preparation of Final Accounts of a Corporate Body as per the latest version of Schedule VI (Simple Problems only); Main difference between the old format and the new one; Notable Corporate Scandals with Special Reference to India.

Course Outcomes: Student will be able to understand the accounting knowledge about complex business activities and they are also able to develop a global perspective of business situation and institutions.

Recommended Books

1. R.L. Gupta and Radhaswamy, 'Advanced Accountancy', Volume II, S. Chand & Sons.
2. Maheshwari and Maheshwari, 'Advanced Accountancy', Volume II, Vikas Publications.
3. Jain and Narang, 'Corporate Accounting', Kalyani Publications.
4. Shukla, Grewal and Gupta, 'Advanced Accounts', Vol.- II, S. Chand & Sons.
5. Hanif and Mukherjee, 'Corporate Accounting', Tata McGraw Hill, New Delhi.
6. P.C. Tulsian, 'Advanced Accounting', Vol.-I, Pearson Publications.

COMPANY LAW

Subject Code – BCOM2-302

**L T P C
4 0 0 4**

Duration: 45 Hrs.

Course Objectives: The objective of this course is to provide basic knowledge of the provisions of the Company Law, to guide the students about different terminologies in company law.

UNIT-I (11 Hrs.)

Nature of a Company: Definition of a Company, Characteristics of a Company, Lifting the Corporate Veil, Company Distinguished from Partnership. Kinds of Companies: Classification on the Basis of Incorporation; Classification on the Basis of Liability, Classification on the basis of number of members, Classification on the Basis of Control, Classification on the basis of ownership. Formation of a Company: Steps involved in the formation and incorporation of a Company.

UNIT-II (12 Hrs.)

Memorandum of Association: Meaning and Importance, Form and Contents, Alteration of Memorandum. Articles of Association: Meaning, Relationship of and Distinction between MOA and AOA. Prospectus: Meaning, Definition and Contents, Statutory Requirements in relation to Prospectus. Share Capital: Kinds of Share Capital, Alteration of Share Capital, and Ways for raising Share Capital, Allotment of Shares, Share Certificate and Share Warrant, calls on Shares, Forfeiture and Surrender of Shares, Transfer of Shares. Borrowing Powers, Debentures and Charges

UNIT-III (11 Hrs.)

Company Management: Definition of Director, Appointment of Director, Position of a Director, Restrictions on the Appointment of Director, Disqualifications of Director, Meetings of Directors, Powers of Directors, Duties and Liabilities of Directors. Meetings: General Meetings of Shareholders, Requisites of a Valid Meeting, Proxies, Voting and Poll.

UNIT-IV (10 Hrs.)

Auditors: Audit Committee; Appointment of Auditors; Rights, Powers and Duties of Auditors. Winding Up: Meaning of Winding Up; Modes of Winding Up; Consequences of Winding Up; Procedure of Winding Up by The Court; Voluntary Winding Up.

Course Outcomes: Students will be able to understand the functioning of company law and able to apply those principles to problem-solving exercises. The students became aware about the memorandum, articles and company management to gain a insight in the company law.

Recommended Books

1. Avtar Singh, 'Company Law', Eastern Book Co., Lucknow.
2. M.C. Kuchal, 'Modern India Company Law', Shri Mahavir Books, Noida.
3. N.D. Kapoor, 'Company Law -Incorporating the Provisions of the Companies, Amendment Act, 2000', Sultan Chand & Sons, New Delhi.
4. A.K. Bagrial, 'Company Law', Vikas Publishing House, New Delhi.

MONEY, BANKING & INTERNATIONAL TRADE

Subject Code – BCOM2-303

L T P C

Duration: 45 Hrs.

4 0 0 4

Course Objectives: This course aims to help students to understand the concepts, policy framework and environment of Money Market, Banking and International Trade.

Course Outcomes: To make the student aware about the different terms and conditions of money market, banking system and about international trade so that they would be able to handle the complex problem arises in the respective fields.

UNIT-I (12 Hrs.)

Money: Meaning and Definition, Features, Functions and Kinds/Forms of Money; Supply of Money: Mechanics of Money Supply, Measures of Money Supply in India. Demand for Money: Factors Determining Demand for Money, Fisher, Cambridge, Keynesian and Freidman Theories of Money.

Rate of Interest: Meaning and Definition, Determination, Factors affecting the Level and Structure of Interest Rates. An overview of Interest Rate Structure in India.

Money Market: Introduction, characteristics and role of Money Markets in India. Weaknesses of Indian Money Market.

UNIT-II (11 Hrs.)

Banking: Introduction, Types of Banks, Functions, Safety-Liquidity-Profitability Trade off. **Central Banking:** Functions and Techniques of Credit Control. Reserve Bank of India: Role and Functions.

Commercial Banking in India: Structure and Functioning; Role of Commercial Banks in Economic Development. Banking Sector Reforms in India. Prudential Norms for Income Recognition, Provisioning for Bad and Doubtful Debts, Capital Adequacy and Concentration of Credit/Investments.

Innovations in Banking: Internet Banking, E-Banking, Mobile Banking, Wholesale and Retail Banking, Universal and Narrow Banking, Off-Shore Banking. Asset, Classification, Non-Performing Assets,

UNIT-III (11 Hrs.)

International Trade: Meaning, Features, Importance and Implications for the Developing Countries. International Trade Theories: Absolute Cost Advantage, Comparative Cost advantage, Heckscher-Ohlin theory. India's Foreign Trade Policy during the Post Reforms, Composition and recent trends in Foreign Trade with Special Reference to India. Balance of Payments situation during the Post Reform Period. Recent changes in India's Export and Import Policies. Organizations and Institutions involved in Export and Import Management.

UNIT-IV (11 Hrs.)

Regulation of International Trade in India, EXIM Policy and Foreign Exchange Management Act (FEMA), 1999, Introduction to General Agreement on Tariffs and Trade (GATT)/World Trade Organisation (WTO): Trade Related Investment Measures (TRIMS) and its implications; Agreement on Agriculture (AOA) and its implications; General Agreement on Trade in Services (GATS) and its implications; Trade Related Intellectual Property Rights (TRIPS) and its implications with special references to India. Recent Development under the Ministerial Conferences

Recommended Books

1. M.C. Vaish, 'Money, Banking and International Trade', New Age International Pvt. Ltd.
2. T.N. Hajela, 'Money, Banking and International Trade', Ane Books Pvt. Ltd.
3. M.L. Seth, 'Money, Banking and International Trade', Lakshmi Narayan Agarwal.
4. Jagannath Mishra, 'Money, Banking and International Trade', Thacker, Spink and Company.
5. T.R. Jain, 'Banking and Foreign Trade', V.K. Publications.

MRSPTU

OPERATION RESEARCH

Subject Code: BCOM2- 304

L T P C
4 0 0 4

Duration: 45 Hrs.

Course Objectives: The objectives of the Course are to acquaint the students with the applications of the Operations Research to business and industry and help them to grasp the significance of Analytical Approach to Decision Making.

Course Outcomes: After studying this course, the students learn the role of operations on achieving various competitive capabilities. The students also learn how to help an organization in improving productivity and meeting customer's competitive capabilities.

UNIT-I (11 Hrs.)

Operations Research: Nature, Scope, Methodology of Operations Research and Role in Managerial Decision Making. Linear Programming: Formulation of Problem and its Solution by Graphical and Simplex Methods, Duality.

UNIT-II (11 Hrs.)

Transportation Problems: Formulation, Optimal Solution, Unbalanced Transportation Problem, Degeneracy, Assignment Problems: Formulation, Optimal Solution, Variants of Assignment Problems, Travelling Salesman Problems

UNIT-III (12 Hrs.)

Game Theory: Games with Pure and Mixed Strategies, Saddle Point, Odds Method, Principle of Dominance, Sub Games Method, Equal Gains Method and LPP- Graphic Method Sequencing Problems: Processing N Jobs through two machines, Processing in jobs through three machines.

UNIT-IV (12 Hrs.)

Inventory Models: EOQ Models, Quantity Discount Models, Purchase Inventory Models with one Price Break (Single Discount) and Multiple Discount Breaks. Network Analysis: PERT and CPM Model, Difference between PERT and CPM, Computation of Critical Path, Slack, Floats and Probability of Project Completion by a Target Date.

Recommended Books

1. P.K. Gupta & D.S. Hira, 'Operations Research', S. Chand & Co. Ltd., New Delhi,
2. H.A. Taha, 'Operations Research', Prentice Hall of India, New Delhi,
3. C.K. Mustafi, 'Operations Research', New Age International Pvt. Ltd., New Delhi,
4. M.P. Gupta & J.K. Sharma, 'Operations Research for Management', Mayoor Paperbacks, Delhi.

HUMAN RESOURCE MANAGEMENT

Subject Code: BCOM2- 305

**L T P C
4 0 0 4**

Duration: 45 Hrs.

Course Objectives: The objectives of this Course is to provide basic knowledge of Human Resource Management. And to make students aware of the importance of this subject in the working of organizations.

Course Outcomes: After completing this course the students should be able to understand the concepts, principles and processes of HRM, understand the crucial role that HRM plays in helping organizations all over the world adapt to the endless change today.

UNIT-I (12 Hrs.)

Introduction: Definition; Nature, Scope & Objectives; Need; Significance of Human Resource Management. Manpower Planning: Definition, Objectives, Process, Factors affecting Manpower Planning. Job analysis: Meaning, Objectives, Uses, Process; Techniques and Problems.

UNIT-II (11 Hrs.)

Recruitment: Meaning, Process, Sources, Methods. Selection: Meaning, Importance, Process. Tests and Interviews, Placement and Induction. Job Changes - Transfers and Promotions.

UNIT-III (11 Hrs.)

Training and Development: Concept and Importance; Identifying Training and Development Needs; Designing Training Programmes, Evaluating training effectiveness. Career Planning and Development: Meaning, Objectives, Responsibility, Stages, Steps in effective career planning. Performance Appraisal System: Nature and Objectives; Techniques of Performance appraisal; Potential Appraisal and Employee Counselling.

UNIT-IV (11 Hrs.)

Compensation: Concept, Policies and Administration; Methods of Wage Payments and Incentive Plans; Fringe Benefits; Performance Linked Compensation. Job Evaluation: Meaning, Importance, Methods. Maintenance: Employee Health and Safety; Employee Welfare, Social Security; Grievance. Handling and Redressal.

Recommended Books

1. Edwin B. Flippo, 'Personal Management', Tata McGraw Hill.
2. Bohlander, 'Snell & Vohra, Human Resource Management', Cengage Learning.
3. Gary Dessler, 'Human Resource Management', McMillan.
4. V.S.P. Rao, 'Human Resource Management', Excel Books.
5. C.B. Memoria, 'Personnel Management', Himalaya Publications.
6. T.N. Chhabra, 'Human Resource Management', Dhanpat Rai & Sons.
7. C.B. Gupta, 'Human Resource Management', Sultan Chand and Sons.
8. R.S. Dwivedi, 'HRD in India Companies', Himalaya Publications

INDIAN ECONOMIC PROBLEMS

Subject Code: BCOM2-306

L T P C
4 0 0 4

Duration: 45 Hrs.

Course Objectives: The objective of this paper is to acquaint the students with the ability to understand the features and issues of Indian Economy.

Course Outcomes: Students will understand various social, political, legal and economic and other factors that influence business in India so as to enable them appreciate associated opportunities, risks and challenges and their relevance for managerial decisions

UNIT-I (12 Hrs.)

Structure of Indian Economy: Nature of Indian Economy, Occupational Distribution of Labour Force; Poverty and Income Distribution in India, Problems of Unemployment and Rising Prices, Parallel Economy in India.

Demography of India: Demographic Features of Indian Population, Size and Growth of Population in India. Population and Economic Development. Problem of Over Population, Population Policy in India.

UNIT-II (11 Hrs.)

Basic Issues in Indian Agriculture: Role, Nature and Cropping Pattern; Trends in agricultural production and productivity; Factors determining productivity; Agricultural Price Policy, Distress in Indian Agriculture. Rural Indebtedness, Role of NABARD in Rural Development in India.

Issues in Indian Industry: Growth and Problems of Major Industries-Iron and Steel, Cotton Textiles, Cement and Petroleum. Problems and prospects of Cottage and Small Scale Industries in India. Role, problems and scope of Public Sector in India, Industrial Policies in pre and post reforms period.

UNIT-III (11 Hrs.)

Economic Planning: Importance of Planning for Economic Development. Features, objectives, Achievements and Failures of planning in India, Factors affecting successful implementations of plans. Niti Ayog in India: features, structure and it's functioning.

Indian Public Finance: Indian Finance System. Critical evaluation of budgets in India, Taxation Structure, Mobilization of Resources for Development, Fiscal Policy in India

UNIT-IV (11 Hrs.)

External Sector: India's Foreign Trade- Features, Composition and Direction; India's Balance of Payments Problem; Indian Trade Policy; Foreign Capital, Foreign Aid, Multinational Corporations (MNCs); FERA and FEMA.

Forex Market: Methods of Measuring Exchange Rate. Determinants of Exchange Rate, Currency Depreciation and Devaluation, Nature of Indian Forex Market.

Recommended Books

1. S.K. Mishra and Puri, 'Indian Economy', Himalaya Publishers.
2. Arvind Panagariya, 'India: The Emerging Giant', Oxford University Press.
3. Datt, Ruddar and K.P.M. Sundharam, 'Indian Economy', S. Chand & Company Ltd.
4. Uma Kapila, 'Indian Economy: Performance and Policies', Academic Foundation.

4TH
SEMESTER

CORPORATE ACCOUNTING-II

Subject Code: BCOM2-401

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives:

1. To be familiar with basic corporate accounting concepts and their applications in managerial decision making.
2. To be familiar with corporate accounting procedures and in-depth knowledge of preparation of various accounts related to corporate field.
3. Developing students with skills to evaluate organization performance spot inefficiencies.

Course Outcomes: After completing of this course, the student will be able to:

1. Learning accounting standards and other regulatory pronouncements that address accounting for inter-entity relationships
2. Apply various financial analysis tools to examine financial information for finding business solution
3. Implement latest costing techniques for sustainability of business
4. Demonstrate how the concepts of accounting and costing could integrate

UNIT –I (15 Hrs.)

Amalgamation, Absorption and External Reconstruction: Meaning; Methods of Calculating Purchase Consideration; Accounting Entries and Preparation of a Balance Sheet, (Excluding Inter-Company Holdings) Treatment of Inter-Company Owings and Unrealized Profit in Stock; A Reference to AS-14.

UNIT–II (15 Hrs.)

Holding and Subsidiary Company: Meaning; Advantages and Disadvantages of a Holding Company; Cost of Control and Capital Reserve; Minority Interest; Capital Profits and Revenue Profits; Treatment of Unrealized Profits and Mutual Owings; Simple Problems on the Preparation of a Consolidated Balance Sheet.

UNIT–III (15 Hrs.)

Liquidation/Winding Up: Meaning; Compulsory and Voluntary Winding Up; Preferential Payments; Liquidator's Statement of Affairs and Surplus/Deficiency Account; Liquidator's Final Statement of Account; Receiver for Debenture Holders; 'B' List of Contributories.

UNIT–IV (15 Hrs.)

Insurance Company Accounts (General and Life), Banking Company Accounts, Internal Reconstruction.

Suggested Readings

1. R.L. Gupta & Radhaswamy, 'Advanced Accountancy', S. Chand & Sons.
2. Maheshwari and Maheshwari, 'Advanced Accountancy', Vikas Publications.
3. Jain and Narang, 'Corporate Accounting', Kalyani Publications.
4. Shukla, Grewal and Gupta, 'Advanced Accounts', S. Chand & Sons.
5. P C. Tulsian, 'Advanced Accounting', Pearson Publication.

COST ACCOUNTING-I

Subject Code: BCOM2-402

L T P C
4 0 0 4

Duration: 60 Hrs

Course Objectives: The main aim of this course is

1. To understand the classification of various types of costs
2. To understand the various costing techniques
3. To understand how costing can be set as per industry benchmark.

Course Outcomes: After completing this course, students will be able to

1. Analyse and provide recommendations to improve the operations of organizations through the application of Cost accounting techniques
2. Evaluate the costs and benefits of different conventional and contemporary costing systems
3. Familiarize with estimation of budgetary control, marginal costing, and standard costing.
4. Aware the students to analyze the behavior of cost in relation to change in volume of output.

UNIT-I (15 Hrs.)

Meaning, Nature, Scope and Advantages of Cost Accounting, Management Accounting, Distinction Between Cost, Financial and Management Accounting, Elements of Cost & Basic Cost Sheet. Materials; Purchase and Storage, Control and Pricing of the Material, Issue of Material.

UNIT-II (15 Hrs.)

Labour: Meaning, Components of Labour Cost and Methods of Wage Payment and Incentive Plans. Meaning Causes Effects, Accounting & Control of Idle Time and Overtime Cost, Overheads: Classification, Collection, Allocation, Apportionment and Absorption. Reconciliation of Cost and Financial Accounts

UNIT-III (15 Hrs.)

Methods for Cost Determination: Job, Batch, Contract, Process (Including Joint and Bye products).

UNIT-IV (15 Hrs.)

Tools for Cost Control: Marginal Costing and Its Applications, Budgetary Control, Standard Costing and Analysis of Variances.

Suggested Readings

1. Jawahar Lal, 'Cost Accounting', Tata McGraw Hill.
2. D.K. Mittal/Luv Mittal, 'Cost Accounting', Galgotia Publishing Company.
3. T.R. Sikk, 'Cost Accounting', Sharma Publications
4. M.N. Arora, 'Cost Accounting', Vikas Publishing House

FUNDAMENTAL OF CORPORATE FINANCE

Subject Code: BCOM2-403

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objective: The main objectives of this course are:

1. Provide an in-depth view of the process in financial management of the firm.
2. Develop knowledge on the allocation, management and funding of financial resources.
3. Improving students' understanding of the time value of money concept and the role of a financial manager in the current competitive business scenario.

Course Outcomes (COs): After completion of the course, the students shall be able to:

1. Demonstrate the decision making by applying financial theory to problems faced by business enterprises.
2. Apply foundational finance theories and to analyse a forecast using relevant data and to conduct preliminary measurement of leverage analysis.
3. Apply time value of money techniques to various pricing and budgeting problems.
4. Apply modern techniques in capital budgeting analysis.

UNIT-I (15 Hrs.)

Business Finance: Conceptual Foundations – Finance Function in Business – Scope and Objectives – Relation of Finance with Other Business Functions. Conflicts in Profit versus Value Maximisation Principle, Role of Chief Financial Officer. Time Value of Money, Compounding and Discounting Techniques – Concepts of Annuity and Perpetuity

UNIT –II (15 Hrs.)

Different Sources of Finance, Project Financing - Intermediate and Long Term Financing. Negotiating Term Loans with Banks and Financial Institutions and Appraisal thereof, Introduction to Lease Financing, Venture Capital Finance. Cost of Capital – Introduction

UNIT-III (15 Hrs.)

Capital Structure: Optimum Capital Structure - Determinants and Theories, Leverage - Concept, Measurement and Significance, Capital Budgeting: Meaning & Process

UNIT-IV (15 Hrs.)

Working Capital Management: Cash Securities, Receivables and Inventory Management – Management of Working Capital – Kinds of Working Capital - Determinants of Working Capital. Dividend Policy and Decisions: Influencing Factors – Forms of Dividend.

Course Outcomes: after completion of the subject students are known to the different sources of finance and their usage. Students will gain the knowledge about capital structure and working capital management.

Suggested Readings

1. I.M. Pandey, 'Financial Management' Vikas Publications.
2. Prasanna Chandra, 'Financial Management Theory and Practice', McGraw Hill Publications
3. S.C. Kuchhal, 'Corporate Finance', Chaitanya Publications

FUNDAMENTAL OF DIGITAL MARKETING

Subject Code: BCOM2-404

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives:

1. To provide students with the knowledge about business advantages of the digital marketing and its importance for marketing success.
2. To develop a digital marketing plan.
3. To explore and develop social media marketing initiatives that are designed to meet business objectives.

Course Outcomes: After completion of this course, students will be able to:

1. Identify the importance of the digital marketing for business sustainability
2. Understand various business ethics in digital marketing
3. Apply the digital marketing for communication with customers and other stakeholders
4. Explain latest tools for promoting brand on social media sites.

UNIT-I (15 Hrs.)

Key Concepts of Digital Marketing, Traditional Marketing vs. Digital Marketing, The Opportunity of Digital Marketing, Characteristics of Digital Marketing, Implications of Digital Marketing, Strategies in Digital Marketing

UNIT-II (15 Hrs.)

Google Webmaster Tool: Introduction to Webmaster Tools, Refine personal and site settings, Manage, monitor and maintain your site, Remove Content from Google, Search Traffic & Search Appearance, Google Index & Crawl, Crawl Rate, Crawl Errors and Crawl Stats, Blocked URL's and Fetch as Google.

UNIT-III (15 Hrs.)

Search Engine Optimization (SEO): On page Optimization Techniques, Off Page Optimization Techniques, Preparing Reports, Creating Search Campaigns, Creating Display Campaigns. Social Media Optimization (SMO): Introduction to Social Media Marketing, Advanced Facebook Marketing.

UNIT-IV (15 Hrs.)

Website Traffic Analysis, Affiliate Marketing and Ad Designing: Google Analytics, Online Reputation Management, EMail Marketing, Affiliate Marketing, Understanding Ad Words Algorithm, Advertisement Designing.

Suggested Readings

1. Seema Gupta, Digital Marketing 'Tata Mcgraw Hill Publication.
2. Charlesworth A., Internet Marketing: A Practical Approach, BH Publications.
3. Chaffey Dave, Internet Marketing: Strategy, Implementation and Practice, Pearson Education.
4. Parkin Godfrey, Digital Marketing: Strategies for Online Success, New Holland Publishers.

E-COMMERCE TECHNOLOGY

Subject Code: BCOM2-405

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives: The main objectives of this course are:

1. To learn about foundations of E-Commerce.
2. To learn about E-Business plan and address E-Commerce related issues.
3. To provide insights on Business incubators.

Course outcome: After the completion of this course students will be able to:

1. Identify and apply relevant problem-solving methodologies.
2. Design components, systems and/or processes to meet required specifications for a web presence.
3. Demonstrate and Communicate effectively in ways appropriate to the discipline, audience and purpose.

UNIT-I (15 Hrs)

E-Commerce-Framework-Classification of electronic commerce -Anatomy of E-Commerce Applications- Components of the I way-Network Access Equipment-Internet Terminology, Electronic Data Interchange- Benefits-EDI Legal, Security & privacy issues

UNIT-II (15 Hrs)

Network security and firewalls- Client Server Network Security- Emerging client server security threats- Firewalls and network security- Data and message security- Encrypted documents and electronic mail- Hypertext publishing- Technology behind the web- Security and the web.

UNIT-III (15 Hrs)

Consumer Oriented Electronic Commerce: Consumer Oriented Applications-Mercantile Process Models-Mercantile Models From the Consumers Perspective- Mercantile Models from the Merchants Perspective.

UNIT-IV (15 Hrs)

Electronic Payment Systems-Types-Digital Token Based Electronic Payment System-Smart Cards & Credit Card Electronic Payment Systems -Risk -Designing electronic payment system.

Suggested Readings

1. Daniel Minoli, Emma Minoli “Web Commerce Technology Handbook”, Tata McGraw Hill Publishing, New Delhi.
2. Bharat Bhasker, “Electronic Commerce”, Tata Mc Graw Hill Publishing Co Ltd, New Delhi
3. Dr. C. S. Rayudu, “ -Commerce &E-Business”, Himalaya Publishing House, New Delhi, 2004.
4. Kenneth C. Laudon Carol GuercioTraver, E-Commerce’, Pearson Publications
5. Russ, Henneberry, Digital Marketing for Dummies, Willey Publications

DIGITAL MARKETING LAB

Subject Code: BCOM2-406

L T P C
0 0 2*2 2

Duration: 60 Hrs

Course Objectives: The main aim of this course is

1. To understand the basic functions of digital marketing.
2. To understand various data presentation tools in digital marketing.
3. To explore and develop social media marketing ingenuities that are designed to meet Business points.

Course Outcomes: After completion of this course, students will be able to:

1. Apply digital marketing tools in business marketing.
2. Identify the importance of the digital marketing for business sustainability.
3. Understand various business ethics in digital marketing.
4. Apply the digital marketing for communication with customers and other stakeholders.
5. Explain latest tools for promoting brand on social media sites

Course Contents:

1. Creating the Webstore, registering domain name, web hosting
2. Search engine marketing, adwords, using adword planner
3. Bidding for keywords, ad rank.
4. Create the Digital Marketing Webpage
5. Creating Banners for Facebook,
6. Creating YouTube Videos,
7. Twitter Marketing Strategies and Implementation, Using Tweets, Retweets and Hashtags for Marketing,
8. Creating LinkedIn Pages for Companies,
9. Instagram Marketing Strategies and Implementation, Creating banners and videos for Instagram Marketing.
10. Email Marketing

Suggested Readings

1. Seema Gupta, Digital Marketing 'Tata Mcgraw Hill Publication, 2017
2. Charlesworth A., Internet Marketing: A Practical Approach, BH Publications.
3. Chaffey Dave, Internet Marketing: Strategy, Implementation and Practice, Pearson Education.
4. Parkin Godfrey, Digital Marketing: Strategies for Online Success, New Holland Publishers.

5TH SEMESTER

E-COMMERCE STRATEGY AND APPLICATION

Subject Code: BCOM2-501

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives: The objective of this paper is

1. To provide an exposure about the Practical Application of e-Commerce
2. To enable the students to be aware on the emerging changes in marketing and advertising
3. To impart knowledge on multimedia.
4. To gain knowledge on wireless technologies.
5. To apply the concept of SGML, CORBA.

Course Outcomes After completing the course, student will be able to

- 1 Understand the concept on marketing on Internet.
- 2 Understand the technology behind software agents.
- 3 Understand the concept on multimedia applications.
- 4 Apply knowledge on wireless technologies.
- 5 Analyze the concept of SGML, CORBA

Unit I (15 Hrs.)

Advertising and marketing on the Internet: The new age of information-based marketing
Advertising on the Internet – Charting the on-line marketing process-Market research.
Consumer Search and Resource Discovery: Search and resource discovery paradigms –
Information search and retrieval – Electronic commerce catalogs or directories – Information
filtering –Consumer data interface.

Unit II (18 Hrs.)

Software Agents: Characteristics and properties of agents –Technology behind software agents
– Telescript agent language- Safe-Tcl –Applets, Browsers and Software agents – Software
agents in action. Internet Protocol Suite: Layers and networking – Internet Protocol suite –
SLIP and PPP – Other forms of IP-based networking-Mobile TCP/IP- based networking-
Multicast IPNext generation IP.

Unit III (12 Hrs.)

Multimedia and Digital Video: Concepts-Digital video and electronic commerce-Desktop
video processing-Desktop video conferencing. Broadband Telecommunications: Concepts
Frame relay-Cell relay-Switched multimegabit data service-ATM.

Unit IV (15 Hrs.)

Mobile and Wireless Computing Fundamentals Framework- Wireless delivery technology and
switching methods –Mobile information access devices-Mobile data internetworking standards
Cellular data communication protocols-Mobile computing applications-Personal
communication service.

Structure Documents: Fundamentals-SGML. CORBA: Distributed objects. Transaction
Processing- Online Purchases-Online share trading –Railway/air ticket reservation.

Suggested Readings:

1. Ravi Kalakota & Andrew b. Whinston , “Frontiers of Electronic Commerce”, Dorling
Kindersley (India) Pvt.Ltd-2006

2. Bharat Bhasker, "Electronic Commerce", Tata Mc Graw Hill Publishing Co Ltd, New Delhi 2006.
3. Daniel Minoli, Emma Minoli "Web Commerce Technology Handbook", Tata McGraw Hill Publishing, New Delhi.
4. Dr.C.S. Rayudu, "E-Commerce & E-Business", Himalaya Publishing House, New Delhi, 2004.

MRSPTU

BUSINESS AUDITING

Subject Code: BCOM2-502

L T P C
4 0 0 4

Duration: 60 Hrs

Course objective: The objective of this paper is

1. To acquire the basic concept on auditing and audit programmes.
2. To enable the students on working with vouchers.
3. To impart knowledge on audit reports.
4. To create an audit report.
5. To apply the concept of electronic auditing.

Course Outcome After competing this course, the students will be able to:

1. Understand the concept on auditing.
2. Analyze the vouching of various working papers.
3. Gain knowledge on valuation of assets and liabilities.
4. Evaluate an audit report.
5. Apply the concept of electronic auditing.

Unit I (18 Hr.)

Auditing– Origin – Definition – Objectives – Types – Advantages and Limitations – Qualities of an Auditor – Audit Programmes.

Internal Control – Internal Check and Internal Audit – Audit Note Book – Working Papers. Vouching – Voucher – Vouching of Cash Book – Vouching of Trading Transactions – Vouching of Impersonal Ledger

Unit II (15 Hr.)

Verification and Valuation of Assets and Liabilities – Auditor's position regarding the valuation and verifications of Assets and Liabilities – Depreciation – Reserves and Provisions – Secret Reserves.

Unit III (15 Hr.)

Audit of Joint Stock Companies – Qualification – Dis-qualifications – Various modes of Appointment of Company Auditor – Rights and Duties – Liabilities of a Company Auditor – Share Capital and Share Transfer Audit – Audit Report – Contents and Types.

Unit IV (12 Hr.)

Investigation – Objectives of Investigation – Audit of Computerized Accounts – Electronic Auditing – Investigation under the provisions of Companies Act

Suggested Readings:

1. B.N. Tandon, "Practical Auditing", S Chand Company Ltd
2. F.R.M De Paula, "Auditing-the English language Society and Sir Isaac Pitman and Sons Ltd, London
3. Spicer and Pegler, "Auditing: Khatalia"s Auditing"
4. Kamal Gupta, "Auditing", Tata Mcgriall Publications

CORPORATE TAX PLANNING

Subject Code: BCOM2-503

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives: The aim of this course is:

1. To acquaint the students with basic principles underlying the provisions of direct and indirect tax laws and to develop a broad understanding of the tax laws and accepted tax practices.
2. To identify the technical terms related to Corporate Tax Planning.
3. To prepare the students to have a thorough knowledge about the planning and management of corporate taxation.

Course Outcomes: After completing this course, the students will be able to:

1. Know the various tax policies of the Indian government.
2. Gather practical knowledge required for tax procedures and systems.
3. Understand tax evasion and tax avoidance; Nature and scope of tax planning and management in the corporate sector; Justification of corporate tax planning and management.

UNIT-I (15 Hrs.)

Structure of Direct and Indirect Taxes in India, Meaning of Tax Planning and Management, Tax Evasion and Tax Avoidance; Nature and Scope of Tax Planning and Management in the Corporate Sector; Justification of Corporate Tax Planning and Management, Taking Advantages of Available Reliefs, Rebates and Tax Free Sources of Income.

UNIT-II (15 Hrs.)

Definition of Various Kinds of Companies - Meaning of Company under IT Act, Residential Status of Companies and Implications for Tax Planning, Assessment of Companies Including Carry Forward and Set Off of Losses.

UNIT-III (15 Hrs.)

Tax Planning with Reference to Setting up of a New Business, Tax Planning with Reference to Location of Business. Tax Planning with Reference to Nature of Business, Tax Planning with Reference to Form of Organization.

UNIT-IV (15 Hrs.)

Tax Planning with reference to Financial Management Decisions, Tax Planning with reference to Managerial Decisions, Tax Planning in respect to Employee's Remuneration, Tax Planning and Adoption of Method of Accounting. Tax planning regarding Capital Gains, Tax Planning in respect of Amalgamation or Demerger.

Recommended Books

1. V.K. Singhania, 'Direct Taxes: Planning and Management'.
2. Girish Ahuja, 'Direct Taxes: Law and Practice'.
3. Bhagwati Prasad, 'Law and Practice of Income Tax in India'.
4. R.N. Lakhotia, 'Corporate Tax Planning'.

BANKING LAW AND PRACTICES

Subject Code: BCOM2-504

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objectives: The aim of this course is-

1. To acquire specialized knowledge of law and practice relating to Banking.
2. To understand the Functioning of banks.
3. To recognize the security system of banking industry.

Course Outcomes (COs): After completion of the course, the students shall be able to:

1. Gain the knowledge of working of RBI System.
2. Understand the legal framework of banking industry.
3. Comprehend the role and functioning of banks in Security system.

UNIT-I (12 Hrs.)

Overview of Banking System and Regulatory Framework and Compliances: Provisions of RBI Act 1935, Banking Regulation Act 1949, Prevention of Money Laundering Act, 2002. Government and RBI's Powers Opening of New Banks and Branch Licensing Constitution of Board of Directors and their Rights Banks Share Holders and their Rights CRR and SLR.

UNIT-II (15 Hrs.)

Legal Aspects of Banking Operations: Case Laws on Responsibility of Paying and Collecting Banker Indemnities or Guarantees - Scope and Application – Obligations of a Banker - Precautions and Rights - Laws relating to Bill Finance, LC and Deferred Payments - Laws Relating to Securities - Valuation of Securities - Modes of Charging Securities - Lien, Pledge, Mortgage, Hypothecation etc. - Registration of Firms/Companies - Creation of Charge and Satisfaction of Charge.

UNIT-III (15 Hrs.)

Banking Related Laws: Law of Limitation - Provisions of Bankers Book Evidence Act - Special Features of Recovery of Debts Due to Banks and Financial Institutions Act, 1993 TDS Banking Cash Transaction Tax Service Tax, Asset Reconstruction Companies, The Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002, The Consumer Protection Act, 1986, Banking Ombudsman Lok Adalats, Lender's Liability Act, Anti-money laundering Law.

UNIT-IV (18 Hrs.)

Electronic Banking: Electronic Banking; Electronic Fund Management, Enabling Technologies of Modern Banking- Electronic Commerce and Banking; Integrated Communication Networks for Banks Security and Control Systems - Cybercrimes and fraud management Planning and Implementation of Information Systems.

Suggested Books:

1. M.L.Tannan, revised by : Banking Law and Practice, Wadhwa & Company, Nagpur
C.R. Datta & S.K. Kataria
2. A.B. Srivastava and : Seth's Banking Law, Law Publisher's India (P) Limited K.
Elumalai
3. R.K. Gupta: BANKING Law and Practice in 3 Vols. Modern Law Publications.

4. Prof. Clifford Gomez : Banking and Finance - Theory, Law and Practice, PHI Learning Private Limited
5. J.M. Holden: The Law and Practice of Banking, Universal Law Publishing.

MRSPTU

INTERNET AND WEB DESIGNING

Subject Code: BCOM2-505

**L T P C
2 0 4 4**

Duration: 60 Hrs.

Course Objectives: Upon completion of the course the student shall be able to

1. To acquire the basic knowledge on Internet
2. To enable the students on gaining the knowledge on HTML
3. To impart knowledge on applying the various tools
4. To gain knowledge on working with webpage
5. To apply the frames in webpage

Course Outcomes After completing this course, students will be able to:

- 1 Remembering the concept on WWW
- 2 Gain the knowledge on directories and inventories
- 3 Apply the concept on HTML
- 4 Gain knowledge on working with web page
- 5 Apply the frames in web page

UNIT – I (13 Hours)

Introduction to Internet - Internet Access / Dial-Up Connection – Internet Services“ Features – TCP/IP Vs Shell Accounts – Configuring the Machine for TCP/IP Account – Configuring the Shell Account – Telnet – Changing the Password – World Wide Web (WWW) - Web Page – Hyper Text – HTML Tags – Net Surfing - Internet/Web Browsing - Browser – Internet Addressing – IP Address – Domain Name – Electronic Mail – Uniform Resource Locator (URL) – Internet Protocols –TCP/IP – FTP – HTTP – Telnet – Gopher –WAIS.

UNIT – II (13 Hours)

Searching the Web – Web Index – Web Search Engine – Web Meta – Searcher – Search Functions – Search Engines – Meta Search Sites – Directories and Indexes – Specialized Directories – Electronic Mail (E-Mail) – E-Mail Message – Customizing E-Mail Programs – Managing Mails – Zen of „E-mailing“ – Address Book – Signature Feature – File Attachment Facility – Setting priority – Advantages and Disadvantages of E-Mail

UNIT – III (14 Hours)

Introduction to HTML–HTML Code for a Web Page–Web Page Basics–Setup a Web Page – Display a Web Page in a Web Browser – Start a New Paragraph – Start a New Line – Insert Blank Spaces – Heading – Pre-format Text – Comment – Special Characters – Format Text – Emphasize – Superscript and Subscript – Font Style and Size – Color – Margins – Mono Spaced Font – Block Quote – Lists – Ordered List – Unordered List – Nested List – Definition List – Images–Addan Image–Back ground Image–Border–Wrap Text Around an Image– Aligning the Image – Horizontal Rule – Use Images in List – Convert an Image to GIF or JPEG

UNIT – IV (20 Hours)

Links - Link to another Web Page – Link within a Web Page – Link to an Image – Link to a File – E-mail Link – Link to an FTP Site – Change Link Colors – Create Keyboard Shortcuts

– Change the Tab Order – Tables – Create a Table – Add a Border – Caption – Column Groups – Row Groups – Color – Background Images – Aligning Data – Size of a Table – Size of a Cell – Span Cells – Cell Spacing and Cell Padding – Borders – Text Wrapping – Nested Tables – Wrap Text around a Table.

Sounds and Videos – Link to a Sound – Sound Considerations – Embedded Sound – Extended Video – Video Considerations – Internal Video – Introduction to Forms – Set up a Form – Text Box – Large Text Area – Check Boxes – Radio Buttons – Menu – Upload Files – Submit and Reset Button – Hidden Field – Organize Form Elements – Label Form Elements – Introduction to Frames – Creating Frames – Frame Considerations – Provide Alternative Information – Link to a Frame - Scroll Bars – Resizing Frames – Frame Borders – Frame Margins – Nested Framesets – Inline Frame.

Recommended Books: (Latest Edition)

1. Alexis Leon & Mathews Leon, “Internet for Everyone”, Leon Tech World, Chennai
2. Eric Kramer, “HTML”.
3. Kamallesh N. Agarwala, Amit Lal & Deeksha Agarwala, “Business of the Net”.
4. John Zabour, Jeff Foust & David Kerven, “HTML 4 HOW- TO”.

SEMINAR ON TRAINING REPORT

Subject Code: BCOM2-506

L T P C

0 0 0 2

Students will submit their summer internship report and give presentation in front of evaluation committee. Department Training and Placement Coordinator will provide them the format of training report and students will submit their report as per the prescribed format.

MRSPTU

6TH SEMESTER

SOFTWARE ENGINEERING

Subject Code: BCOM2-601

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objective: This course aims at

1. To acquire the basic knowledge on software engineering.
2. To enable the students on the functional aspects of software design.
3. To impart knowledge on software maintenance.
4. To gain knowledge on debugging.
5. To apply the concept of managing the software design.

Course Outcomes After completion of this course, students will be able to:

- 1 Understand the concept on software engineering.
- 2 Understand the concept on structured design.
- 3 Remember the techniques of software cost estimation.
- 4 Apply the quired knowledge on debugging.
- 5 To apply the concept of managing the software design.

Unit I (15 Hrs.)

Introduction to Software Engineering: Introduction – Definition –Size factors Quality and productivity factors. Planning a software project: Defining the problem, developing a solution strategy- Planning the development process.

Unit II (12 Hrs.)

Software cost estimation: Software cost factors- Software cost estimation techniques, Estimating software maintenance costs.

Unit III (18 Hrs.)

Software Design: Fundamental design concepts- Coupling and cohesion- Design notations Structured design- Integrated top down development- Design Guidelines. Implementation Issues- Verification and validation techniques: Quality assurance Static analysis- Symbolic execution- Unit testing and debugging- System testing.

Unit IV (15 Hrs.)

Software Maintenance: Enhancing maintainability during development Managerial aspects of software maintenance- Configuration management- Source code metrics.

Suggested Readings:

1. Richard E. Fairley, “Software Engineering Concept”, Tata Mc Graw Hill Pub, Company Ltd., New Delhi.
2. Roger Pressman, “Software Engineering”, Tata Mc Graw Hill Pub, Company Ltd, New Delhi

CYBER LAW

Subject Code: BCOM2-602

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objective: This course aims at:

1. To gain through knowledge on the basic concepts which lead to the formation and execution of electronic contracts.
2. To Study the Technical aspects of Cyber Security and Evidence Aspects.
3. To acquire knowledge on Information Technology Act and EDI.

Course Outcomes After successful completion of this course, students will be able to:

1. Discuss the concepts of Cyber law and Cyber Space.
2. Describe Cyber Security technical aspects.
3. Explain the Evidence Aspects.
4. Understand the Electronic Data Interchange Scenario in India.
5. To gain knowledge on Information Technology Act.

Unit I (15 Hrs.)

Cyber Law: Introduction- Concept of Cyberspace-E-Commerce in India-Privacy factors in E - Commerce-cyber law in E-Commerce-Contract Aspects

Unit II (15 Hrs.)

Security Aspects: Introduction-Technical aspects of Encryption-Digital Signature-Data Security. Intellectual Property Aspects: WIPO-GII-ECMS-Indian Copy rights act on soft propriety works Indian Patents act on soft propriety works.

Unit III (15 Hrs.)

Evidence Aspects: Evidence as part of the law of procedures –Applicability of the law of Evidence on Electronic Records-The Indian Evidence Act1872.Criminal aspect: Computer Crime-Factors influencing Computer Crime- Strategy for prevention of computer crime Amendments to Indian Penal code 1860.

Unit IV (15 Hrs.)

Global Trends- Legal frame work for Electronic Data Interchange: EDI Mechanism Electronic Data Interchange Scenario in India.

The Information Technology Act 2000-Definitions-Authentication of Electronic Records Electronic Governance-Digital Signature Certificates.

Suggested Readings:

1. The Indian Cyber Law: Suresh T. Viswanathan, Bharat Law House, New Delhi
2. Cyber Law & Cyber Crimes By Advocate Prashant Mali; Snow White Publications, Mumbai
3. Cyber Law in India by Farooq Ahmad; Pioneer Books
4. The Indian Cyber Law by Suresh T. Vishwanathan; Bharat Law House New Delhi
5. Guide to Cyber and E- Commerce Laws by P.M. Bukshi and R.K. Suri; Bharat Law House, New Delhi
6. Guide to Cyber Laws by Rodney D. Ryder; Wadhwa and Company, Nagpur

DATABASE MANAGEMENT SYSTEM

Subject Code: BCOM2-603

L T P C
4 0 0 4

Duration: 60 Hrs

Course Objective: The course aims at providing

1. To acquire the basic concept on database system.
2. To enable the students on the functional aspects of SQL.
3. To impart knowledge on various network approach.
4. To gain knowledge on IMS networks.
5. To apply the networking approach in various E-Commerce Activities.

Course Outcomes After the completion of this course students will be able to:

1. Remembering the concept on database system and structure.
2. Gaining the knowledge on key relational approach.
3. Understanding the embedded SQL at various operations.
4. Gain knowledge on IMS networks.
5. Apply the networking approach.

Unit I (15 Hrs.)

INTRODUCTION to database Management System: Database System Architecture Basic Concepts: Data System, Operational data, data Independence, Architecture for a database system, Distributed databases, Storage Structures: Representation of Data. Data Structures and corresponding operators: Introduction, Relation Approach, Hierarchical Approach, Network Approach

Unit II (15 Hrs.)

Types of Approaches: Relational Approach:- Relational Data Structure: relation, domain, attributes, keys Relational Algebra : Introduction, Traditional set operation. Attribute names for derived relations. Special relational operations.

Unit III (15 Hrs.)

Embedded SQL: Introduction – Operations not involving cursors, involving cursors - Dynamic statements, Query by Example – Retrieval operations, Built – in – functions, update operations. QBE Dictionary. Normalization: Functional dependency, First, Second, third normal forms, Relations with more than one candidate key, Good and bad decomposition

Unit IV (15 Hrs.)

Hierarchical Approach: IMS data structure. Physical Database, Database description. Hierarchical sequence. External level of IMS: Logical Databases, the program communication block IMS Data manipulation.

Network Approach: Architecture of DBTG system. DBTG Data Structure: The set construct, Singular sets, Sample schema, the external level of DBTG – DBTG Data manipulation.

Suggested Readings:

1. An introduction to Database Systems - Bipin C Desai
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, Sixth Edition.
3. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition.
4. Fundamentals of Database Systems, Elmasri Navathe Pearson Education.
5. An Introduction to Database systems, C.J. Date, A.Kannan, S.Swami Nadhan, Pearson, Eight Edition

MRSPTU

INTERNATIONAL TRADE

Subject Code: BCOM2-604

L T P C
4 0 0 4

Duration: 60 Hrs

Course Objective: The objective of this course is

1. To analyze the trade patterns.
2. To critically explore issues and policies in International Economics.
3. To apply theoretical principles of international trade to the prevailing global economic environment.

Course Outcomes After completion of this course, students will be able to:

1. To gain conceptual clarity of the theoretical aspects, foundations and principles of International Economics.
2. To examine the broad pattern of changes in the arena of International Economic Policy and the evolving Global Economic environment.
3. To comprehend the complexities of theories, problems and policies in International Economics.
4. To gain fundamental exposure to the role, structure and functioning of international institutions/organizations.

Unit I (18 Hrs.)

Theories of International Trade: An Introduction, Globalization of the World Economy, Deglobalization, The Mercantilist Views on Trade, The Theory of Absolute Cost Advantage & The Theory of Comparative Cost Advantage, Two-by-Two-by-Two Sector Model A critical review is carried out regarding the assumptions, principles, limitations and comparison of the early trade theories. Case study – Growth Story of the Southeast Asian Countries/ASEAN economies (to understand how trade has helped economy to grow) and Policies adopted by them which helped trade facilitation.

Modern Theories of International Trade: Product Cycle Theory, Linders Theory of Volume of Trade and Demand Pattern, Krugman's Alternative Theory of Trade, Gravity Model.

Unit II (15 Hrs.)

Terms of Trade and Determination of Exchange Rate: Concepts and Measurement of Terms of Trade, Factors affecting Terms of Trade of a Country, Exchange Rate Determination A critical review is undertaken of the Terms of Trade of Developed and Developing nations and the applicability of the BOP and PPP Theories.

Unit III (12 Hrs.)

Commercial Policy – Barriers to Trade, Basic Principles of WTO, Government Intervention in Trade, Trade Restrictions: Tariffs and Non-Tariff Barriers, Exchange Control, Dumping.

Unit- IV (15 Hrs)

Balance of Payments and Trade Distortions: Equilibrium and Disequilibrium in BOP, Measures to correct disequilibrium, Current and Capital Account convertibility, Protectionism in the changing world scenario, Role of WTO in reducing trade distortions, Effect of Covid-19 Pandemic on Trade.

Suggested Readings:

1. Bhatia. H L (2006) International Economics, Vikas Publishing N. Delhi.
2. Carbaugh Robert (2009) International Economics, J.S.W. College Publication.
3. Cherunilam Francis (2017) International Economics-By Tata Mcgraw Hill N. Delhi.
4. Gandolfo Giancarlo (2006) Elements Of International Economics N. Delhi Abe Books Private Ltd • JhinganM.L(2012) International economics-6th ed. Vrinda Publications
5. Krugman Paul, Maurice Obstfeld, and Marc Melitz, (2012).International Economics: Theory and Policy, Addison-Wesley (Pearson Education Indian Edition), 9th edition.
6. Krugman R. Paul, Kindersley Dorling (2009) International economics-6th ed.
7. Kenneth, A.R (2012). An Introduction to International Economics, Cambridge university Press(2012)
8. Suranovic Steve,(2010) International Trade: Theory and Policy, Saylor Foundation

DATA VISUALIZATION LAB

Subject Code: BCOM2-605

**L T P C
0 0 4 2**

Duration: 30 Hrs

Course Objectives: This course aims at:

1. To learn software to manage monetary data.
2. To work on formulas and functions for data handling.
3. To develop professional skills for data management.

Course Outcomes After completing this course, students will be able to:

1. Use data handling software to manage monetary data.
2. Work with formulas and functions.
3. Develop professional-looking worksheets with charts and graphs, data tables by using web tools.
4. Use spreadsheet's solver for complex problems.

UNIT- I (08 Hrs)

Managing Data: Introduction, Naming and Moving Worksheets, Copying Worksheets, Adding, Deleting and Hiding Worksheets, Grouping Worksheets Conditional Formatting, Date and Time Function: Date, Day, Month, Year, Edate, Eomonth, Network days, Workday, Weeknum, Weekday, Hour, Minute, Second, Now, Today Time Look Up Functions: Data Validation, Advanced Range Names, VLookUp, H LookUp

UNIT- II (07 Hrs)

Logical Functions: IF Function, Nested IF, CountIf, SumIf, IF with AND and OR, Average, Averagea, Averageif, Averageifs, Subtotal, Rand, Rand between, Roundup, Round down

UNIT-III (07 Hrs)

What if Analysis, Scenario Analysis, Sensitivity Analysis, Goal Seek, Advanced Pivot Table: Filtering Pivot Tables, Pivot Table Analysis, Proper Function, Trim Function, Advance Pivot Charts

UNIT-IV (08 Hrs)

Financial Functions: Time Value of Money- NPV/ IRR/ Discounting and other financial functions Statistical Function – Correlation, Regression.

Suggested Readings:

1. Greg Harvey, _Microsoft Excel 2016 All-in-One for Dummies, Wiley Publications
2. Lokesh Lalwani, _Excel 2019 All – In – One‘ BPB Publication
3. Manisha Nigam, _Data Analysis with Excel‘ BPB Publication
4. Paul McFedries, _Excel 2016- Formulas and Functions‘ Que Publications

MAJOR PROJECT

Subject Code: BCOM2-606

L T P C
0 0 0 4

A Faculty supervisor will be appointed to the students from the department. In consultation with the supervisor, student will decide their topic. Students can do their project on any topic of their choice (Commerce/Banking/Internet/Tax etc.) and submit the project in the department. Students must give presentation on their project in the department. Their final evaluation will be done based on the work done in the project and their performance during presentation and Viva Voce.

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**MRSPTU INTEGRATED/DUAL DEGREE B.COM-M.COM SYLLABUS
2021 BATCH ONWARDS**

Semester – VII

Subject Code	Subject Name	Contact Hours			Marks			Credit
		L	T	P	Int.	Ext.	Total	
Generic Elective								
BMCMS1-701	Organization Behavior	4	-	-	40	60	100	4
Core Papers								
BMCMS1-702	Corporate Tax Planning	4	-	-	40	60	100	4
BMCMS1-703	International Accounting	4	-	-	40	60	100	4
BMCMS1-704	Merger, Acquisition and Valuation	4	-	-	40	60	100	4
Discipline Specific Elective								
BMCMS1-705	Advertising and Sales Management	4	-	-	40	60	100	4
Skill Enhancement Course								
BMCMS1-706	Social Entrepreneurship	3	-	-	40	60	100	3
Ability Enhancement Compulsory Course								
BMCMS1-707	Business Plan Development Project & Presentation	-	-	-	60	40	100	2
	Total	23	-	-	300	400	700	25

**MRSPTU INTEGRATED/DUAL DEGREE B.COM-M.COM SYLLABUS
2021 BATCH ONWARDS**

Semester – VIII

Subject Code	Subject Name	Contact Hours			Marks			Credit
		L	T	P	Int.	Ext.	Total	
Generic Elective								
BMCMS1-801	CSR & Business Ethics	4	-	-	40	60	100	4
Core Papers								
BMCMS1-802	International Finance	4	-	-	40	60	100	4
BMCMS1-803	Marketing Research	4	-	-	40	60	100	4
BMCMS1-804	Advanced Auditing Practices in Business	4	-	-	40	60	100	4
Discipline Specific Elective								
BMCMS1-805	Banking Law and Practices	4	-	-	40	60	100	4
Skill Enhancement Course								
BMCMS1-806	Communication Skills and Personality Development	3	-	-	40	60	100	3
Ability Enhancement Compulsory Course								
BMCMS1-807	Business Statistics Research Lab	-	-	2*2	60	40	100	2
	Total	23	-	4	300	400	700	25

**MRSPTU INTEGRATED/DUAL DEGREE B.COM-M.COM SYLLABUS
2021 BATCH ONWARDS**

Semester – IX

Subject Code	Subject Name	Contact Hours			Marks			Credit
		L	T	P	Int.	Ext.	Total	
Generic Elective								
BMCMS1-901	Operation Research	4	-	-	40	60	100	4
Core Papers								
BMCMS1-902	Financial Risk Management in Banks	4	-	-	40	60	100	4
BMCMS1-903	International Financial Reporting System	4	-	-	40	60	100	4
BMCMS1-904	Management of Financial Services	4	-	-	40	60	100	4
Discipline Specific Elective								
BMCMS1-905	Services Marketing	4	-	-	40	60	100	4
Skill Enhancement Course								
BMCMS1-906	Advanced Computerized Accounting Lab	-	-	2*2	60	40	100	2
Ability Enhancement Compulsory Course								
BMCMS1-907	Seminar on Contemporary Issues in Business	2	-	-	60	40	100	2
	Total	22	-	4	320	380	700	24

Semester – X

Subject Code	Subject Name	Contact Hours			Marks			Credit
		L	T	P	Int.	Ext.	Total	
Ability Enhancement Compulsory Course								
BMCMS1-011	Internship Project	-	-	-	360	240	600	30
	Total	-	-	-	360	240	600	30

7TH
SEMESTER

ORGANIZATION BEHAVIOUR

Subject Code: BMCMS1-701

L T P C

Duration: 60 Hrs

4 0 0 4

Course Objectives: The aim of this course is-

1. To provide an understanding of basic concepts, theories and techniques in the field of human behaviour at the individual, group and organizational levels in the changing global scenario.
2. To develop strategies to improve employee engagement and motivation.
3. To understand how individual, groups and structure have impacts on the organizational effectiveness and efficiency.

Course Outcomes: After completing this course, the students will be able to -

1. Identify, explore and examine factors impinge on individual and group behaviour in organizations in the new millennium.
2. Explain the terminology associated with organizational behaviour.
3. Incorporate and apply the predominant organizational behaviour theories to gain knowledge of contemporary issues in organizational behaviour and frameworks to work with real life organizational issues concerned with Human Behaviour at work place.

UNIT-I (15 Hrs)

Organizational Behaviour: Concepts, Theories and organization aspects of OB, Contributing Disciplines to OB, challenges and opportunities for OB. Foundations of Individual Behaviour: Biographical Characteristics, Learning, Theories of Learning, Ability, Attitudes, Attitude Change, Values & Beliefs, Prejudices.

Personality: Determinants of Personality, Perception, Attribution Theory, Person's Perception.

UNIT-II (15 Hrs)

Motivation: Definition & Process, Early Theories of Motivation, Contemporary Theories of Motivation, Nature and process of Motivation, Application of Motivation Concept.

Job Satisfaction: Nature & Significance of Job satisfaction.

Leadership: Nature Significance & Theories; Leadership Effectiveness Model; Leadership in Indian Culture; Leadership Traits & Skills; Behavioural Styles in Leadership. Transactional Analysis, Life Position, Johari Window Model.

UNIT-III (15 Hrs)

Foundations of Group Behaviour: Nature & Concept of Group Formation, Group properties: Roles, Norms, Status, Size and Cohesiveness, Stages of Group Formation, Theories of Group Formation. Teams, Work Teams, Difference between Group & Team.

Group Decision Making: Decision Making Process; Decision Making Styles; Advantages & Disadvantages of Decision Making; Techniques of Decision Making; Consensus Decision Making in Groups.

Conflict Management: Definition of Conflict, Transitions in Conflict thought; Functional Vs Dysfunctional Conflict; Conflict Process; Individual, Group Level Conflict and Organization level Conflict; Managing Organizational Conflict Negotiations - Meaning & Definition, Negotiations Process; Issues in Negotiations.

UNIT-IV (15 Hrs)

Organizational Change & Development: Understanding Organization, Managing Organization Culture and Technology, Organizational Change: Change Agents, Change Models, Resistance to Change.

Managing Power and Politics in Organization: Nature & Concepts, Sources & Types of Power, Techniques of Politics.

Recommended Books

1. Robbins, 'Organization Behaviour', Pearson Education.
 2. Luthans, 'Organization Behaviour', Tata McGraw Hill.
 3. Hersey, 'Management of Organizational Behaviour', Prentice Hall India.
 4. Aswathappa, 'Organization Behaviour', Himalaya Publications.
 5. L.M. Prasad, 'Organisation Behaviour', Sultan Chand & Sons.
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CORPORATE TAX PLANNING

Subject Code – BMCMS1- 702

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objectives

The aim of this course is:

1. To acquaint the students with basic principles underlying the provisions of direct and indirect tax laws and to develop a broad understanding of the tax laws and accepted tax practices.
2. To identify the technical terms related to Corporate Tax Planning.
3. To prepare the students to have a thorough knowledge about the planning and management of corporate taxation.

Course Outcomes

After completing this course, the students will be able to:

1. Know the various tax policies of the Indian government.
2. Gather practical knowledge required for tax procedures and systems.
3. Understand tax evasion and tax avoidance; Nature and scope of tax planning and management in the corporate sector; Justification of corporate tax planning and management.

UNIT-I (15 Hrs.)

Structure of Direct and Indirect Taxes in India, Meaning of Tax Planning and Management, Tax Evasion and Tax Avoidance; Nature and Scope of Tax Planning and Management in the Corporate Sector; Justification of Corporate Tax Planning and Management, Taking Advantages of Available Reliefs, Rebates and Tax Free Sources of Income.

UNIT-II (15 Hrs.)

Definition of Various Kinds of Companies - Meaning of Company under IT Act, Residential Status of Companies and Implications for Tax Planning, Assessment of Companies Including Carry Forward and Set Off of Losses.

UNIT-III (15 Hrs.)

Tax Planning with Reference to Setting up of a New Business, Tax Planning with Reference to Location of Business. Tax Planning with Reference to Nature of Business, Tax Planning with Reference to Form of Organization.

UNIT-IV (15 Hrs.)

Tax Planning with reference to Financial Management Decisions, Tax Planning with reference to Managerial Decisions, Tax Planning in respect to Employee's Remuneration, Tax Planning and Adoption of Method of Accounting. Tax planning regarding Capital Gains, Tax Planning in respect of Amalgamation or Demerger.

Recommended Books

1. V.K. Singhania, 'Direct Taxes: Planning and Management'.
2. Girish Ahuja, 'Direct Taxes: Law and Practice'.
3. Bhagwati Prasad, 'Law and Practice of Income Tax in India'.
4. R.N. Lakhotia, 'Corporate Tax Planning'.

MRSPTU

INTERNATIONAL ACCOUNTING

Subject Code – BMCMS1-703

L T P C

Duration: 60 Hrs.

4 0 0 4

Course Objectives

The aim of this course is:

1. To develop students' knowledge of accountancy, particularly in relation to international accountancy through a more in depth and broader study of its contents.
2. To impart knowledge to the students regarding the application of international accounting principles in different situations.
3. To make students capable of tackling issues in prevailing regulatory environments.

Course Outcomes

After completing this course, the students will be able to:

1. Understand accounting knowledge about complex business activities and they are also able to develop a global perspective of business situation and institutions.
2. Apply the knowledge of fundamental concepts of finance.
3. Learn the knowledge of accounting policy and accounting treatment about complex business activities. Students will also be able to understand the differences in accounting policies around the world.

UNIT-I (15 Hrs.)

International Standards and Organization: The International Accounting Standards Board (IASB)-The role and the standard setting process, advantages, supporting and deterring forces; International and Regional Efforts in Standard Setting; International Standards setting process; IFRS adoption or convergence by Indian Companies. The IASB-International Financial Reporting Standards framework for: First-Time Adoption of International Financial Reporting Standards; Accounting Policies; Changes in Accounting Estimates and Errors.

UNIT-II (15 Hrs.)

International Dimensions of accounting and control: Multinational enterprise, Internationalization of capital markets, Internationalization of accounting profession. Operational and conceptual issue.

Foreign currency translations: methods and practices.

Managerial Accounting Issues: Strategic Planning; Management Control Systems; Performance Evaluation of foreign operations.

UNIT-III (15 Hrs.)

Specific Reporting Issues: Regulatory Disclosure Requirements; Foreign Operations Disclosure; Social Responsibility Disclosures.

Financial Statement Analysis of companies and countries differences in accounting principles, foreign currency statements and Ratio Analysis.

Transfer pricing, methods, objectives, strategies. Emerging issues in International Accounting.

UNIT-IV (15 Hrs.)

The Effects of changes in foreign exchange rate, Accounting for government grants and disclosure of government assistance, Segment Reporting, Exploration for and evaluation of mineral resources, Construction contracts and Employment and post-employment benefits.

Recommended Books

1. Chartered Institute of Management Accountants. CIMA dictionary of finance and accounting. London: Bloomsbury.
 2. B. Elliott, & J. Elliott, 'Financial Accounting and Reporting', Harlow: Pearson/Prentice Hall.
 3. S. Agarwal, 'Manual of Accounting Standards', Snow White.
 4. T.P. Ghosh, 'Accounting Standards and Corporate Accounting Practices', Taxmann Publishers.
 5. Bhabatosh Banerjee, 'Regulation of Corporate Accounting and Reporting in India', World Press.
 6. Lev Baruch, 'Financial Statement Analysis- A New Approach', Prentice Hall.
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MERGER, ACQUISITION AND VALUATION

Subject Code- BMCMS1- 704

L T P C

Duration: 60 Hrs

4 0 0 4

Course Objectives

The aim of this course is:

1. To gain the understanding of Merger and Acquisition at corporate level.
2. To teach the valuation of companies during merger and acquisition.
3. To get familiarize with major corporate restructuring strategies.
4. To get an understanding of valuation and analytical tools.

Course Outcomes

After completing this course, the students will be able to:

1. Examine appropriate strategies for Merger and Acquisitions.
2. Analyze the effect of financing decisions on organization structure, firm performance.
3. Understand the Shareholder's perspective involved in Merger and Acquisitions.

UNIT-I (15 Hrs)

Corporate Restructuring: Meaning of Merger & Acquisitions, Types of Mergers, Process of Merger & Acquisition, Motives Behind Merger & Acquisition, Difference between Merger & Acquisition, Securities and Exchange Board of India (Substantial Acquisition of Shares and Takeovers) Regulations, 2011.

UNIT-II (15 Hrs)

Corporate Takeovers: Motivations, Cross Border Take Overs, Takeover Strategies, Anti Takeover Strategies, Change in Ownership: Buy Back of Shares, Leverage Buyouts (LBO), LBO Process, Management Buyouts (MBO), Going Private, Exchange Offer, Reverse Merger, Financial Restructuring.

UNIT-III (15 Hrs)

Exit Strategies: Demerger: Introduction, Types of demerger – Sell off, Equity Carve out, Divestiture, Tracking Stocks, Stock Split.

Post-Merger Integration: Critical success factors for post-merger integration, Ingredients of integration, Timing and Speed of integration, approaches to integration, Challenges in integration.

UNIT-IV (15 Hrs)

Overview of Business Valuation: Genesis of Valuation, Need for Valuation, Hindrances / Bottlenecks in Valuation, Business Valuation Approaches, Principles of Valuation (Cost, Price and Value)

Valuation of Business and Assets for Corporate Restructuring: Type of Valuations, Valuation Principles, Relative Valuation.

Valuation of Merger & Acquisition: Shareholder Value Analysis, Determination of Swap Ratio, Determination of Financial Benefits of Merger & Acquisitions internal and external change forces contributing to M & A activities- Impact of M & A on stakeholders.

Recommended Books

1. J F Weston & S C Weaver, Mergers & Acquisition: Tata McGraw Hill.
 2. Stowell David, “Investment Banking, Hedge Funds & Private Equity”, Elsevier.
 3. Subramanian Pratap: Investment Banking (concepts, analyses and cases).
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ADVERTISING AND SALES MANAGEMENT

Subject Code – BMCMS1- 705

L T P C

Duration – 60 Hrs

4 0 0 4

Course Objectives

The aim of this course is:

1. To explore how companies use advertising and marketing to sell products.
2. To evaluate different strategies for selling products.
3. To learn how to use persuasive sales techniques.

Course Outcomes

After completing this course, the students will be able to:

1. Explain use of advertising and sales management as a marketing tool.
2. Identify key players in advertising industry.
3. Explain appropriate selection of media.
4. Identify and make decisions regarding the most feasible advertising appeal, media mix and sales force.

UNIT-I (15 Hrs)

Introduction: Definition, Nature and Evolution of advertising, its functions and role and types of advertising Social, Economic and Legal aspects of advertising. Advertising and Marketing Mix, Advertising and Communication Process.

Advertising Budget: Objectives, Preparation and Methods of Advertising Budget.

UNIT-II (15 Hrs)

Advertising Agency: Function, Selection and Compensation.

Advertising Media: Different Types of Media, Function, Merits and Demerits of Media, Selection of media and its vehicles.

Copy Writing: Different Elements of a Copy and Layout.

UNIT-III (15 Hrs)

Introduction to Sales Management: Nature, role and importance. Functions of sales manager.

Sales Organization: Formal, Informal, Horizontal, Vertical, Centralized, Decentralized, Geographic, Customer, Product, Combination, Organizations.

UNIT-IV (15 Hrs)

Planning and recruitment of sales force: Job analysis specification, Job description, Sources of Recruitment, Selection of Sales Person.

Sales Force Motivation: Nature, Importance, Factors Influencing the Motivation of sales force.

Evaluation of Sales Forces Performance: Qualitative and Quantitative Basis to Evaluate Sales Force Control and Budget.

Relevant Case Studies should be discussed in class.

Recommended Books

1. Belch, George E. and Belch, Michael A. “Advertising and Promotion”, Tata McGraw Hill.
2. Guinn, Allen, Chris T., Semenik, Richard J. “Advertising & Integrated Brand Promotion”, Thomson – South Western.
3. Batra, Rajeev, Mayers, John G., and Aaker, David A. “Advertising Management”, Pearson Education, New Delhi.
4. Spiro, Stanton and Rich “Management of a Salesforce”, Tata McGraw Hill.

MRSPTU

SOCIAL ENTREPRENEURSHIP

Subject Code–BMCMS1- 706

L T P C

Duration – 45 Hrs

3 0 0 3

Course Objectives: The aim of this course is-

1. To provide knowledge about The Social Entrepreneurship.
2. To help students to develop “a Social entrepreneurial imagination and to bring out the practice of Social.
3. To create viable socio-economic structures, relations, institutions, organizations and practices, that yield and sustain social benefits.

Course Outcomes: After completing this course, the students will be able to -

1. Know the parameters to assess opportunities and constraints for social entrepreneurship.
2. Understand the systematic process to select social entrepreneurship and screen a business idea.
3. Understand various funding opportunities available for social entrepreneurship and new ventures.

UNIT-I (10 Hrs)

Social Entrepreneur, Social Entrepreneurship and Social Enterprises: Meaning, definition: Social entrepreneur, social entrepreneurship, and social enterprises. Characteristics of Social Entrepreneurship - Explicitly formulated mission to create and sustain social value and to benefit the communities, high degree of economic risk and autonomy in activities related to producing goods and/or selling services, pursuit of new opportunities and exploration of hidden resources.

UNIT-II (15 Hrs)

Social Entrepreneurship Process: The Timmons Model of the Entrepreneurship Process, The PCDO (The People, Context, Deal, and opportunity) frame work, The Case Model, The Social Entrepreneurship Frame work. Sources of Social Entrepreneurship -Public Sector, Private Sector, Voluntary Sector. 7 Qualities and Skills of Social Entrepreneur - Entrepreneurial, innovative, transformatory, leadership, storytelling, people, questions and doubts, accountability, succession, scale.

UNIT-III (10 Hrs)

Social Entrepreneurship In Practice: Bangladesh Rural Advancement Committee (BRAC), The Grameen Bank (GB), The Self Employment Women’s Association (SEWA), Aravind Eye Hospital, Barefoot College, Bhartia Samruddhi Investment & Consulting Services (BASIX), Narayana Hrudayalaya Institute of Medical Sciences, Technology Informatics Design Endeavour (TIDE). Boundaries of Social Entrepreneurship – Social service provision, Social activism.

UNIT-IV (10 Hrs)

Ethical Entrepreneurship and Challenges In Social Entrepreneurship: Ethical entrepreneurship: Meaning. Empirical ethics, eternal ethics. Entrepreneur and customer,

Entrepreneur and employee, Entrepreneur and Government. Challenges in Social Entrepreneurship.

Recommended Books

1. Robert A. Philips Margret Bonefiel Ritesh Sharma, Social entrepreneurship, the next big business opportunity Global Vision Publishing House, New Delhi, 2011.
2. S.S.Khanka, Entrepreneurship in India, perspective and practice, Akansha publishing house, New Delhi, 2009.
3. Jill Kickul and Thomas S.Lyons, Routledge, Understanding social entrepreneurship, the relentless pursuit of mission in an ever changing world, New York, 2012.
4. Vasanth Desai, Entrepreneurial development, Himalaya Publishing House, 2008, web resources.

BUSINESS PLAN DEVELOPMENT PROJECT & PRESENTATION

Subject Code–BMCMS1- 707

L T P C

0 0 0 2

Students will explore the various business opportunities in rural and urban areas and will prepare a business plan. Students will learn about preparation of Business Plan and its development in this project. They will submit the project in the department and will give presentation on the basis of their project report. It may be individual or group project

8TH
SEMESTER

CSR and BUSINESS ETHICS

Subject Code: BMCMS1-801

L T P C

Duration: 60 Hrs

4 0 0 4

Course Objectives

The aim of this course is:

1. To discuss the various concepts of Corporate Social Responsibility (CSR).
2. To understand the importance of sustainability and social responsibility with context business and how they integrate into the vision and planning of the firm.
3. To understand the changing role of Business with context to the society.

Course Outcomes

After completing this course, the students will be able to:

1. Understand about Corporate Social Responsibility, Business Ethics, Models and its strategies.
2. Evaluate corporate governance, ethical culture and its practices across various business areas.
3. Comprehend sustainability and its relationship with CSR and Business Ethics.
4. Apply the reporting system of National Voluntary Guidelines on Social, Environmental and Economic Responsibilities of Business International Standards.

UNIT-I (15 Hrs)

Introduction to Corporate Social Responsibility (CSR): Meaning, Definition & Objectives of CSR, Chronological evolution of CSR in India; Need of CSR, Models of CSR in India, Carroll's model; Drivers of CSR; Major codes on CSR; Initiatives in India, Corporate citizenship-Business practices-Strategies for CSR-Challenges and implementation.

Sustainability: Meaning and Scope, Corporate Social Responsibility and Corporate Sustainability-Sustainability Terminologies and Meanings-Why is Sustainability an Imperative.

UNIT-II (12 Hrs)

Evolution of Corporate Governance-Governance practices and regulation-Structure and Development of boards-Role of capital market and government-Governance Ratings-Future of governance Corporate Sustainability Reporting Frameworks, Global Reporting Initiative Guidelines, National Voluntary Guidelines on Social, Environmental and Economic.

UNIT-III (15 Hrs)

Business Ethics: Characteristics, Principles, Types, Importance, Factors highlighting the importance of Business Ethics, Myths about Business Ethics. Ethical Values, Theories of Ethics, Absolutism verses Relativism, Teleological approach, the Deontological approach, Kohlberg's six stages of moral development (CMD), Ethics v/s Ethos, Indian v/s Western Management, Globalization and Business Ethics. Emerging issues of Business Ethics.

UNIT-IV (18 Hrs)

Managing Ethical Dilemma: Characteristics, Ethical Decision Making, Ethical Reasoning, the dilemma resolution process; Ethical dilemmas in different business areas: Finance, Marketing HRM and International Business.

Ethical Culture in Organization: Developing Codes of Ethics and Conduct, Ethical and Value Based Leadership. Role of scriptures in understanding ethics, Indian wisdom & Indian Approaches towards Business Ethics.

Recommended Books

1. C.V. Baxi and Ajit Prasad, 'Corporate Social Responsibility: Concepts and Cases: The Indian Experience', Excel Books India, New Delhi, *Latest Edition*.
2. Mike Blowfield and Alan Murray, 'Corporate Responsibility', Oxford University Press, *Latest Edition*.
3. J.P. Sharma, Corporate Governance, Business Ethics & CSR, Ane Books Pvt Ltd, New Delhi. *Latest Edition*.

INTERNATIONAL FINANCE

Subject Code: BMCMS1-802

L T P C

Duration: 60 Hrs

4 0 0 4

Course Objectives

The aim of this course is:

1. To learn the global financial system.
2. To understand the financial decision making at Multinational companies.
3. To familiarize students with unique international economic factors that helps in policy making in companies.

Course Outcomes

After completing this course, the students will be able to:

1. Gain knowledge on global monetary system.
2. Examine the foreign exchange market and evaluate foreign exchange exposure and risk.
3. Evaluate Conceptual and analytical frame work of international financial institutions and working capital management.

UNIT –I (15 Hrs)

International Finance: Introduction: Growing Importance of International Finance, Factors affecting International Trade flows.

Balance of Payments: Introduction, Basics of BOP, Current Account Surplus and Deficit, Capital Account Convertibility, J – Curve.

International Monetary System: Evolution, Classical Gold Standard, Bretton Woods System, Failure of Bretton Wood System, Flexible Exchange Rate Regime, The European Monetary Union (EMU) – Origin and Functions of EMU.

UNIT –II (15 Hrs)

Foreign Exchange Market: Function and Structure of the Forex markets, Major Participants, Types of transactions and settlements.

Parity Conditions in International Finance: Relationship between Inflation, Interest Rates and Exchange Rates, Purchasing Power Parity – Absolute and Relative, Covered Interest Rate Parity, Real Interest Parity Conditions, The Fisher effect, The International Fisher Effect.

Foreign Exchange Rate: Types – Spot Rate, Forward Rate and Cross rate, Determination of Exchange Rate, Foreign Exchange Quotations, Types and Settlements, Factors Influencing Foreign Exchange Rates. The Relationship between Forward and Future Spot Rate.

UNIT –III (15 Hrs)

Foreign Exchange Risk Management: Measuring and Managing Transaction Exposure, Economic Exposure and Translation Exposure, Country Risk Analysis.

Currency Derivatives: Currency Futures, Currency Options, Currency Swaps and Functions of Currency Derivative Market, Interest Rate Derivatives.

UNIT – IV (15 Hrs)

Multilateral Financial Institutions: World Bank – Origin and Functions; International Monetary Fund(IMF) – Origin, Functions, Regional Development Banks, Different International Development

Association (IDA) - International Finance Corporation (IFC), OPEC, ADB.

International Market: International Bond Markets, Floating Rate Bonds, Dual Currency Bonds, Equity Related Bonds, ADR, GDR and Special Drawing Rights (SDRs), Securitisation.

Recommend Books

1. P.G.Apte, 'International Financial Management', Tata McGraw-Hill, New Delhi.
2. Jeff Madura, 'International Financial Management', 6th edition, Thomson Publications.
3. Maurice D.Levi, 'International Finance', 3rd edition, Tata Mc Graw-Hill, New Delhi.
4. P.K Jain, Josette Peyrard and Surendra S. Yadav, 'International Financial Management', Macmillan Publishers.
5. S.EunChoel and Risnick Bruce, 'International Financial Management', Tata Mc Graw Hill.

MARKETING RESEARCH

Subject Code – BMCMS1-803

L T P C

Duration – 60 Hours

4 0 0 4

Course Objectives

The aim of this course is:

1. To make the student aware of the research angle to marketing at a basic level.
2. To familiarize students with the fundamentals of Marketing Research.
3. To provide the students with basic understanding of research process and tools for the same.

Course Outcomes

After completing this course, the students will be able to:

1. Understand basic of research process and tools.
2. Understand techniques required for research and report writing.
3. Demonstrate research concepts through research report, exhibit research design, data collection method, analysis and interpretation in the report.

UNIT–I (15 Hrs)

Introduction to Research: Meaning, Definition, Objective and Process, Qualitative Research, Quantitative Research, Research Ethics.

Research Design: Meaning, Types - Historical, Descriptive, Exploratory and Experimental.

Research Problem: Necessity of Defined Problem, Problem Formulation, Understanding of Problem.

Literature Review: Identifying, Accessing and Managing Sources of Information and Scholarly Literature- Academic Writing and Referencing, Steps in Literature Review Development, Argumentation.

Design of Experiment: Basic Principal of Experimental Design, Randomized Block, Completely Randomized Block, Latin Square, And Factorial Design.

UNIT–II (15 Hrs)

Sources of Data: Primary and Secondary, Validation of Data.

Data Collection Methods: Survey, Questionnaire: Process of Questionnaire Design, Information Required, Interview Method, Questionnaire Format and Question Composition, Individual Question Content, Questions Order, Form and Layout, Pilot Testing the Questionnaire.

Sampling Design & Techniques – Probability Sampling and Non Probability Sampling.

Scaling Techniques: Meaning & Types.

Reliability: Test – Retest Reliability, Alternative Form Reliability, Internal Comparison Reliability and Scorer Reliability.

Validity: Content Validity, Criterion Related Validity and Construct Validity.

UNIT–III (15 Hrs)

Data Process Operations: Editing, Sorting, Coding, Classification and Tabulation.
Analysis of Data: Statistical Measure and Their Significance, Central Tendency, Dispersion, Correlation: Linear and Partial, Regression: Simple and Multiple Regression, Skewness, Time series Analysis, Index Number.
Hypothesis: Introduction, Types, Formulation of Hypothesis, Type-I Error, Type –II Error.
Testing of Hypothesis: Steps of Hypothesis Testing, T-test, Z- test, Chi Square, F-test, ANOVA.

UNIT – IV (15 Hrs)

Multivariate Analysis: Factor Analysis, Discriminant Analysis, Cluster Analysis, Conjoint Analysis, Multi-Dimensional Scaling.
Report Writing: Essentials of Report Writing, Report Format.
Research Proposal: Purpose, Nature and Evaluation - Content and Format.
Practical Considerations - Timelines, Budgets, Supervision Management, Presentation and Defence of proposals.
Statistical Software: Application of Statistical Softwares like SPSS, MS Excel, Eviews in Data Analysis.

Recommended Books

1. R.I Levin and D.S. Rubin, ‘Statistics for Management’, Pearson Education New Delhi, Seventh Edition.
2. N.K. Malhotra, ‘Marketing Research–An Applied Orientation’, Pearson Education New Delhi, Fourth Edition.
3. Donald Cooper, ‘Business Research Methods’, Tata McGraw Hill New Delhi.
4. Sadhu Singh, ‘Research Methodology in Social Sciences’, Himalaya Publishers.
5. Darren George & Paul Mallery, ‘SPSS for Windows Step by Step’, Pearson Education New Delhi.
6. C.R.Kothari, ‘Research Methodology Methods & Techniques’, New Age International Publishers, Second Edition.

ADVANCED AUDITING PRACTICES IN BUSINESS

Subject Code – BMCMS1-804

L T P C

Duration – 60 Hours

4 0 0 4

Course Objectives

The aim of this course is:

1. To educate the present auditing practices, conceptual understanding, different terminologies, International Auditing practices, comparison with Indian Auditing practices.
2. To know leading & Top Auditing Firms and its importance, to learn Auditing and Digitalization, Indian Standards on Auditing (SA), major scams in India and its impact on economy of the Country.
3. To know the importance of auditing with different accounting practices.

Course Outcomes

After completing this course, the students will be able to:

1. Understand the conceptual ideology of auditing and its practices.
2. Compare the national auditing practices with international auditing principles.
3. Have a detailed knowledge on Auditing Standards and its uses.
4. Evaluate impact of auditing on the Indian & global economy and its contribution for the economic development.

UNIT-I (15 Hrs)

Introduction - Objectives of Auditing, Different Types of Auditing, Auditor Qualification, Qualities, Rights and Duties, Computerised Environment, Auditing and Digitalisation, Audit Programme, Internal Check and Internal Control. Government Accounting, Professional Accounting, Auditing Boards GAAS, CAG, PCAOB.

UNIT-II (15 Hrs)

Auditing Standards - Generally Accepted Auditing Standards, Introductory Matters SA 100-199, General Principles and Responsibilities SA 200-299, General Activities SA 1200, Auditor Communications SA 260, Quality Control for an Audit of Financial Statements, Statements SA 220 and Guidance Notes -Case studies.

Audit Procedures - Audit Planning and Risk Assessment SA 300-499, Auditing Internal Control Over Financial Reporting, Audit Procedures in Response to Risks—Nature, Timing, and Extent, Auditor's Responsibilities Regarding Supplemental and Other Information, Concluding Audit Procedures, Post-Audit Matters. Case Studies.

UNIT-III (15 Hrs)

Audit Reports - Auditor Reporting SA 700-799, Reporting on Audits of Financial Statements, Other Reporting Topics, Matters Relating to Filings Under Federal Securities Laws, Other Matters Associated with Audits (SA 6101, SA 6105, SA 6110, SA 6115). Standards on Quality

Control (SQC), Standards on Auditing (SAs), Audit Committee and Corporate Governance, Audit of Limited Companies Schedule III of Companies Act 2013, Environmental Auditing, Audit Data Analytics, Case Studies - Leading & Top Auditing Firms -Case studies.

UNIT-IV (15 Hrs)

Audit Regulation and Laws - CAG Recommendations, Hierarchy of Audit regulations in India, Investigation, Forensic Audit, Peer and Quality Review, Auditing Software - Winman, SAP, Audit related Penalties, Imprisonment and Prosecution, Rethinking of Audit, International Auditing Practices, Comparison with Indian Auditing practices. Indian Standards on Auditing (SA), Major Scams in India and its Impact on Economy of the Country. Case Studies- Kingston Cotton Mill Company 1896, Satyam Scandal/Scam 2008 and 2G Spectrum Scam 2010.

Recommended Books

1. A Hand Book of Practical Auditing – by B.N. Tandon, S. Sundharabahu & S Sudharsnam, Publisher: S.Chand Publishing, New Delhi.
2. Advanced Auditing and Professional Ethics – ICAI, <https://www.icaai.org/Auditing Standard>.
3. Advanced Auditing & Professional Ethics, By CA Panakj Garg.
4. Simplified Approach to Advanced Auditing and Professional Ethics by Vikas Oswal.

BANKING LAW AND PRACTICES

Subject Code – BMCMS1-805

L T P C

Duration – 60 Hours

4 0 0 4

Course Objectives: The aim of this course is-

1. To acquire specialized knowledge of law and practice relating to Banking.
2. To understand the Functioning of banks.
3. To recognize the security system of banking industry.

Course Outcomes (COs): After completion of the course, the students shall be able to:

1. Gain the knowledge of working of RBI System.
2. Understand the legal framework of banking industry.
3. Comprehend the role and functioning of banks in Security system.

UNIT-I (12 Hrs)

Overview of Banking System and Regulatory Framework and Compliances: Provisions of RBI Act 1935, Banking Regulation Act 1949, Prevention of Money Laundering Act, 2002. Government and RBI's Powers Opening of New Banks and Branch Licensing Constitution of Board of Directors and their Rights Banks Share Holders and their Rights CRR and SLR.

UNIT-II (15 Hrs)

Legal Aspects of Banking Operations: Case Laws on Responsibility of Paying and Collecting Banker Indemnities or Guarantees - Scope and Application – Obligations of a Banker - Precautions and Rights - Laws relating to Bill Finance, LC and Deferred Payments - Laws Relating to Securities - Valuation of Securities - Modes of Charging Securities - Lien, Pledge, Mortgage, Hypothecation etc. - Registration of Firms/Companies - Creation of Charge and Satisfaction of Charge.

UNIT-III (15 Hrs)

Banking Related Laws: Law of Limitation - Provisions of Bankers Book Evidence Act -Special Features of Recovery of Debts Due to Banks and Financial Institutions Act, 1993 TDS Banking Cash Transaction Tax Service Tax, Asset Reconstruction Companies, The Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002, The Consumer Protection Act, 1986, Banking Ombudsman Lok Adalats, Lender's Liability Act, Anti-money laundering Law.

UNIT-IV (18 Hrs)

Securities for Banker's Loans: The legal issues involved in and the practice governing the different kinds of securities for banker's advances and loans Guarantees, pledge, lien, mortgage, charge – subject matters of collateral security Corporate Securities Documents of title to goods

Land and Buildings Book debts Life Policies Factoring; Bill Discounting; Bank Guarantees; Letters of Credit; Commercial Papers.

Electronic Banking: Electronic Banking; Electronic Fund Management, Enabling Technologies of Modern Banking- Electronic Commerce and Banking; Integrated Communication Networks for Banks Security and Control Systems - Cybercrimes and fraud management Planning and Implementation of Information Systems.

Suggested Books:

1. M.L.Tannan, revised by : Banking Law and Practice, Wadhwa& Company, Nagpur C.R. Datta & S.K. Kataria
2. A.B. Srivastava and : Seth's Banking Law, Law Publisher's India (P) Limited K. Elumalai
3. R.K. Gupta : BANKING Law and Practice in 3 Vols.Modern Law Publications.
4. Prof. Clifford Gomez : Banking and Finance - Theory, Law and Practice, PHI Learning Private Limited
5. J.M. Holden: The Law and Practice of Banking, Universal Law Publishing.

COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT

Subject Code – BMCMS1-806

L T P C

Duration – 45 Hours

3 0 0 3

Course Objectives

The aim of this course is:

1. To help students understand the process of communication in link with Non – verbal Communication.
2. To targets the understanding of different barriers that creep into the communication process.
3. To practice self-assessment and self-development.

Course Outcomes

After completing this course, the students will be able to:

1. Know the process of communication and its components.
2. Understand how to make effective presentations.
3. Write various formal documents of technical and professional Communication.

UNIT-I (10 Hrs)

Basics of Communication: Introduction, meaning and definition, process of communication, Types of communication: formal and informal, verbal, non-verbal and written Barriers to effective communication, 7 Cs for effective communication (considerate, concrete, concise, clear, complete, correct, courteous).

UNIT-II (15 Hrs)

Oral Skills: Presentation Skills: Defining Purpose of Presentation, Importance of Presentation, Planning of Presentation, Making effective presentations.

Mock Interview: The Interview Process, Pre-Interview Preparation, Answering Strategies.

UNIT-III (10Hrs)

Professional Writing: Office Drafting: Circular, Notice and Memo, Précis writing, Letters: business and personnel, E-mail Etiquettes, Report Writing.

UNIT-IV (10 Hrs)

Personality Development: Self Confidence/ Confidence Building, Positive Attitude, Time Management, Stress Management.

Recommended Books:-

1. Raman and Sharma, *Technical Communications*, OUP, New Delhi, 2017.
2. Lata and Kumar, *Communication Skills*, OUP, New Delhi, 2018.
3. Mike Martin and Roland Schinzing, *Ethics in Engineering*, McGraw Hill, New York, 2014.
4. Sherfield, Montgomery and Moody, *Cornerstone: Developing Soft Skills*, UP, 2009.
5. Lesikar R V, Flatley M E ,Rentz K and Pandey Business Communication: Making Connections in a Digital World 2009: New Delhi, Tata Mcgrow Hill.

BUSINESS STATISTICS RESEARCH LAB

Subject Code – BMCMS1-807

L T P C

Duration: 60 Hrs

0 0 4 2

Course Objectives

The aim of this course is:

1. To give insights about Managing spreadsheets.
2. To teach data analysis techniques to students.
3. To give practical exposure of applying Financial Tools in Spreadsheets and Statistical Softwares.

Course Outcomes

After completing this course, the students will be able to:

1. Apply Statistical analysis in Minor project and Major Projects.
2. Implement Financial Analysis in their project work.
3. Handle various MS excel functions in spreadsheets.
4. Manage various spreadsheet functions.

UNIT – I (15 Hrs)

Managing Spread Sheet: Introduction, Naming and Moving Worksheets, Copying Worksheets, Adding, Deleting and Hiding Worksheets, Grouping Worksheets Conditional Formatting.

Date and Time Function: Date, Day, Month, Year, Edate, Eomonth, Network days, Workday, Weeknum, Weekday, Hour, Minute, Second, Now, Today, Time.

Look Up Functions: Data Validation, Advanced Range Names, V-LookUp, H-LookUp.

UNIT -II (15 Hrs)

Logical Function: IF Function, Nested IF, CountIf, SumIf, IF with AND and OR, Average, Averagea, Averageif, Averageifs, Subtotal, Rand, Randbetween, Roundup, Rounddown.

Pivot Table: Introduction, Create Pivot Table, Layout of Pivot Tables, Filtering Pivot Tables, Pivot Table Analysis, Proper Function, Trim Function.

UNIT – III (15 Hrs)

Data Analysis: What If Analysis, Goal Seek, Scenario Analysis.

Introduction to Financial Analysis: PMT, NPV, IRR, Risk and Return, Volatility.

UNIT- IV (15 Hrs)

Statistical Analysis Tools: Frequency Distribution, Graphs, Histograms, Descriptive Statistics, Normality of Data, Correlation and Regression Analysis, t-test, ANOVA, Forecasting, Chi Square, Factor Analysis.

Use of Bibliography Soft-wares

Note: Students have to prepare a research report on their interest area (Finance, HR, Marketing etc.) Students will have to apply all research report components like Introduction, Review of literature, Research Methodology, Statistical Techniques (Learn in Business Statistical Research Lab), Findings etc. in the report. The students will have to give presentation of 15-20 minute on the research report.

Recommended Books

1. Greg Harvey, 'Microsoft Excel 2016 All-in-One for Dummies, Wiley Publications.
2. LokeshLalwani, 'Excel 2019 All – In – One' BPB Publication.
3. Manisha Nigam, 'Data Analysis with Excel' BPB Publication.
4. Paul McFedries, 'Excel 2016- Formulas and Functions' Que Publication.

9TH
SEMESTER

OPERATION RESEARCH

Subject Code –BMCMS1-901

L T P C

Duration – 60 Hrs

4 0 0 4

Course Objectives

The aim of this course is:

1. To understand various research techniques used in operations management are discussed for the attainment of accurate and valid results.
2. To learn the operations research methodologies in manufacturing and information systems.
3. To give knowledge about operations research techniques to solve the real problems.
4. To develop insight about determining the best choice using among available alternate resources.

Course Outcomes

After completing this course, the students will be able to:

1. Learn operation research course and get desired result statistically and by using research techniques.
2. Integrate the knowledge domains of the engineering and management.
3. Analyze techniques and Information technology will be used to solve various business problems.
4. Apply operations research techniques to solve the manpower related issue.

UNIT-I (15 Hrs)

Nature and development of operation research, tools of operation research, application of operation research to industrial problems, Decision-making under certainty, uncertainty and risk situations, Branch and bound method scheduling system-single machine.

UNIT-II (15 Hrs)

Formulation of linear programming models and its concept, dual linear programming, application of simplex technique to industrial problem. Transportation problems; methods for obtaining optimal solution. Flow shop, job shop-vehicle routing problems.

UNIT-III (15 Hrs)

Queuing systems and concepts: Introduction and scope of game problems in, Mini-max criterion and optimal strategy, resources constrained project scheduling- Bin packing portfolio optimization, CPM/PERT and solution of simple problems. Two-stage supply chain distribution problem.

UNIT-IV (15 Hrs)

Staff transfers Problem– Two stage supply chain distribution problem, Review of Basic Operations Research tools, future of operations research applications.

Relevant Case Studies should be discussed in class

Recommended Books

1. R. Panneerselvam - Operations Research 2nd Edn, Prentice Hall of India.
2. Sharma J K - Operations Research 3rd Edn. Pearson Education.
3. TahaHamdy - Operations Research - An Introduction, 9th Edn. Prentice-Hall.

MRSPTU

FINANCIAL RISK MANAGEMENT IN BANKS

Subject Code – BMCMS1-902

L T P C

Duration – 60 Hrs

4 0 0 4

Course Objectives: The aim of this course is:

1. To develop a detail understanding of the fundamental concepts of risk and risk management including available strategies for managing and mitigating risks.
2. To understand the types of risk faced by banks and the processes followed by banks for managing and mitigating risks
3. To understand the role of regulations in bank risk management and ongoing enhancements brought about in contemporary Baselnorms.

Course Outcomes: After completing this course, the students will be able to:

1. Identify the risks faced by Banks and understand the methodologies adopted by Banks for identification, measurement, monitoring and mitigation of risk.
2. Analyze different risk management frameworks being used in the bank and evaluate how far the same comply with global best practices and the Basel Guidelines.
3. Synthesize prior learning including the use of research techniques to address complex risk management approaches used by banks.

UNIT-I (15 Hrs)

Introduction to Risk Management: An Overview, Credit Risk Management, Liquidity and Market Risk Management, Operational Risk Management, Analyzing Banking Risk, Special Issues- Risk Management Organization; Reporting of Banking Risk, Global Best Practices in an Age of Turbulence.

UNIT-II (15 Hrs)

Interest Rate Risk and Market Risk: Introduction to interest rate risk, balancing the Banks: Global Lessons from the Financial Crisis, Understanding Systemic Risk in Global Financial Markets

UNIT-III (15 Hrs)

Credit Risk and Liquidity Risk: Credit Risk Management for Indian Banks, Risk Management in Indian Banking Sector: Special Emphasis on the Compliance with Basel III, Derivatives and Risk Management

UNIT-IV (15 Hrs)

Sovereign Risk and Insolvency Risk: Risk Management – Indian Institute of Banking and Finance, Advance Bank Management – Indian Institute of Banking and Finance.

Operational Risk and Off-Balance Sheet Risk: Bank Financial Management – Indian Institute of Banking and Finance, Treasury, Investment and Risk Management – Indian Institute of Banking and Finance.

Suggested Readings:

1. J.M. Holden : The Law and Practice of Banking, Universal Law Publishing.
2. Jimmy Skoglund , Wei Chen: Financial Risk Management: Applications in Market, Credit, Asset and Liability Management and Firm wide Risk by Wiley Finance
3. John C. Hull Risk Management and Financial Institutions by Wiley Finance

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INTERNATIONAL FINANCIAL REPORTING SYSTEM

Subject Code – BMCMS1-903

L T P C

Duration – 60 Hrs

4 0 0 4

Course Objectives

The aim of this course is:

1. To provide a deeper understanding of International Financial Reporting Standards issued by IASB.
2. To develop student's knowledge and understanding of the structure of the IASB, its conceptual framework.
3. To provide the knowledge of adoption or convergence of IFRS in countries around the world.

Course Outcomes: After completing this course, the students will be able to:

1. Understand International Financial Reporting Standards issued by IASB.
2. Understand global accounting standards and the need for harmonization and convergence of accounting standards.
3. Compare the accounting standards and practices used globally.
4. Comprehend various technical aspects associated with International Financial Reporting Standards.

UNIT I (15 Hrs.)

International Accounting Standards Board: The structure, vision and mission of IASB. The standard setting process. Adoption or convergence of IFRS in countries around the world.

UNIT II (15 Hrs.)

IFRS 1 to 6: The main features of IFRS 1: First Time Adoption of IFRS; IFRS-2: Share Based Payments; IFRS 3: Business Combinations; IFRS 4: Non-current Assets held for sale and Discontinued operations; IFRS 6: Exploration for and evaluation of mineral resources.

UNIT III (15 Hrs.)

IFRS 7 to 12: The main features of IFRS 7: Financial Instruments: Disclosures; IFRS 8: Operating Segments; IFRS 9: Financial Instruments; IFRS 10: Consolidated financial statements; IFRS 11: Joint Arrangements; and IFRS 12: Disclosure of Interests in Other Entities.

UNIT IV (15 Hrs.)

IFRS 13 to 17: The main features of IFRS 13: Fair Value Measurement; IFRS 14: Regulatory Deferral Accounts; IFRS 15: Revenue from contracts with customers; IFRS 16: Leases and IFRS 17: Insurance Contracts.

Recommended books:

1. IFRS Part A and Part B, Taxmann Publications Pvt. Ltd., New Delhi, 2011.
2. IFRS: A Practical Approach by Jasmine Kaur, Tata McGraw Hill Education Private Ltd., New Delhi, 2011.
3. Wiley IFRS 2010: Interpretation and Application of International Financial Reporting Standards, by Barry J. Epstein, Eva K. Jermakowicz , John Wiley Publications, 2010
4. Financial Accounting: IFRS Edition, 1st Edition by Jerry J. Weygandt, Paul D. Kimmel, Donald E. Kieso, John Wiley Publications, 2010.
5. The Vest Pocket IFRS by Steven M. Bragg by John Wiley Publications, 2010

MANAGEMENT OF FINANCIAL SERVICES

Subject Code – BMCMS1-904

L T P C

Duration – 60 Hrs

4 0 0 4

Course Objectives

The aim of this course is:

1. To give an idea about fundamentals of financial services and players in financial sectors, key concept from environment studies, political, and social analysis.
2. To examine forwards and futures contracts for equity indexes, commodities, and currencies.
3. To demonstrate an awareness of the current structure and regulation of the Indian financial services sector.

Course Outcomes

After completing this course, the students will be able to:

1. Understand the fundamental & operations of financial market, to apply & evaluate the financial & investment theories.
2. Gain knowledge about risk, wealth, economics & legal framework of global financial market.
3. Achieve highly paid jobs as finance manager Research analysis, financial consultant etc.

UNIT-I (15 Hrs)

Financial Services - Meaning, types and their importance. Depository - Introduction, Concept, Depository Participants, Functioning & Benefits of Depository Systems. Dematerialization and Rematerialisation, Functions of NSDL and CDSL, Role of Depositories in Stock Broking services.

Mutual Funds and AMCs- Concept, Origin and Growth of Mutual Funds, Management of MFS - Sponsors, Trustees, AMCs, and Custodians. Classification of Mutual Fund Schemes, Advantages and Disadvantages of Mutual Fund Schemes, NAV, SEBI guidelines for Mutual funds.

UNIT-II (15 Hrs)

Merchant Banking - Origin and Development of Merchant Banking in India Scope, Role and Functions of Merchant Bankers, Issues Management Intermediaries – Merchant Bankers/Lead Managers – Underwriters – Bankers, Brokers and Registrars to an Issue and Share Transfer Agents– Debenture /Trustees- IPO, FPO, Book building, Green shoe Option, Qualified Institutional Placement. Latest Guidelines of SEBI w.r.t. Merchant Bankers – Pre & Post issues activities – Raising capital from International markets: ADRs, GDRs, ECB etc.

UNIT-III (15 Hrs)

Lease and Hire purchase: Meaning and Types of leasing – Legislative frameworks – Difference between Leasing and Hire Purchase, Types of Leasing Business, Advantages to Lessor and

Lessee. Tax implications in leasing, Problems on leasing – Hire Purchasing – Concepts and features, Problems on Hire Purchasing.

Factoring –Definition, Factoring, Types & Importance, Forfeiting.

UNIT-IV (15 Hrs)

Credit Rating - The Concept and Objective of Credit Rating, Various Credit Rating Agencies in India and International Credit Rating Agencies, Factors Affecting Credit Rating.

Securitization: Concept, Process of Securitization, Risks in Securitization. Benefits and Limitations of Securitization, Mortgage Based Securitization.

Venture Capital: Meaning and Modes of Financing, Seed capital and Start-up financing, Key Factors considered in Venture Capital Financing.

Relevant Case Studies should be discussed in class.

Recommended Books

1. S Gurusamy, 'Financial Services & System' Thomson Publications.
2. M Y Khan, 'Financial Services' Tata McGraw-Hill.
3. L M Bhole, 'Financial Institutions & Markets' Tata McGraw- Hill.
4. Gordon &Natarajan, 'Financial Markets & Services' Himalaya Publications.
5. V. A. Avdhani, 'Financial Services in India', Himalaya Publications.
6. Vasant Desai, 'Financial Markets and Financial Services', Himalaya Publications.

SERVICES MARKETING

Subject Code – BMCMS1- 905

L T P C

Duration - 60 Hrs

4 0 0 4

Course Objectives

The aim of this course is:

1. To equip the students with understanding to apply Service Marketing Concepts and Strategies.
2. To the Create Customer Value in Today's Highly Competitive Environment.
3. To inform you about the best current thinking on services marketing and management, through contemporary readings, current case analysis, and lectures.

Course Outcomes

After completing this course, the students will be able to:

1. Demonstrate an extended understanding of the similarities and differences in service- based and physical product-based marketing activities.
2. Demonstrate a knowledge of the extended marketing mix for services.
3. Develop and justify marketing planning and control systems appropriate to service-based activities.

UNIT-I (15 Hrs.)

Introduction to Services, Growth of Service Sector Economy, Service Characteristics, Service Classification, Service Marketing Mix, Consumer Behaviour in Services: Customer Expectation of Service, Customer Perceptions of Service.

UNIT-II (15 Hrs.)

Managing Relationship and Building Loyalty, Complaint Handling and Service Recovery Strategies, Service Development and Design: Challenges of Service Design, Types of New Services, Core and Supplementary Elements, New Service Development Process, Service Blueprint, Physical Evidence and the Services capes: Types, Role and its Effect on Behaviour

UNIT-III (15 Hrs.)

Delivering and Performing Service Through Employees and Customers: Service Culture, Employee's Role, Strategies to Deliver Quality, Cycle of Failure, Mediocrity and Success, Self Service Technologies and Customer Participation, Introduction to Customer Citizenship Behaviour Delivering Services through Intermediaries and Electronic Channels, Managing Demand and Capacity, Waiting Line Strategies Integrated.

UNIT-IV (15 Hrs.)

Services Marketing Communications and Services Marketing Triangle, Pricing of Services: Pricing Approaches, Pricing Strategies, Improving Service Quality and Productivity: Integrated Gaps Model of Service Quality, Prescriptions for Closing Quality Gaps. Relevant Case Studies Related to the topics should be discussed.

Recommended Books

1. Zeithmal A. Valarie and Bitner Mary, 'Services Marketing', Tata McGraw Hill.
2. Christopher H. Lovelock, 'Services Marketing', Pearson Education.
3. Hoffman, 'Marketing of Services', Thomson South Western.
4. Govind Apt, 'Service Marketing', Oxford Press.
5. Shajahan, 'Service Marketing', Himalaya Publishing.
6. Harsh V. Verma 'Services Marketing- Text and Cases', Pearson Publications.

MRSPTU

ADVANCED COMPUTERIZED ACCOUNTING LAB

Subject Code – BMCMS1-906

L T P C

Duration - 60 Hrs

0 0 4 2

Course Objectives: The main aim of this course is:

1. To use the basic concepts of operating a microcomputer.
2. To use an accounting software package to create an accounting system.
3. To use a spreadsheet software package to predict financial outcomes.
4. To design spreadsheets to solve problems in the areas of financial and managerial accounting.

Course Outcome: After completing this course, the students will be able to:

1. Utilize an application software to perform accounting tasks
 2. Maintain records and prepare and analyze reports for a business entity.
 3. Complete a comprehensive project that entails the major course competencies and outcomes
 4. Identify and explain the components of general ledger software.
-
- 1) Create a Company with all relevant details including VAT options.
 - 2) Create the ledgers under appropriate predefined groups.
 - 3) From the Balances of a trader, Prepare Trading a/c, Profit and Loss a/c and Balance Sheet for the Year.
 - 4) Create vouchers and view Day Book, Profit and loss a/c and Balance sheet for a concern including pettycash, non-fund items.
 - 5) Create FINANCIAL VOUCHERS with various inventories giving quantity details and value per unit.
 - 6) Enter the INVENTORY VOUCHERS involving
 - (i) Unit of measurement
 - (ii) Stock groups
 - (iii) Stock items
 - (iv) Stock Summary
 - 7) MAINTAIN BILLWISE DETAILS.
Create bill wise details for a creditor/debtor involving advance
 - 8) Generate RATIO ANALYSIS statement.
Enter the details comment on the various ratios statement generated upon financial transactions
And analyses about the solvency position of the company.
 - 9) Enter transactions involving various INTERESTPARAMETERS
 - 10) Enter transactions involving foreign currencies for purchases and sales and calculate FOREIGNGAINS/LOSS

Suggestive Readings

1. Learning Tally. ERP 9–Vishnu Priya Singh
2. Straight to the Point-Tally. ERP 9 -Dinesh Maidasani
3. Official Guide to Financial Accounting Using: Tally. ERP9 With GST -2nd Edition

Recommended Hardware/Software Tools:

1. Tally ERP9 (Gold Edition Mode)
2. Window 7 or Above

MRSPTU

SEMINAR ON CONTEMPORARY ISSUES IN BUSINESS

Subject Code – BMCMS1-907

L T P C

Duration - 30 Hrs

2 0 0 2

Course Objectives: The basic aim of this course is

1. To make the students aware of various international institutions/trading blocs.
2. To analyse various current economic and business issues.

Course Outcomes: After this course students are able to

1. Explain how international factors affect domestic concerns.
2. Describe businesses expansion abroad and key legal issues related to businesses operating in other countries.

Suggestive Topics Globalization and Its Growing Importance in World Economy; Impact of Globalization Regional Trading Blocs: EU, NAFTA, SAARC, WTO, G-20, BRICS, ASEAN, India's Economic Interaction with the World: Foreign Investment, Exchange Rate, Economic and Other Relevant Issues Relating to FDI & FII flows. Global Trading Environment - Recent Trends in World Trade in Goods and Services Role and Functions of I.M.F. World Bank with Specific Reference to its Affiliates such as International Finance Corporation, W.T.O with Special Reference to TRIPs/TRIMs, WIPO UNCTAD, World Economic Forum (WEF). Transfer Price Mechanism, Tax Heavens, Current International Business Affairs.

Recommended Books

1. 'Bennet – International Business', Pearson Education.
2. 'WTO, WIPO, UNCTAD, IMF, World Bank Reports'.
3. 'Various Journals of Current Issues-International'.
4. K. Aswathappa, 'International Business', Tata McGraw Hills.
5. Subba Rao, 'International Business', Himalaya Publishing House.

10TH
SEMESTER

**MRSPTU INTEGRATED/DUAL DEGREE B.COM-M.COM SYLLABUS
2021 BATCH ONWARDS**

Internship Project

Subject Code: **BMCMS1-011**

L T P C

0 0 0 30

Course Objectives: The basic aim of this course is

1. To identify the contemporary business and social problems
2. To apply various statistical tools to analyse the data for finding the solutions
3. To prepare and presenting the project reports as per academic standards
4. To develop communication and presentation skills.

Under the guidance of his/her supervisor, Students will identify the problem from the area of commerce . The problem should be relevant to current commerce or business scenario. The student will do literature review, set the objectives, collect data (primary/Secondary) regarding the problem, apply statistical techniques and document the findings of the study with the justification how these findings will solve the existing problem in business/society. Student will submit the report (Hard Binding) and give presentation and final oral viva.

Internship Project – Joining Report

Name of Student: _____

Roll No.: _____

Name of Company: _____

Company Address: _____

Date of Joining Internship: Supervisor Detail Name: _____

Designation: _____

Contact Number: _____

Email id: _____

Supervisor Signature

Note: Send copy of this form to the department office within one week of joining the internship by email or post.

CERTIFICATE (on Company Letter head)

This is to certify that Mr./Ms. _____ Roll No. _____ student of BBAMBA Integrated (Batch _____) of University Business School (College Name), Maharaja Ranjit Singh Punjab Technical University, Bathinda has worked with our company during summer internship from (date) _____ to _____ (date) in the _____ (department name) and has worked on _____ (project title). His / Her performance was

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found Satisfactory / Non-satisfactory during the period. This certificate is being issued to meet the requirement of the University.

Date: Signature of Supervisor

Name & Designation of Signatory

Seal / Stamp of Organisation

Company Supervisor Evaluation Performa

Name of Student:

Uni. Roll No. –

Title of Project

Evaluation Criteria

Sr. No.	Parameters	Maximum Marks	Marks given by Company Supervisor
1	Completion of given task on time	10	
2	Behaviour and Conduct during training	10	
3	Discipline, Punctuality and Regularity	10	
4	Quality of Project Undertaken and Findings	10	
5	Total Marks	40	

Suggest improvement area / feedback for student

Date

Name & Designation of Supervisor

Signature of Supervisor

Name of Company

Company Seal / Stamp

(Project Title)

A Training Report submitted to the MRSPTU in partial fulfilment of the requirements for the award of the Degree of MASTER OF COMMERCE

Submitted by

(Student Name)

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(Student Reg. No.)

Under the Guidance of

Name & Designation of Faculty Guide

Name & Designation of Industry Guide

University Business School Maharaja Ranjit Singh Punjab Technical University, Dabwali Road,
Bathinda -151001 Punjab (India)

Year (July 2021)

Summer Internship Project Guidelines

- All the students have to prepare and submit a written project at the end of the internship.
- Each student has to prepare two hard copies of internship project in the presubscribed form.
- The report should include a certificate issued by a competent authority from the company.
- The report should include Company Supervisor Evaluation Report duly signed by supervisor in the company.

Structure of Report

Cover Page – It is the Outer cover of the report.

Front page – The format of Cover page & Front Page should be same.

Certificate

Acknowledgement

Executive Summary (Summary of Training and Project) (Maximum 2 Pages)

Table of Content

List of Tables

List of Figures/Charts

List of Abbreviations

Chapter 1 Introduction of Company Company History (Establishment) Mission & Vision of Company Types of Products/ Services produced Market Position of Company

Chapter 2 Organization Structure Departments and Functions of Departments Organization Hierarchy Chart

Chapter 3 Description of Work & responsibilities Taken Describe the department you worked in Job & Responsibilities taken

Chapter 4 Project (Given by Company) Objective of Project Scope Research Methodology Data Analysis Findings & Recommendations

Chapter 5 Experienced Gained & Challenges Faced What type of challenges you faced at work? What did you learn? How this learning will help you in your career? References Key Parameters

Length of Report 15000 – 20000 Words

Page Size A 4 Size

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Font Style Times New Roman

Font Size: (Chapter Heading) 16 (Bold)

Font Size (Sub Headings) 14 (Bold)

Font Size (Body Content) 12 (Justified from Both Left & Right Sides)

Line Spacing 1.5 Page Numbers

- Page numbers should be mentioned at the bottom side in the middle of page (in Numbers 1,2,3..)
- Page No. 1 should start from Chapter 1 (Introduction of company)
- Roman Numerals (i,ii,iii,iv) should be used for pages (certificate, acknowledgment etc.) before starting Chapter 1 and for the annexure and references (if any) Tables & Figures
- Tables & Figures must be numbered according to the Chapters (1.1, 2.1 etc.)
- Title of table should be depicted at the top of the table.

Maharaja Ranjit Singh Punjab Technical University

Bathinda-151001



FACULTY OF COMMERCE AND MANAGEMENT

SYLLABUS

FOR

BACHELOR OF MANAGEMENT STUDIES (BMS)

2024 BATCH ONWARDS

Note: (i) Copy rights are reserved.

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Please visit the University website time to time.

**MRSPTU BACHELOR OF MANAGEMENT STUDIES SYLLABUS
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Semester – I

Subject Code	Subject Name	Contact Hours			Marks			Credit
		L	T	P	Int.	Ext.	Total	
BBMSS1-101	Principles of Management	4	-	-	40	60	100	4
BBMSS1-102	Managerial Economics	4	-	-	40	60	100	4
BBMSS1-103	Organizational Behaviour	4	-	-	40	60	100	4
BBMSS1-104	Accounting And Financial Analysis	4	-	-	40	60	100	4
BBMSS1-105	Fundamentals of Computers	2	-	2	40	60	100	3
BBMSS1-106	Business Communication - I	2	-	2	40	60	100	3
BBMSS1-107	Basic Excel	-	-	4	60	40	100	2
BMNCC0-003	Human Values and Professional Ethics	2	-	-	100	-	100	S/NS*
	Total	22	-	8	400	400	800	24

Semester – II

Subject Code	Subject Name	Contact Hours			Marks			Credit
		L	T	P	Int.	Ext.	Total	
BBMSS1-201	Business Statistics	4	-	-	40	60	100	4
BBMSS1-202	Human Resource Management	4	-	-	40	60	100	4
BBMSS1-203	Financial Management	4	-	-	40	60	100	4
BBMSS1-204	Marketing Management	4	-	-	40	60	100	4
BBMSS1-205	Personality Development and Soft Skills	2	-	2	40	60	100	3
BBMSS1-206	Business Communication - II	2	-	2	40	60	100	3
BBMSS1-207	Advance Excel	-	-	4	60	40	100	2
BMNCC0-004	Drug Abuse: Problem, Management and Prevention	2	-	-	100	-	100	S/NS*
	Total	22	-	8	400	400	800	24

**1ST
SEMESTER**

PRINCIPLES OF MANAGEMENT

Subject Code – BBMSS1-101

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objectives: The objective of this paper is

1. To deliver basic knowledge to the students about the organisation and management of a business enterprise.
2. To providing an exposure to the concepts, theories and practices in the field of management.
3. To focuses on the basic roles, skills and functions of management.

Course Outcomes After completing the course, student will be able to

1. Understand and explain the concept of management and its managerial perspective.
2. Map complex managerial aspect arises due to ground realities of an organization.
3. Gain knowledge of contemporary issues in Management principles and various approaches to resolve those issues.
4. Understand decision making and applications of theories in decision making.

Unit I (15 Hrs.)

Spectrum of Business Activities, Manufacturing and service sectors. India's experience of liberalization and globalization, Technological innovations and skill development. 'Make in India' Movement. Social Multinational Corporations and Indian transnational companies. Social responsibility and ethics. Emerging opportunities in business; Franchising, Outsourcing, and E-commerce.

Unit II (12 Hrs.)

The Process of Management: Planning; Decision-making; Strategy Formulation. Organizing: Basic Considerations; Departmentation – Functional, Project, Matrix and Network; Delegation and Decentralisation of Authority; Dynamics of group behaviour.

Unit III (18 Hrs.)

Change Management: Resistance to change and strategies to manage change, conflict levels, causes and resolution. Functional and Dysfunctional aspects of conflict. Emerging issues in management.

Unit IV (15 Hrs.)

Sole Proprietorship, One Person Company, Joint Hindu Family Firm, Partnership firm, Joint Stock Company, Cooperative society; Limited Liability Partnership. Choice of Form of Organisation. Entrepreneurial Process- Idea generation, Feasibility study. Basic considerations in setting up a Business Enterprise.

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Suggested Readings:

1. Singh, B.P. & Chhabra, T.N., Business Organisation and Management, Sun India Publications, New Delhi.
2. Shankar, Gauri; Modern Business Organisation, Mahavir Book Depot, New Delhi.
3. Tulsian, P.C.; Business Organisation & Management, Pearson Education, New Delhi
4. Tripathi, P.C.; Principles of Management, Tata McGraw Hill Publishing, New Delhi.
5. Barry, Jim, Chandler, John, Clark, Heather; Organisation and Management, Thompson Learning, New Delhi.
6. Bushkirk, R.H.; Concepts of Business: An Introduction to Business System, Dryden Press, NY.
7. Douglas, MCgregor.; The Human Side of Enterprise, McGraw Hill, New York.
8. Kotler, Philip; Marketing Management: Analysis, Planning, Implementation & Control, Prentice-Hall of India, New Delhi.
9. Robbins, Stephen P.; Business Today: New World of Business, Harcourt College Publishers, Fortworth.

MANAGERIAL ECONOMICS

Subject Code – BBMSS1-102

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objective: Objective of the course is

1. To acquaint the students with the concepts of micro economics dealing with consumer behaviour
2. To make them understand the supply side of the market through the production and cost behaviour of firms.

Course Outcomes After completing this course, students will be able to:

1. Understand and explain the basic concept of economics.
2. Understand its managerial perspective including the real insight of the consumer's economic behavior
3. Estimate the demand for the new product as well as changes in the existing products.
4. Acquaint students with the concept of production functions and analysis.

Unit I (15 Hrs.)

Micro Economics: Meaning, Nature, Scope and Limitations, Role of managerial economics in decision Making. Basic concepts: Marginal and Incremental Principles, Opportunity Cost, Equilibrium Utility: Cardinal Utility Approach: Diminishing Marginal Utility; Ordinal Utility Approach, Indifference Curve, Properties, Consumer Equilibrium and Marginal Rate of Substitution.

Unit II (15 Hrs.)

Demand and Supply: Determinants of demand, movements vs. shift in demand curve, Determinants of Supply, Movement along a supply curve vs. shift in supply curve; -Market equilibrium and price determination. Elasticity of demand and supply. Application of demand and supply. Demand for factors. Supply of factor, backward bending supply curve for labor concepts of economic rent; Functional Distribution of Income

Unit III (15 Hrs.)

Production and Cost: Production: Firm as an agent of production. Concepts of Production function. Law of variable proportions; Isoquants; Return to scale. Economics and Diseconomies of scale. **Costs:** Costs in the short run. Costs in the long run, Profit maximization and cost minimization. Equilibrium of the firm, Technological Change: the very long run.

Unit IV (15 Hrs.)

Perfect Competition: Assumption; Theory of a firm under perfect competition; Demand and Revenue; Equilibrium of the firm in the short run and long run, The long run industry supply

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curve: increasing, decreasing and constant cost industry. Allocation efficiency under perfect competition

Monopoly: Short-run and long-run equilibrium of monopoly firm; Concept of supply curve under monopoly; Allocation inefficiency and dead-weight loss monopoly; Price discrimination.

Imperfect Competition: Monopolistic Competition: Assumption; Short – run Equilibrium; Long run Equilibrium; Concepts of excess capacity; Empirical relevance. Oligopoly: Causes for the existence of oligopolistic firms in the market rather than perfect Competition; Cooperative vs. Non cooperative Behaviour and dilemma of oligopolistic firms.

Suggested Readings:

1. Salvatore, D. Schaum's, Outline of Theory and Problems of Microeconomic Theory, McGraw-Hill, International Edition, New Delhi.
2. Ahuja, H.L., Business Economics, S. Chand & Co., New Delhi.
3. Pindyck, R.S., and D.L. Rubinfeld, Microeconomics, Prentice-Hall of India Pvt. Ltd.
4. Deepashree, Business Economics, Ane Books Pvt. Ltd., New Delhi.
5. Varian, H.R., Intermediate Microeconomics: A Modern Approach, Affiliated East-West Press, New Delhi.

ORGANIZATIONAL BEHAVIOUR

Subject Code – BBMSS1-103

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objectives The main aim of this course is:

1. To provide understanding of basic concepts of Human behavior in an organization
2. To learn Theories and techniques in the field of Human behaviour
3. To understand human interactions in an organization
4. To understand Organizational culture

Course Outcomes After completing this course, students will be able to:

1. Analyze individual and group behavior
2. Understand of implications of organizational behavior on the process of management.
3. Explain the terminology associated with organizational behavior
4. Incorporate and apply the predominant organizational behavior theories to gain knowledge of contemporary issues in organizational behavior and frameworks to work with real life organizational issues concerned with Human Behavior at work place.

UNIT-I (15 Hrs)

Introduction: Meaning of Organizational Behavior and Its Relevance in today's Business Environment, Contributing Disciplines to Organization Behavior (OB), Role of OB in Management Practices, Challenges and Opportunities for OB. Individual Behavior in Organization: Foundation of Individual Behavior, Understanding Self. Perception: Nature, Importance, Perceptual Selectivity, Stereotyping, Halo Effect, Learning and its Theories

UNIT-II (15 Hrs)

Attitudes: Importance, Components and Major Job Attitude. Personality: Concept, Self-esteem, Major Determinants of Personality. Motivation: Definition, Types, Theories of Work Motivation given by Maslow, Herzberg and McGregor

UNIT-III (15 Hrs)

Leadership: Nature Significance & Theories; Leadership Effectiveness Model; Leadership in Indian Culture; Leadership Traits & Skills; Behavioural Styles in Leadership. Transactional Analysis Dynamics of Managerial Leadership: Nature, Leadership Styles, Trait, Behavioural, Contingency Theories.

UNIT-IV (15 Hrs)

Group Behavior in Organization: Group Dynamics, Types of Groups, Group Roles, Group Cohesiveness, Group Development and Facilitation. Understanding Work Teams and Types of Team, Creating Effective Team Organization Culture: Functions of Organization Culture, Types of Culture, Managing Cultural Diversity Conflict Management: Definition of Conflict,

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Transitions in Conflict thought; Functional vs Dysfunctional Conflict; Conflict Process; Managing Organizational Conflict.

Recommended Books

1. Robbins, 'Organization Behaviour', Pearson Education
2. Luthans , 'Organization Behaviour', Tata McGraw Hill
3. Hersey, 'Management of Organizational Behaviour', Prentice Hall India
4. Aswathappa, 'Organization Behaviour', Himalaya Publications
5. L.M. Prasad, 'Organisation Behaviour', Sultan Chand & Sons

MRSPTU

ACCOUNTING AND FINANCIAL ANALYSIS

Subject Code – BBMSS1-104

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course objective: The objective of this paper is

1. To help students to acquire conceptual knowledge of the financial accounting
2. To impart skills for recording various kinds of business transactions.
3. To make the student familiar with generally accepted accounting principles of financial accounting.
4. To study applications of accounting principles in business organizations excluding corporate entitles.

Course Outcomes After completing of this course, the student will be able to:

1. Learning accounting standards and other regulatory pronouncements that address accounting for inter-entity relationships
2. Providing an understanding of the concepts which underlie group accounting practice
3. Demonstrating mastery of Fund Flow statements and cash statements.
4. Preparing consolidated financial statements.

Unit I (15 Hrs.)

Accounting as an information system, the users of financial accounting information and their needs. Qualitative characteristics of accounting, information. Functions, advantages and limitations of accounting. Branches of accounting. Bases of accounting; cash basis and accrual basis. The nature of financial accounting principles – Basic concepts and conventions. Financial accounting standards: Concept, benefits, procedure for issuing accounting standards in India.

Unit II (15 Hrs.)

Business Income: Measurement of business income-Net income: the accounting period, the continuity doctrine and matching concept. Objectives of measurement. Revenue: concept, revenue recognition principles, recognition of expenses. Accounting concept of depreciation. Factors in the measurement of depreciation. Methods of computing depreciation.

Unit III (15 Hrs.)

Inventories: Meaning. Significance of inventory valuation. Inventory Record Systems: periodic and perpetual. Methods: FIFO, LIFO and Weighted Average. Consignment: Features, Accounting treatment in the books of the consignor and consignee. Accounting for Inland Branches: Dependent branches and Ascertainment of Profit by Debtors Method & Stock and Debtors Method.

Unit IV (15 Hrs.)

Computerized Accounting System (using any popular accounting software); Creation of Vouchers; recording transactions; preparing reports, cash book, bank book, ledger accounts, trial balance, Profit and loss account, Balance Sheet.

Suggested Readings:

1. Lal, Jawahar and Seema Srivastava, Financial Accounting, Himalaya Publishing House.
2. Monga, J.R., Financial Accounting: Concepts and Applications, Mayoor Paper Backs, New Delhi.
3. Shukla, M.C., T.S. Grewal and S.C.Gupta. Advanced Accounts. Vol.-I. S. Chand & Co., New Delhi.
4. S. N. Maheshwari, Financial Accounting, Vikas Publication, New Delhi. T.S, Grewal, Introduction to Accounting, S. Chand and Co., New Delhi
5. P.C. Tulsian, Financial Accounting, Tata McGraw Hill, New Delhi.
6. Bhushan Kumar Goyal and HN Tiwari, Financial Accounting, Vikas publishing House, New Delhi.
7. Jain, S.P. and K.L. Narang. Financial Accounting. Kalyani Publishers, New Delhi.
8. Compendium of Statements and Standards of Accounting. The Institute of Chartered Accountants of India, New Delhi
9. Goldwin, Alderman and Sanyal, Financial Accounting, Cengage Learning
10. Horn green, Introduction to Financial Accounting, Pearson Accounting

FUNDAMENTALS OF COMPUTERS

Subject Code – BBMSS1-105

**L T P C
2 0 2 3**

Duration: 60 Hrs.

Course Objectives The main aim of this course is:

1. To familiarize the students with computer and its applications in the relevant fields and exposes them with its utility.
2. To investigate emerging technology used in computers for business.
3. To learn internet resources and computer technology

Course Outcome After completing this course, the students will be able to:

1. Understand the concepts of computer and various software related to it.
2. Learn the use of Word Processing tools and presentation tools which helps in different type of analysis and projection of reports related to the business management.
3. Achieve hand on experience with computer software which to enhance business activities and helps in planning and coordinating different activities of the company.
4. Analyse the steps, tools and security considerations needed create an E- commerce model.

UNIT-I (15 Hrs)

Introduction to World Wide Web: Concepts of Web Technology, Web Browsers, Internet and Intranet, Various applications of Internet such as Search Engines, Email, Information gathering, Telnet, FTP etc. Web designing using HTML and DHTML

UNIT-II (15 Hrs)

Word Processing Tools: Overview, Creating, Saving, Opening, Importing, Exporting & Inserting files. Formatting Pages, Paragraphs and Sections. Indents and outdates. Creating lists and numbering. Heading Styles, Fonts and size editing, positioning & viewing text. Finding & replacing text, inserting page breaks, page numbers, book marks, symbols & dates. Header, Footer & Printings Presentation Tools: Presentation Basics Menus & Toolbars. Opening & Saving & existing presentation creating & Saving a presentation, Design Template Blank Presentation. Slide show, Printing slides

UNIT-III (15 Hrs)

Database Systems: Database approach, Advantages of Database approach, Database Management Systems(DBMS), Components of DBMS Environment, Advantages and Disadvantages of DBMS, Types of Database. Database Architecture: Design and Data Modeling - Hierachial Model, Network model, Relational model, Object Oriented Model

UNIT-IV (15 Hrs)

Introduction to E-Commerce: Defining Commerce; Main Activities of E- Commerce; Benefits of **Computer** E-Commerce; Broad Goals of E-Commerce; Main Components of E-Commerce;

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Functions of E- Commerce, Process of E-Commerce; Types of E-Commerce; Role of Internet and Web in E-Commerce; E-Business Models. E-Payment Systems: Electronic Funds Transfer; Digital Token Based E-Payment Systems; Modern Payment Systems; Steps for Electronic Payment; Payment Security; Net Banking. *Faculty members can take practical sessions during the lectures.

Recommended Books

1. ITL, ESL, 'Introduction to Infotech', Pearson Education.
2. Goyal, Anita, 'Computer Fundamentals', 1st Edition, Pearson Education.
3. Joseph A. Brady and Ellen F Monk, 'Problem Solving Cases in Microsoft and Excel', 4th Annual Edition, Thomson Learning.
4. V. Rajaraman, 'Introduction to Information Technology', Prentice Hall of India
5. Leon and Leon, 'Introduction to Information Technology', Vikas Publishing House
6. Deepak Bharihoke, 'Fundamentals of Information Technology', 3rd Edition, Excel Books

**MRSPTU BACHELOR OF MANAGEMENT STUDIES SYLLABUS
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BUSINESS COMMUNICATION - I

Subject Code – BBMSS1-106

**L T P C
2 0 2 3**

Duration: 60 Hrs.

Course Objectives: Upon completion of the course the student shall be able to

1. Communicate effectively (Verbal and Non Verbal)
2. Effectively manage the team as a team player
3. Develop interview skills and Leadership qualities and essentials

Course Outcomes After completing this course, students will be able to:

1. Apply appropriate language skills in commerce activities
2. Apply grammar and to know its intricacies for effective usage.
3. Enrich written communication skills for employability.

UNIT – I (13 Hours)

Communication Skills: Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context: Barriers to communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers.

UNIT – II (13 Hours)

Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment.

Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication.

UNIT – III (14 Hours)

Communication Styles: Introduction, The Communication Styles Matrix with example for each - Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style.

Interview Skills: Purpose of an interview, Do's and Dont's of an interview • Giving Presentations: Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery. Group Discussion: Introduction, Communication skills in group discussion, Do's and Dont's of group discussion

UNIT – IV (20 Hours)

COMMUNICATION SKILLS (Practical) The following learning modules are to be conducted using wordsworth® English language lab software Basic communication covering the following topics

Meeting People Asking Questions Making Friends What did you do? Do's and Dont's Pronunciations covering the following topics Pronunciation (Consonant Sounds) Pronunciation

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and Nouns Pronunciation (Vowel Sounds) Advanced Learning Listening Comprehension / Direct and Indirect Speech Figures of Speech Effective Communication Writing Skills Effective Writing Interview Handling Skills E-Mail etiquette Presentation Skills

Recommended Books: (Latest Edition)

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1st Edition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1st Edition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1st Edition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5th Edition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2nd Edition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1st Edition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1st Edition, Mc Graw Hill Education, 2011
11. Effective communication, John Adair, 4th Edition, Pan Mac Millan,2009
12. Bringing out the best in people, Aubrey Daniels, 2nd Edition, Mc Graw Hill, 1999

**MRSPTU BACHELOR OF MANAGEMENT STUDIES SYLLABUS
2024 BATCH ONWARDS**

BASIC EXCEL

Subject Code – BBMSS1-107

**L T P C
0 0 4 2**

Duration: 60 Hrs.

Course Objectives The main aim of this course is:

1. To learn how to use basic spreadsheet tools
2. To construct formulas, including the use of built-in functions, and relative and absolute references
3. To learn enter, modify and edit data

Course Outcomes After completing this course, students will be able to:

1. Set up the chart function of Excel to represent numeric data in multiple formats
2. Access and manipulate data using the database functions of spreadsheet
3. Knowledge of using graphs and charts
4. Efficiently use the various basic and intermediate level features of spreadsheet

UNIT – I (13 Hrs)

Data Entry and Editing: Introduction to Spreadsheet, Data Entry, Editing, Cell Addressing Ranges, Commands, Menus, Copying & Moving cell content, Rows & Columns - Inserting and Deleting Rows and Columns, Column Formats, Cell Protection, Printing, Creating, Displaying and Printing Graphs.

UNIT – II (13 Hrs)

Managing Work Sheets: Introduction, Naming and Moving Worksheets, Copying Worksheets, Adding, Deleting and Hiding Worksheets, Grouping Worksheets Charts & Graphs: Introduction, Types of Charts, Pie Chart, Bar Chart, Histogram, Chart Style, Chart Layout, Add labels, Axis Options, Data labels

UNIT -III (14 Hrs)

Tables: Introduction, Insert a Table, Style Options, Add Rows and Columns, Functions in Tables Conditional Formatting: Introduction, Highlight Cell rules, Top/Bottom Rules, data Bars, Color Scale, Custom formatting rules, Proper Function, Trim Function

UNIT – IV (20 Hrs)

Sort & Filter: Introduction, Sort data, Filter data, Custom Sort & Filter Understanding Formula – Introduction to Common Formulas, Copying Formula.

Recommended Books

1. Greg Harvey, 'Microsoft Excel 2016 All-in-One for Dummies, Wiley Publications
2. Lokesh Lalwani, 'Excel 2019 All – In – One' BPB Publication
3. Manisha Nigam, 'Data Analysis with Excel' BPB Publication
4. Paul McFedries, 'Excel 2016- Formulas and Functions' Que Publications

**MRSPTU BACHELOR OF MANAGEMENT STUDIES SYLLABUS
2024 BATCH ONWARDS**

HUMAN VALUES AND PROFESSIONAL ETHICS

Subject Code – BMNCC0-003

**L T P C
2 0 0 0**

Duration: 30 Hrs.

Course Objectives The main aim of this course is

1. To understand the importance of values prevalent in society and culture
2. To understand various theories of Morality and sharing
3. To understand various professional ethics and rights
4. To understand the application of technology for man-kinds

Course Outcomes: After completing this course, students will be able to

1. Understand the concept of human values as social fact. Clarity about different universal values and value systems relevant to professions and work.
2. Discern the meanings of values, morality, ethics and their relationship with religion. Able to make sense of some significant related theories.
3. Realize the relevance of Professional ethics and virtues at the workplace and their importance for the benefits of society at large.
4. Appreciate the judicious use of Technology and social laws for the conservation of environment and consequently for the welfare of the humanity.

UNIT-I (8 Hrs.)

Meaning of values, Values as social fact, Universal values – equality, justice, freedom/ liberty, inclusion. Distinction between social and culture values and values associated with crafts and occupations. Work and leisure as values – Marx and Veblen

UNIT-II (9 Hrs.)

Values, morality, ethics and their relation with Religion, values as mechanisms of control and coercion. Functional Theory of Values of Talcott Parsons, Theory of Basic Values of Shalom Schwartz, Theory of Protestant Ethic and Capitalism of Max Weber, Bhagwat Gita and Theory of Karma-Dharma, Sikhism and theory of work, dignity of labour, meditation and sharing.

UNIT-III (7 Hrs.)

Meaning and types of Professional Ethics, Goals of professional work and their problems, Normative and evaluative elements in professional work, Duties and obligations, Professional rights, Virtues in professional life (honesty, trustworthiness, transparency, competence, integrity and exemplary conduct), Engineering ethics and service ideals.

UNIT-IV (6 Hrs.)

Technology for and against mankind and environment- fulfilment of human needs, and industrial disasters: case studies – Bhopal Gas Tragedy, Chernobyl and Fukushima Disasters; Equality at work place: gender discrimination and caste/class-based exclusions.

Recommended Books

1. Schwartz, H. Shalom, 'An Overview of the Schwartz Theory of Basic Values'. Online Readings in Psychology and Culture. 2 (1). doi:10.9707/2307-0919.1116, 2012.
2. John Berry, Janek, Pandey; Poortinga, Ype 'Handbook of Cross-cultural Psychology', 2nd Edn.. Boston, MA: Allyn and Bacon. p. 77. ISBN 9780205160747, 1997.
3. Timo Airaksinen, 'The Philosophy of Professional Ethics', University of Helsinki, Finland. 4. Manju Jitendra Jain, 'Yes, It's Possible', Kalpana Publications, Mumbai, 2011.

MRSPTU

**2ND
SEMESTER**

BUSINESS STATISTICS

Subject Code: BBMSS1-201

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objective: The objective of this course is

1. To familiarize students with the applications of Mathematics and statistical techniques in business decisions.
2. To learning statistical tools which can be used in day to day business transactions and covers the mathematical processes and techniques currently used in the fields of business and finance.
3. To solving monetary problems in business and personal finance.

Course Outcomes After completing of this course, the students will be able to:

1. Appreciate business mathematics concepts that are encountered in the real world.
2. Understand the underlying business concepts involved in mathematics to help another person gain insight into the situation.
3. Work with different theorems and matrices

Unit I (18 Hrs.)

Business Statistics: Uni-variate Analysis:- Measures of Central Tendency including Arithmetic mean, Geometric mean and Harmonic mean: properties and applications; Mode and Median. Partition values - quartiles, deciles, and percentiles. Measures of Variation: absolute and relative. Range, quartile deviation and mean deviation; Variance and Standard deviation: calculation and properties. **Bi-variate Analysis:** Simple Linear Correlation Analysis: Meaning, and measurement. Karl Pearson's co-efficient and Spearman's rank correlation. Simple Linear Regression Analysis: Regression equations and estimation. Relationship between correlation and regression coefficients.

Unit II (15 Hrs.)

Simple Correlation and Regression Analysis: Assumptions; Pearsons product moment and Spearmen's rank correlation method; least squares technique; properties of correlations and regression coefficients.

Unit III (15 Hrs.)

Time-based Data: Index Numbers and Time Series Analysis: Meaning and uses of index numbers; Construction of index numbers: Aggregative and average of relatives – simple and weighted, Tests of adequacy of index numbers, Construction of consumer price indices. Components of time series; additive and multiplicative models; Trend analysis: Finding trend by moving average method and Fitting of linear trend line using principle of least squares.

Unit- IV (12 Hrs)

Elementary Probability Theory: Deterministic and non-deterministic experiments; different types of events; a priori and empirical definition of probability. Conditional probability, laws of addition and multiplication of probability. Properties of binomial, Poisson and normal distributions.

Suggested Readings:

1. J. K. Sharma, Business Statistics, Pearson Education.
2. S.C. Gupta, Fundamentals of Statistics, Himalaya Publishing House.
3. S.P. Gupta and Archana Gupta, Elementary Statistics, Sultan Chand and Sons, New Delhi.
4. Richard Levin and David S. Rubin, Statistics for Management, Prentice Hall of India, New Delhi.
5. M.R. Spiegel, Theory and Problems of Statistics, Schaum's Outlines Series, McGraw Hill Publishing Co.

HUMAN RESOURCE MANAGEMENT

Subject Code: BBMSS1-202

L T P C

Duration: 60 Hrs

4 0 0 4

Course Objectives: The main objectives of this course are:

1. To enable the students to understand the HR Management and system at various levels in general and in certain specific industries or organizations.
2. To help the students focus on and analyze the issues and strategies required to select and develop manpower resources.
3. To develop relevant skills necessary for application in HR related issues.
4. To Enable the students to integrate the understanding of various HR concepts along with the domain concept to take correct business decisions.

Course Outcomes: On completion of this course, the students will be able:-

1. To develop the understanding of the concept of human resource management and to understand its relevance in organizations.
2. To develop necessary skill set for application of various HR issues.
3. To analyze the strategic issues and strategies required to select and develop manpower resources.
4. To integrate the knowledge of HR concepts to take correct business decisions.

UNIT-I (15 Hrs)

Introduction: Nature, scope, role and importance of HRM. New trends in HRM due to globalization deregulation and technological advancements, HRM practices in India, issues and challenges.

UNIT-II (15 Hrs)

Job analysis: steps in analyzing job and introduction to methods of collecting job analysis information, Job description, Job specification, job design, job simplification, job rotation, job enrichment and job enlargement.

UNIT-III (15 Hrs)

Recruitment: sources of recruitment, policies and procedure of recruitment, selection process, testing and interviews, Placement and induction, transfer and promotion.

UNIT-IV (15 Hrs)

Human Resource Development: Identification of training needs and techniques of training, employee development and career planning, Wage and salary administration and incentives, Performance appraisal, methods and problems of performance appraisal.

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Suggested Readings

1. Rao V.S.P., Human Resource Management, Excel books
2. Monnappa and Saiyadan, Personnel Management, Tata McGraw Hill.
3. Dessler, Garg, Human Resource Management, Pearson education.
4. C.B. Memoria, Personal Management Himalaya
5. K. Aswathappa, Human Resource Management Tata McGraw Hill
6. C.B. Gupta, Human Resource Management Sultan Chand and Sons

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FINANCIAL MANAGEMENT

Subject Code: BBMSS1-203

L T P C

Duration: 60 Hrs

4 0 0 4

Course Objective: The main objectives of this course are:

1. Provide an in-depth view of the process in financial management of the firm.
2. Develop knowledge on the allocation, management and funding of financial resources.
3. Improving students' understanding of the time value of money concept and the role of a financial manager in the current competitive business scenario.

Course Outcomes (COs): After completion of the course, the students shall be able to:

1. Demonstrate the decision making by applying financial theory to problems faced by business enterprises.
2. Apply foundational finance theories and to analyse a forecast using relevant data and to conduct preliminary measurement of leverage analysis.
3. Apply time value of money techniques to various pricing and budgeting problems.
4. Apply modern techniques in capital budgeting analysis.

UNIT-I (15 Hrs)

Financial Management Introduction: Meaning, nature and Scope, Goals of Financial Management-Profit Maximization vs. Wealth Maximization; Finance functions-investment, Financing, Liquidity and dividend decisions. Sources of finance-Long term and short term.

Time Value of Money: Present value, Future value, Annuity.

UNIT-II (15 Hrs)

Cost of Capital: Meaning and significance of cost of capital; cost of equity shares; cost of preference shares; cost of debt, weighted average cost of capital. Form of Capital: Introduction to Capital Structure; theories- NI approach; NOI approach; MM approach; Traditional approach
Operating and Financial Leverage: Types of leverages.

UNIT-III (15 Hrs)

Investment Decision Making: Meaning, importance, nature of investment decisions. Investment evaluation criteria
Capital budgeting Techniques: Non-discounted cash flow, Pay back methods; Post Payback period; Accounting rate of return method, Discounted cash flow techniques-Net Present value method; Internal rate of return method; Profitability index method.

UNIT-IV (15 Hrs)

Working Capital: Meaning, significance, types, approaches, Factors affecting working capital management capital. Dividend Policies: Issues in dividend decisions. Forms of dividend-Theories of relevance and irrelevance of dividends.

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Suggested Readings

1. Khan, M. Y. and Jain P. K —Financial Management, Text, Problems & Casesl.Tata McGraw Hill Company, New Delhi.
2. Pandey, I.M. —Essentials of Financial Managementl, Vikas Publishing House Pvt. Ltd., New Delhi.
3. Maheshwari, S.N.—Financial Management – Principles & Practicel, Sultan Chand & Sons, New Delhi.
4. Rustagi,Dr.R.P.—Basic Financial Managementl, 8 th Edition, Sultan Chand & Sons, New Delhi.

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MARKETING MANAGEMENT

Subject Code: BBMSS1-204

L T P C

Duration: 60 Hrs

4 0 0 4

Course Objective: The main objectives of the course are:

1. To understand the concepts of marketing management.
2. To learn about marketing process for different types of products and services.
3. To understand the tools used by marketing managers in decision situations.
4. To understand the marketing environment.

Course Outcomes (COs): After completion of the course, the students shall be able to:

1. Explain the basics of marketing, selling, marketing mix and its core concepts.
2. Describe the intricacies of the marketing environment and marketing information systems for effective marketing planning and strategies.
3. Develop necessary skills for effective market segmentation, targeting and positioning.
4. Develop an understanding of promotion mix and strategies for successful promotion.

Unit I (15 Hrs.)

Marketing: Nature and scope of marketing, concepts of traditional and modern marketing, marketing environment-marketing and its environment. Consumer Buying Behaviour: Factors affecting, purchase behaviour.

Unit II (15 Hrs.)

Market segmentation: Nature, basis & strategies. Marketing mix: Introduction & factors affecting. Product decisions: Product definition, new product development process, product life cycle, positioning, branding & packaging decisions.

Unit II (15 Hrs.)

Pricing decision: Importance, objectives & strategies. Product promotion: Promotion mix & factors affecting it. Distribution: Channel decisions, types & factors, physical distribution system & its components. Marketing of services: Introducing services, characteristics, services marketing mix, successful marketing of service, mastering service quality

Unit IV (15 Hrs.)

Distribution: Types of channel, factors affecting decision, Designing and Managing Marketing Channel, Managing Retailing, physical distribution system and its components. Product Promotion: promotion mix-introduction, importance, advantages and disadvantages of various components and factors affecting. Designing and managing Integrated Marketing Communications.

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Suggested Readings

1. Kotler, P., Keller, K.L. Koshy, A. and Jha, M., —Marketing Management: A South Asian Perspective”, Pearson Education.
2. Etzel, M., Walker, B., Stanton, W. and Pandit, A —Marketing Management, Tata McGraw Hill.
3. Ramaswamy, V.S and Namakumari, S. —Marketing Management: Global Perspective Indian Contextl, Macmillan Publishers India Ltd.
4. Saxena, Rajan, —Marketing Managementl, Tata McGraw Hill Education Pvt. Ltd

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PERSONALITY DEVELOPMENT AND SOFT SKILLS

Subject Code: BBMSS1-205

L T P C

Duration: 60 Hrs

2 0 2 3

Course Objectives: The course aims at

1. To cause a basic awareness about the significance of soft skills in professional and interpersonal communications and facilitate an all-round development of personality.
2. To cover key areas like conversation skills, group skills and persuasion skills required during the interview process in an organization.

Course Outcomes: At the end of the course, the student will be able to:

1. Demonstrate soft skills required for business situations.
2. Analyze the value of soft skills for career enhancement.
3. Apply soft skills to workplace environment.
4. Confidently participate in interview process.
5. To handle stress in their lives and future in a better way.

UNIT-1 (15 Hrs)

SOFT SKILLS- Introduction to Soft Skills, Aspects of Soft Skills, Identifying your Soft Skills, Negotiation skills, Importance of Soft Skills, Concept of effective communication. **SELF-DISCOVERY-** Self-Assessment, Process, Identifying strengths and limitations, SWOT Analysis Grid.

FORMING VALUES- Values and Attitudes, Importance of Values, Self-Discipline, Personal Values - Cultural Values-Social Values-some examples, Recognition of one's own limits and deficiencies.

UNIT-2 (15 Hrs)

BODY LANGUAGE - Introduction- Body Talk, Forms of body language, uses of body language, Body language in understanding Intra and Inter-Personal Relations, Types of body language, Gender differences, Gaining confidence with knowledge of Kinesics.

ETIQUETTE AND MANNERS- **ETIQUETTE-** Introduction, Modern Etiquette, Benefits of Etiquette, Taboo topics, Do's and Don'ts for Men and Women. **MANNERS-** Introduction, Importance of manners at various occasions, Professional manners, Mobile manners. **CORPORATE GROOMING TIPS-** Dressing for Office: Do's and Don'ts for Men and Women, Annoying Office Habits.

UNIT-3 (15 Hrs)

STRESS MANAGEMENT – Introduction, meaning, positive and negative stress. Sources of stress. Case studies. signs of stress. Stress management tips. Teenage stress.

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TIME MANAGEMENT - Introduction, the 80-20 Rule, three secrets of Time Management, Time Management Matrix, Effective Scheduling, Time Wasters, Time Savers, Time Circle Planner, Difficulties in Time Management, Overcoming Procrastination.

UNIT-4 (15 Hrs)

INTERVIEW SKILLS - Introduction. Types of interview. Types of question asked. Reasons for rejections. Post-interview etiquette. Telephonic interview. Dress code at interview. Mistakes during interview. Tips to crack on interview. Contextual questions in interview skills. Emotional crack an interview. Emotional intelligence and critical thinking during interview process.

Recommended Books:

1. K. Alex, S. Chand Publishers.
2. R.C. Sharma and Krishna Mohan, 'Business Correspondence and Report Writing', TMH, New Delhi, 2016.
3. N. Krishnaswami and T. Sriraman, 'Creative English for Communication', Macmillan.
4. Penrose, John M., et al., 'Business Communication for Managers', Thomson South Western, New Delhi, 2007.
5. Holtz, Shel, 'Corporate Conversations', PHI, New Delhi, 2007.

BUSINESS COMMUNICATION - II

Subject Code: BBMSS1-206

L T P C

Duration: 60 Hrs

2 0 2 3

Course Objectives: This course aims at:

1. Communicate effectively in Written and Unwritten form.
3. Effectively transfer the message with skills and manage the team as a team player.
4. Develop language skills for good employability.

Course Outcomes After completing this course, students will be able to:

1. Apply appropriate language skills in commerce activities
2. Develop language skills inside them for best opportunities.
3. Enrich in all forms of communication for employability.

Unit- I (18 Hrs)

Basic Listening Skills: Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations. The Language of Touch, Meta Communication, Types of Listening, Listening tips.

Reading Skills Introduction. Benefits of reading. Tips for effective reading. the SQ3R technique. Different stages of reading. Determining reading rate of students. Activities to increase the reading rate. Problems faced. Becoming an effective reader.

Unit- II (12 Hrs)

Effective Written Communication: Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication. Writing Effectively: Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message. Drawback of written communication. Business Writing, Business Letter, Format and Styles, Types of business letters, Art of writing correct and precise mails, Understand netiquette.

Unit- III (15 Hrs)

Speaking: Introduction, Communication process. Importance of communication, channels of communication. Formal and informal communication. Barriers to communication. Tips for effective communication. Tips for conversation.

Unit- IV (15 Hrs)

Presentation skills. Effective multi-media presentation skills. Speeches and debates. Combating nervousness. Patterns and methods of presentation. Oral presentation, planning and preparation.

Recommended Books: (Latest Edition)

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011

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2. Communication skills, Sanjay Kumar, Pushpalata, 1st Edition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1st Edition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1st Edition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5th Edition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2nd Edition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1st Edition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1st Edition, Mc Graw Hill Education, 2011
11. Effective communication, John Adair, 4th Edition, Pan Mac Millan, 2009
12. Bringing out the best in people, Aubrey Daniels, 2nd Edition, Mc Graw Hill, 1999

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ADVANCE EXCEL

Subject Code: BBMSS1-207

L T P C

Duration: 60 Hrs

0 0 4 2

Course Objectives The main aim of this course is:

1. To learn how to use advance spreadsheet tools
2. To construct formulas, including the use of built-in functions, and relative and absolute references
3. To learn enter, modify and edit data

Course Outcome- After Completing this course, Students will be able to

1. Use spreadsheet software to manage monetary data.
2. Work with formulas and functions.
3. Develop professional-looking worksheets with charts and graphs, data tables by using web tools.
4. Use spreadsheet's solver for complex problems.

UNIT- I (15 Hrs)

Managing Spread Sheet: Introduction, Naming and Moving Worksheets, Copying Worksheets, Adding, Deleting and Hiding Worksheets, Grouping Worksheets Conditional Formatting, Date and Time Function: Date, Day, Month, Year, Edate, Eomonth, Network days, Workday, Weeknum, Weekday, Hour, Minute, Second, Now, Today Time Look Up Functions: Data Validation, Advanced Range Names, VLookUp, H LookUp

UNIT- II (15 Hrs)

Logical Functions: IF Function, Nested IF, CountIf, SumIf, IF with AND and OR, Average, Averagea, Averageif, Averageifs, Subtotal, Rand, Rand between, Roundup, Round down

UNIT-III (15 Hrs)

What if Analysis, Scenario Analysis, Sensitivity Analysis, Goal Seek, Advanced Pivot Table: Filtering Pivot Tables, Pivot Table Analysis, Proper Function, Trim Function, Advance Pivot Charts

UNIT-IV (15 Hrs)

Financial Functions: Time Value of Money- NPV/ IRR/ Discounting and other financial functions Statistical Function – Correlation, Regression

Suggested Readings

1. Greg Harvey, *Microsoft Excel 2016 All-in-One for Dummies*, Wiley Publications
2. Lokesh Lalwani, *Excel 2019 All – In – One* BPB Publication
3. Manisha Nigam, *Data Analysis with Excel* BPB Publication
4. Paul McFedries, *Excel 2016- Formulas and Functions* Que Publications

DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION

Subject Code: BMNCC0-004

L T P C

Duration: 30 Hrs

2 0 0 0

Course Objectives The main aim of this course is:

1. To aware students about Consequences of Drug Abuse
2. To aware students about preventions of Drug Abuse
3. To aware various roles of society to prevent drug abuse

Course Outcomes After completing this course, Students will be able to:

1. Understand the responsibilities of society and family to prevent Drug Abuse
2. Understand the role of educational institutes in controlling Drug Abuse
3. Aware about various Psychological and Social management of Drug abuse
4. Understand the role of Media and Legislation to control the drug abuse.

UNIT-I (6 Hrs.)

Meaning of Drug Abuse: Meaning: Drug abuse, Drug dependence and Drug addiction. Nature and extent of drug abuse in India and Punjab.

UNIT-II (8 Hrs.)

Consequences of Drug Abuse Individual: Education, Employment, Income. Family: Violence. Society: Crime. Nation: Law and Order problem.

UNIT-III (8 Hrs.)

Prevention of Drug Abuse Role of Family: Parent-child relationship, Family support, supervision, shipping values, active scrutiny. School: Counselling, Teacher as role-model, Parent-teacher-health professional coordination, Random testing on students.

UNIT-IV (8 Hrs.)

Treatment and Control of Drug Abuse Medical Management: Medication for treatment and to reduce withdrawal effects. Psychological Management: Counselling, Behavioural and Cognitive therapy. Social Management: Family, Group therapy and Environmental intervention. Treatment: Medical, Psychological and Social Management. Control: Role of Media and Legislation.

Recommended Books

1. Ram Ahuja, 'Social Problems in India', Rawat Publications, Jaipur,
2. 'Extent, Pattern and Trend of Drug Use in India', Ministry of Social Justice and Empowerment, Govt. of India,
3. J.A. Inciardi, 'The Drug Crime Connection', Sage Publications, Beverly Hills,
4. T. Kapoor, 'Drug Epidemic among Indian Youth', Mittal Publications, New Delhi,
5. Kessel, Neil and Henry Walton, 'Alcoholism, Harmond Worth', Penguin Books,
6. Ishwar Modi and Shalini Modi, 'Addiction and Prevention', Rawat Publications, Jaipur,

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7. 'National Household Survey of Alcohol and Drug Abuse', Clinical Epidemiological Unit, All India Institute of Medical Sciences, New Delhi,
8. Ross Coomber and Others, 'Key Concept in Drugs and Society', Sage Publications, New Delhi,

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FACULTY OF COMMERCE AND MANAGEMENT

SYLLABUS

FOR

BACHELOR OF COMMERCE (B.COM.)

(3 YEARS PROGRAMME)

2024 BATCH ONWARDS

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Semester – I

Subject Code	Type of Course	Subject Name	Contact Hours			Marks			Credit
			L	T	P	Int.	Ext.	Total	
BCOMS5-101	Core Paper	Business Organization and Management	4	-	-	40	60	100	4
BCOMS5-102	Core Paper	Financial Accounting	4	-	-	40	60	100	4
BCOMS5-103	Core Paper	Principles of Micro Economics	4	-	-	40	60	100	4
BCOMS5-104	Interdisciplinary course	Business Laws	4	-	-	40	60	100	4
BCOMS5-105	Ability Enhancement Courses	Business Communication -I	2	-	2*2	40	60	100	4
BCOMD5-111	Skill Enhancement Courses (Elective)	Computer Applications in Business OR	2	-	2	40	60	100	3
BCOMD5-112		Digital Marketing	3	-	-	40	60	100	
BMNCC0-003	Common Value-Added Course	Human Values and Professional Ethics	2	-	-	100	-	100	S/NS*
Total			22/ 23	-	4/6	340	360	700	23

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Semester – II

Subject Code	Type of Course	Subject Name	Contact Hours			Marks			Credit
			L	T	P	Int.	Ext.	Total	
BCOMS5-201	Core Paper	Corporate Accounting	4	-	-	40	60	100	4
BCOMS5-202	Core Paper	Financial Markets and Institutions	4	-	-	40	60	100	4
BCOMS5-203	Core Paper	Principles of Macro Economics	4	-	-	40	60	100	4
BCOMS5-204	Interdisciplinary course	Business Mathematics and Statistics	4	-	-	40	60	100	4
BCOMS5-205	Ability Enhancement Courses	Business Communication -II	2	-	2*2	40	60	100	4
BCOMD5-211	Skill Enhancement Courses (Elective)	Data Analysis and visualization using MS Excel OR	2	-	2	40	60	100	3
BCOMD5-212		Personality Development and Soft Skills	2	-	2	40	60	100	
BMNCC0-004	Common Value-Added Course	Drug Abuse: Problem, Management and Prevention	2	-	-	100	-	100	S/NS*
Total			22	-	6	340	360	700	23

**1ST
SEMESTER**

BUSINESS ORGANIZATION AND MANAGEMENT

Subject Code – BCOMS5-101

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objectives: The objective of this paper is

1. To deliver basic knowledge to the students about the organisation and management of a business enterprise.
2. To providing an exposure to the concepts, theories and practices in the field of management.
3. To focuses on the basic roles, skills and functions of management.

Course Outcomes After completing the course, student will be able to

1. Understand and explain the concept of management and its managerial perspective.
2. Map complex managerial aspect arises due to ground realities of an organization.
3. Gain knowledge of contemporary issues in Management principles and various approaches to resolve those issues.
4. Understand decision making and applications of theories in decision making.

Unit I (15 Hrs.)

Spectrum of Business Activities, Manufacturing and service sectors. India's experience of liberalization and globalization, Technological innovations and skill development. 'Make in India' Movement. Social Multinational Corporations and Indian transnational companies. Social responsibility and ethics. Emerging opportunities in business; Franchising, Outsourcing, and E-commerce.

Unit II (12 Hrs.)

The Process of Management: Planning; Decision-making; Strategy Formulation. Organizing: Basic Considerations; Departmentation – Functional, Project, Matrix and Network; Delegation and Decentralisation of Authority; Dynamics of group behaviour.

Unit III (18 Hrs.)

Leadership: Concept and Styles; Trait and Situational Theory of Leadership. Motivation: Concept and Importance; Maslow Need Hierarchy Theory; Herzberg Two Factors Theory, McGregor and Ouchi theory. Control: Concept and Process. Communication: Process and Barriers. Transactional Analysis (TA), Johari Window.

Change Management: Resistance to change and strategies to manage change, conflict levels, causes and resolution. Functional and Dysfunctional aspects of conflict.

Emerging issues in management.

Unit IV (15 Hrs.)

Sole Proprietorship, One Person Company, Joint Hindu Family Firm, Partnership firm, Joint Stock Company, Cooperative society; Limited Liability Partnership. Choice of Form of

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Organisation. Entrepreneurial Process- Idea generation, Feasibility study. Basic considerations in setting up a Business Enterprise.

Suggested Readings:

1. Singh, B.P. & Chhabra, T.N., Business Organisation and Management, Sun India Publications, New Delhi.
2. Shankar, Gauri; Modern Business Organisation, Mahavir Book Depot, New Delhi.
3. Tulsian, P.C.; Business Organisation & Management, Pearson Education, New Delhi
4. Tripathi, P.C.; Principles of Management, Tata McGraw Hill Publishing, New Delhi.
5. Barry, Jim, Chandler, John, Clark, Heather; Organisation and Management, Thompson Learning, New Delhi.
6. Bushkirk, R.H.; Concepts of Business: An Introduction to Business System, Dryden Press, NY.
7. Douglas, MCgregor.; The Human Side of Enterprise, McGraw Hill, New York.
8. Kotler, Philip; Marketing Management: Analysis, Planning, Implementation & Control, Prentice-Hall of India, New Delhi.
9. Robbins, Stephen P.; Business Today: New World of Business, Harcourt College Publishers, Fortworth.
10. Buffa, Elwood S.; Production/Operations Management, Prentice Hall of India, New Delhi.

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2024 BATCH ONWARDS**

FINANCIAL ACCOUNTING

Subject Code – BCOMS5-102

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course objective: The objective of this paper is

1. To help students to acquire conceptual knowledge of the financial accounting
2. To impart skills for recording various kinds of business transactions.
3. To make the student familiar with generally accepted accounting principles of financial accounting.
4. To study applications of accounting principles in business organizations excluding corporate entitles.

Course Outcome After competing this course, the students will be able to:

1. Define bookkeeping and elements of financial accounting
2. Understand the tools and techniques of financial accounting
3. Find various errors and issues in financial statements of business
4. Use accounting information for finding business solution of various types of organizations

Unit I (15 Hr.)

Accounting as an information system, the users of financial accounting information and their needs. Qualitative characteristics of accounting, information. Functions, advantages and limitations of accounting. Branches of accounting. Bases of accounting; cash basis and accrual basis. The nature of financial accounting principles – Basic concepts and conventions. Financial accounting standards: Concept, benefits, procedure for issuing accounting standards in India.

Unit II (15 Hr.)

Business Income: Measurement of business income-Net income: the accounting period, the continuity doctrine and matching concept. Objectives of measurement. Revenue: concept, revenue recognition principles, recognition of expenses. Accounting concept of depreciation. Factors in the measurement of depreciation. Methods of computing depreciation.

Unit III (15 Hr.)

Inventories: Meaning. Significance of inventory valuation. Inventory Record Systems: periodic and perpetual. Methods: FIFO, LIFO and Weighted Average. Consignment: Features, Accounting treatment in the books of the consignor and consignee. Accounting for Inland Branches: Dependent branches and Ascertainment of Profit by Debtors Method & Stock and Debtors Method.

Unit IV (15 Hr.)

Computerized Accounting System (using any popular accounting software); Creation of Vouchers; recording transactions; preparing reports, cash book, bank book, ledger accounts, trial balance, Profit and loss account, Balance Sheet.

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Suggested Readings:

1. Lal, Jawahar and Seema Srivastava, Financial Accounting, Himalaya Publishing House.
2. Monga, J.R., Financial Accounting: Concepts and Applications, Mayoor Paper Backs, New Delhi.
3. Shukla, M.C., T.S. Grewal and S.C.Gupta. Advanced Accounts. Vol.-I. S. Chand & Co., New Delhi.
4. S. N. Maheshwari, Financial Accounting, Vikas Publication, New Delhi. T.S, Grewal, Introduction to Accounting, S. Chand and Co., New Delhi
5. P.C. Tulsian, Financial Accounting, Tata McGraw Hill, New Delhi.
6. Bhushan Kumar Goyal and HN Tiwari, Financial Accounting, Vikas publishing House, New Delhi.
7. Jain, S.P. and K.L. Narang. Financial Accounting. Kalyani Publishers, New Delhi.
8. Compendium of Statements and Standards of Accounting. The Institute of Chartered Accountants of India, New Delhi
9. Goldwin, Alderman and Sanyal ,Financial Accounting ,Cengage Learning
10. Horn green ,Introduction to Financial Accounting, Pearson Accounting

**MRSPTU BACHELOR OF COMMERCE SYLLABUS
2024 BATCH ONWARDS**

PRINCIPLES OF MICRO ECONOMICS

Subject Code – BCOMS5-103

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objective: Objective of the course is

1. To acquaint the students with the concepts of micro economics dealing with consumer behaviour
2. To make them understand the supply side of the market through the production and cost behaviour of firms.

Course Outcomes After completing this course, students will be able to:

1. Understand and explain the basic concept of economics.
2. Understand its managerial perspective including the real insight of the consumer's economic behavior
3. Estimate the demand for the new product as well as changes in the existing products.
4. Acquaint students with the concept of production functions and analysis.

Unit I (15 Hrs.)

Micro Economics: Meaning, Nature, Scope and Limitations, Role of managerial economics in decision Making. Basic concepts: Marginal and Incremental Principles, Opportunity Cost, Equilibrium Utility: Cardinal Utility Approach: Diminishing Marginal Utility; Ordinal Utility Approach, Indifference Curve, Properties, Consumer Equilibrium and Marginal Rate of Substitution.

Unit II (15 Hrs.)

Demand and Supply: Determinants of demand, movements vs. shift in demand curve, Determinants of Supply, Movement along a supply curve vs. shift in supply curve; -Market equilibrium and price determination. Elasticity of demand and supply. Application of demand and supply.

Demand for factors. Supply of factor, backward bending supply curve for labor concepts of economic rent; Functional Distribution of Income

Unit III (15 Hrs.)

Production and Cost: Production: Firm as an agent of production. Concepts of Production function. Law of variable proportions; Isoquants; Return to scale. Economics and Diseconomies of scale.

Costs: Costs in the short run. Costs in the long run, Profit maximization and cost minimization. Equilibrium of the firm, Technological Change: the very long run.

Unit IV (15 Hrs.)

Perfect Competition: Assumption; Theory of a firm under perfect competition; Demand and Revenue; Equilibrium of the firm in the short run and long run, The long run industry supply

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curve: increasing, decreasing and constant cost industry. Allocation efficiency under perfect competition

Monopoly: Short-run and long-run equilibrium of monopoly firm; Concept of supply curve under monopoly; Allocation inefficiency and dead-weight loss monopoly; Price discrimination.

Imperfect Competition: Monopolistic Competition: Assumption; Short – run Equilibrium; Long run Equilibrium; Concepts of excess capacity; Empirical relevance. Oligopoly: Causes for the existence of oligopolistic firms in the market rather than perfect Competition; Cooperative vs. Non cooperative Behaviour and dilemma of oligopolistic firms.

Suggested Readings:

1. Salvatore, D. Schaum's, Outline of Theory and Problems of Microeconomic Theory, McGraw-Hill, International Edition, New Delhi.
2. Ahuja, H.L., Business Economics, S. Chand & Co., New Delhi.
3. Pindyck, R.S., and D.L. Rubinfeld, Microeconomics, Prentice-Hall of India Pvt. Ltd.
4. Deepashree, Business Economics, Ane Books Pvt. Ltd., New Delhi.
5. Varian, H.R., Intermediate Microeconomics: A Modern Approach, Affiliated East-West Press, New Delhi.

**MRSPTU BACHELOR OF COMMERCE SYLLABUS
2024 BATCH ONWARDS**

BUSINESS LAWS

Subject Code – BCOMS5-104

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objective The main aim of this course is

1. To understand the legal framework of business related issues
2. To understand various type of contracts and instrument used in companies
3. To understand various partnership acts for structuring the business

Course Outcome After Completing the course, Students will be able to

1. Recognize the essential legal principles behind contractual act.
2. Appreciate the relevance of business law to individuals and businesses and the role of law in an economic, political and social context.
3. Understand the legal structure of different forms of business organizations and their responsibilities as an employer.
4. Present coherent, concise legal business related argument

Unit I (15 Hrs.)

The Indian Contract Act, 1872: Contract – meaning, characteristics and kinds, Essentials of valid contract - Offer and acceptance, consideration, contractual capacity, free consent, legality of objects. Void agreements, Discharge of contract – modes of discharge including breach and its remedies. Contingent contracts, Quasi – contracts, Contract of Indemnity and Guarantee, Contract of Bailment and Pledge, Contract of Agency

Unit II (15 Hrs.)

The Sale of Goods Act, 1930: Contract of sale, meaning and difference between sale and agreement to sell. Conditions and warranties, Transfer of ownership in goods including sale by non-owners, Performance of contract of sale, Unpaid seller – meaning and rights of an unpaid seller against the goods and the buyer, Auction Sale

Unit III (15 Hrs.)

The Limited Liability Partnership Act, 2008: LLP Agreement, Nature and Salient Features of LLP, Difference between LLP and Partnership, LLP and Company, Partners and Designated Partners, Incorporation Document, Incorporation by Registration, Registered office of LLP and change therein :-Change of name, Partners and their Relations, Extent and limitation of liability of LLP and partners. Whistle blowing, Taxation of LLP, Conversion of LLP.

Unit IV (15 Hrs.)

The Information Technology Act 2000: Definitions under the Act, Digital signature, Electronic governance, Attribution, acknowledgement and dispatch of electronic records,

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Regulation of certifying authorities, Digital signatures certificates, Duties of subscribers, Penalties and adjudication, Appellate Tribunal, Offences.

Suggested Readings:

1. Singh, Avtar, The Principles of Mercantile Law, Eastern Book Company, Lucknow.
2. Kuchhal M C, Business Laws, Vikas Publishing House, New Delhi
3. Tulsian P.C., Business Law, Tata McGraw Hill, New Delhi.
4. Sharma, J.P. and Sunaina Kanojia, Business Laws, Ane Books Pvt. Ltd., New Delhi.
5. Sharma, J.P. and Sunaina Kanojia, Vyavsayik Sanniyam, Delhi University Hindi Cell.
6. Chadha P R Business Law, Galgotia Publishing Company, New Delhi
7. Maheshwari & Maheshwari, Business Law, National Publishing House, New Delhi.
8. Information Technology Rules 2000 with Information Technology Act 2000, Taxmann Publications Pvt. Ltd., New Delhi.

**MRSPTU BACHELOR OF COMMERCE SYLLABUS
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BUSINESS COMMUNICATION-I

Subject Code – BCOMS5-105

**L T P C
2 0 4 4**

Duration: 60 Hrs.

Course Objectives: Upon completion of the course the student shall be able to

1. Communicate effectively (Verbal and Non Verbal)
2. Effectively manage the team as a team player
3. Develop interview skills and Leadership qualities and essentials

Course Outcomes After completing this course, students will be able to:

1. Apply appropriate language skills in commerce activities
2. Apply grammar and to know its intricacies for effective usage.
3. Enrich written communication skills for employability.

UNIT – I (13 Hours)

Communication Skills: Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context: Barriers to communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers.

UNIT – II (13 Hours)

Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment.

Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication.

UNIT – III (14 Hours)

Communication Styles: Introduction, The Communication Styles Matrix with example for each - Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style.

Interview Skills: Purpose of an interview, Do's and Dont's of an interview • Giving Presentations: Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery. Group Discussion: Introduction, Communication skills in group discussion, Do's and Dont's of group discussion

UNIT – IV (20 Hours)

COMMUNICATION SKILLS (Practical) The following learning modules are to be conducted using wordsworth® English language lab software Basic communication covering the following topics

Meeting People Asking Questions Making Friends What did you do? Do's and Dont's Pronunciations covering the following topics Pronunciation (Consonant Sounds) Pronunciation

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and Nouns Pronunciation (Vowel Sounds) Advanced Learning Listening Comprehension / Direct and Indirect Speech Figures of Speech Effective Communication Writing Skills Effective Writing Interview Handling Skills E-Mail etiquette Presentation Skills

Recommended Books: (Latest Edition)

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1st Edition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1st Edition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1st Edition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5th Edition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2nd Edition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1st Edition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt. ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1st Edition, Mc Graw Hill Education, 2011
11. Effective communication, John Adair, 4th Edition, Pan Mac Millan, 2009
12. Bringing out the best in people, Aubrey Daniels, 2nd Edition, McGraw Hill, 1999.

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COMPUTER APPLICATIONS IN BUSINESS

Subject Code – BCOMD5-111

**L T P C
2 0 2 3**

Duration: 60 Hrs.

Course Objectives The main aim of this course is:

1. To familiarize the students with computer and its applications in the relevant fields and exposes them with its utility.
2. To investigate emerging technology used in computers for business.
3. To learn internet resources and computer technology

Course Outcome After completing this course, the students will be able to:

1. Understand the concepts of computer and various software related to it.
2. Learn the use of Word Processing tools and presentation tools which helps in different type of analysis and projection of reports related to the business management.
3. Achieve hand on experience with computer software which to enhance business activities and helps in planning and coordinating different activities of the company.
4. Analyse the steps, tools and security considerations needed create an E- commerce model.

UNIT-I (14 Hrs)

Introduction to World Wide Web: Concepts of Web Technology, Web Browsers, Internet and Intranet, Various applications of Internet such as Search Engines, Email, Information gathering, Telnet, FTP etc. Web designing using HTML and DHTML

UNIT-II (16 Hrs)

Word Processing Tools: Overview, Creating, Saving, Opening, Importing, and Exporting & Inserting files. Formatting Pages, Paragraphs and Sections. Indents and outdates. Creating lists and numbering. Heading Styles, Fonts and size editing, positioning & viewing text. Finding & replacing text, inserting page breaks, page numbers, book marks, symbols & dates. Header, Footer & Printings Presentation Tools: Presentation Basics Menus & Toolbars. Opening & Saving & existing presentation creating & saving a presentation, Design Template Blank Presentation. Slide show, Printing slides

UNIT-III (14 Hrs)

Database Systems: Database approach, Advantages of Database approach, Database Management Systems (DBMS), Components of DBMS Environment, Advantages and Disadvantages of DBMS, Types of Database. Database Architecture: Design and Data Modeling - Hierarchical Model, Network model, Relational model, Object Oriented Model

UNIT-IV (16 Hrs)

Introduction to E-Commerce: Defining Commerce; Main Activities of E- Commerce; Broad Goals of E-Commerce; Main Components of E-Commerce; Functions of E- Commerce, Process

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of E-Commerce; Types of E-Commerce; Role of Internet and Web in E-Commerce; E-Business Models. E-Payment Systems: Electronic Funds Transfer; Digital Token Based E-Payment Systems; Modern Payment Systems; Steps for Electronic Payment; Payment Security; Net Banking. *Faculty members can take practical sessions during the lectures.

Recommended Books

1. ITL, ESL, 'Introduction to Infotech', Pearson Education.
2. Goyal, Anita, 'Computer Fundamentals', 1st Edition, Pearson Education.
3. Joseph A. Brady and Ellen F Monk, 'Problem Solving Cases in Microsoft and Excel', 4th Annual Edition, Thomson Learning.
4. V. Rajaraman, 'Introduction to Information Technology', Prentice Hall of India
5. Leon and Leon, 'Introduction to Information Technology', Vikas Publishing House
6. Deepak Bharihoke, 'Fundamentals of Information Technology', 3rd Edition, Excel Books

DIGITAL MARKETING

Subject Code – BCOMD5-112

**L T P C
3 0 0 3**

Duration: 45 Hrs.

Course Objectives The aim of this subject is:

1. To provide students with the knowledge about business advantages of the digital marketing and its importance for marketing success.
2. To develop a digital marketing plan.
3. To explore and develop social media marketing initiatives that are designed to meet business objectives.

Course Outcomes After completion of this course, students will be able to:

1. Identify the importance of the digital marketing for business sustainability
2. Understand various business ethics in digital marketing
3. Apply the digital marketing for communication with customers and other stakeholders
4. Explain latest tools for promoting brand on social media sites

Unit I (10 Hrs)

Digital Marketing: Introduction and Evolution of digital marketing- advantages of digital medium over other media, Impact of internet on consumer buying behaviour.

Unit II (10 Hrs)

Ethical and Legal Issues in the field of digital marketing. Creating initial Digital Marketing Plan; SWOT Analysis; Target Group Analysis.

Unit III (12 Hrs)

Optimization of Web Sites; MS Expression; CRM platform; Budgeting. Ecommerce, -PPC and Online Advertising Search Engine Optimisation (SEO): Introduction, understanding search engines; basics of keyword research; On-page and off-page Search Engine Optimisation.

Unit IV (13 Hrs)

Search Engine Marketing (SEM): Introduction to SEM; Google ad-words; keywords; bidding and budget; quality score; creating and optimising campaign. Google Analytics; Content marketing; Affiliate marketing; Email marketing; Mobile marketing. Marketing on Facebook, LinkedIn, Youtube, Instagram, and Pinterest.

Suggested Readings

1. Seema Gupta, ‘Digital Marketing’ Tata McGraw Hill Publication 2017
2. Charlesworth A., Internet Marketing: A Practical Approach, BH Publications.
3. Chaffey Dave, Internet Marketing: Strategy, Implementation and Practice, Pearson Education.
4. Parkin Godfrey, Digital Marketing: Strategies for Online Success, New Holland Publishers.

**MRSPTU BACHELOR OF COMMERCE SYLLABUS
2024 BATCH ONWARDS**

HUMAN VALUES AND PROFESSIONAL ETHICS

Subject Code – BMNCC0-003

**L T P C
2 0 0 0**

Duration: 30 Hrs.

Course Objectives The main aim of this course is

1. To understand the importance of values prevalent in society and culture
2. To understand various theories of Morality and sharing
3. To understand various professional ethics and rights
4. To understand the application of technology for man-kinds

Course Outcomes: After completing this course, students will be able to

1. Understand the concept of human values as social fact. Clarity about different universal values and value systems relevant to professions and work.
2. Discern the meanings of values, morality, ethics and their relationship with religion. Able to make sense of some significant related theories.
3. Realize the relevance of Professional ethics and virtues at the workplace and their importance for the benefits of society at large.
4. Appreciate the judicious use of Technology and social laws for the conservation of environment and consequently for the welfare of the humanity.

UNIT-I (8 Hrs.)

Meaning of values, Values as social fact, Universal values – equality, justice, freedom/ liberty, inclusion. Distinction between social and culture values and values associated with crafts and occupations. Work and leisure as values – Marx and Veblen

UNIT-II (9 Hrs.)

Values, morality, ethics and their relation with Religion, values as mechanisms of control and coercion. Functional Theory of Values of Talcott Parsons, Theory of Basic Values of Shalom Schwartz, Theory of Protestant Ethic and Capitalism of Max Weber, Bhagwat Gita and Theory of Karma-Dharma, Sikhism and theory of work, dignity of labour, meditation and sharing.

UNIT-III (7 Hrs.)

Meaning and types of Professional Ethics, Goals of professional work and their problems, Normative and evaluative elements in professional work, Duties and obligations, Professional rights, Virtues in professional life (honesty, trustworthiness, transparency, competence, integrity and exemplary conduct), Engineering ethics and service ideals.

UNIT-IV (6 Hrs.)

Technology for and against mankind and environment- fulfilment of human needs, and industrial disasters: case studies – Bhopal Gas Tragedy, Chernobyl and Fukushima Disasters; Equality at work place: gender discrimination and caste/class-based exclusions.

Recommended Books

1. Schwartz, H. Shalom, 'An Overview of the Schwartz Theory of Basic Values'. Online Readings in Psychology and Culture. 2 (1). doi:10.9707/2307-0919.1116, 2012.
2. John Berry, Janek, Pandey; Poortinga, Ype 'Handbook of Cross-cultural Psychology', 2nd Edn.. Boston, MA: Allyn and Bacon. p. 77. ISBN 9780205160747, 1997.
3. Timo Airaksinen, 'The Philosophy of Professional Ethics', University of Helsinki, Finland. 4. Manju Jitendra Jain, 'Yes, It's Possible', Kalpana Publications, Mumbai, 2011.

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**2ND
SEMESTER**

CORPORATE ACCOUNTING

Subject Code: BCOMS5-201

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objective: This course aims at

1. To acquire the conceptual knowledge of the corporate accounting.
2. To understand the various techniques of preparing the financial statements.
3. To understand the preparation of final accounts of the Companies.

Course Outcomes After completion of this course, students will be able to:

1. Acquire the knowledge in company accounts.
2. Understand the accounting treatment in issue of shares at par premium and discount, issues of debenture, managerial remuneration etc.
3. Develop the application skills to computation of pro-rate allotment, redemption of preference shares, final accounts and preparation of balance sheet of joint stock companies.
4. Familiarize the analytical skills in corporate accounting, calculation of underwriting commission, redemption of debentures in sinking fund method Evaluate the techniques for redemption of preference shares.

Unit I (15 Hrs.)

Accounting for Share Capital & Debentures: Issue, forfeiture and reissue of forfeited shares-concept & process of book building. Issue of rights and bonus shares. Buy back of shares. Redemption of preference shares. Issue and Redemption of Debentures.

Final Accounts: Preparation of profit and loss account and balance sheet of corporate entities, excluding calculation of managerial remuneration. Disposal of company profits.

Unit II (15 Hrs.)

Valuation of Goodwill and Valuation of Shares: Concepts and calculation - simple problem only. **Amalgamation of Companies:** Concepts and accounting treatment as per Accounting Standard: 14 (ICAI) (excluding intercompany holdings). Internal reconstruction: concepts and accounting treatment excluding scheme of reconstruction.

Unit III (15 Hrs.)

Accounts of Holding Companies/Parent Companies: Preparation of consolidated balance sheet with one subsidiary company. Relevant provisions of Accounting Standard: 21 (ICAI).

Banking Companies: Difference between balance sheet of banking and non-banking company; prudential norms. Asset structure of a commercial bank. Non-performing assets (NPA).

Unit IV (15 Hrs.)

Cash Flow Statement: Concepts of funds. Preparation of cash flow statement as per Accounting Standard (AS): 3 (Revised) (ICAI): Indirect method only.

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Suggested Readings:

1. J.R. Monga, Basic Corporate Accounting, Mayur Paperbacks (c/o K.L. Malik and Sons Pvt. Ltd, 23 – Dara Ganj, New Delhi.
2. Nirmal Gupta, Chhavi Sharma, Corporate Accounting, Theory and Practice, Ane Books Pvt Ltd, New Delhi.
3. M.C., Shukla, T.S. Grewal and S.C. Gupta, Corporate Accounting, S. Chand and Co., New Delhi.
4. S.N. Maheshwari, and S.K. Maheshwari, Corporate Accounting, Vikas Publication, New Delhi.
5. Mukherjee and Hanif, Corporate Accounting, Tata McGraw Hill, New Delhi.

FINANCIAL MARKETS AND INSTITUTIONS

Subject Code: BCOMS5-202

L T P C

Duration: 60 Hrs

4 0 0 4

Course Objective: This course aims at:

1. To provide the student a basic knowledge of financial markets and institutions
2. To familiarize them with major financial services in India.
3. To develop student's ability in dealing with New issue market and money markets

Course Outcomes After successful completion of this course, students will be able to:

1. Understand the working of banks and insurance banks.
2. Demonstrate the knowledge of structure and working of Indian financial institutions
3. Compare and evaluate the different products of financial capital markets.
4. Comprehend the Ethics of functioning of financial institutions

Unit I (15 Hrs.)

An Introduction to Financial System and its Components: Financial markets and institutions. Financial intermediation. Flow of funds matrix. Financial system and economic development. An overview of Indian financial system. Financial Regulators in India: RBI, Ministry of Corporate Affairs, SEBI, IRDA, Financial Conglomerates.

Unit II (15 Hrs.)

Financial Markets: Money market-functions, organization and instruments. Role of central bank in money market; Indian money market-An overview.

Capital Markets-functions, organization and instruments. Indian debt market; corporate debt market; slow growth of corporate debt market; Development of corporate bond market abroad. Indian equity market-primary and secondary markets; Role of stock exchanges in India.

Unit III (15 Hrs.)

Financial Institutions: Depository and non-depository institutions, Commercial banking-introduction, its role in project finance and working capital finance. Development Financial Institutions (DFIs)-An overview and role in Indian economy. Life and non-life insurance companies in India

Unit IV (15 Hrs.)

Mutual Funds- Introduction and their role in capital market development. Non-banking financial companies (NBFCs). Regional Rural Banks. Urban Cooperative Banks, Rural Cooperative Credit Institutions, Pension Fund Regulatory and Development Authority.

Suggested Readings:

1. Bhole, L.M., Financial Markets and Institutions. Tata McGraw Hill Publishing Company
2. Khan, M.Y., Indian Financial System-Theory and Practice. New Delhi: Vikas Publishing House

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3. Sharma, G.L., and Y.P. Singh eds. Contemporary Issues in Finance and Taxation. Academic Foundation, Delhi
4. Khan and Jain, Financial Services, Tata McGraw Hill
5. Singh, J.K., Venture Capital Financing in India. Dhanpat Rai and Company, New Delhi.
6. Annual Reports of Major Financial Institutions in India.

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PRINCIPLES OF MACRO ECONOMICS

Subject Code: BCOMS5-203

L T P C

Duration: 60 Hrs

4 0 0 4

Course Objective: The course aims at providing

1. The student with knowledge of basic concepts of the macro economics.
2. The modern tools of macro-economic analysis are discussed and the policy framework is elaborated, including the open economy.
3. To study whether the economy uses our limited resources to obtain the maximum satisfaction possible for society.

Course Outcomes After the completion of this course students will be able to:

1. Analyze the economic conditions and assess the position of a company
2. Demonstrate the basic understanding of the economic implications of changes in government fiscal or monetary policy.
3. Calculate equilibrium national income levels and use various multipliers and convert nominal values to real values.

Unit I (20 Hrs.)

Introduction: Concepts and variables of macroeconomics, income, expenditure and the circular flow. **National Income Determination:** Actual and potential GDP; Aggregate Expenditure – Consumption Function, Investment Function; Equilibrium GDP; Concepts of MPS, APS, MPC, APC. Autonomous Expenditure; The Concepts of Multiplier; National Income Determination in an Open Economy with Government- Fiscal Policy – Impact of Changes in Govt. Expenditure and Taxes, Net Export Function, Net Exports and Equilibrium GDP.

Unit II (15 Hrs.)

Inflation: Causes of rising and falling inflation, inflation and interest rates, social costs of inflation. Unemployment – natural rate of unemployment, frictional and wait unemployment. Labour market and its interaction with production system. Phillips curve, the trade-off between inflation and unemployment.

Unit III (15 Hrs.)

Open Economy: Flows of goods and capital, saving and investment in a small and a large open economy, exchange rates, Mundell – Fleming model with fixed and flexible prices in a small open economy with fixed and with flexible exchange rates, interest-rate differentials case of a large economy.

Unit IV (10 Hrs.)

IS-LM Framework: Derivation of IS and LM Functions; Joint determination of National Income and rate of Interest.

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Suggested Readings

1. R. G. Lipsey and K. A. Chrystal –Economics, Chapters 20 to 28; (Oxford University press).
2. Mankiw N. Gregory, Macroeconomic, McMillan Worth Publishers, New York.
3. Dornbusch Rudiger and Stanley Fisher, Macroeconomic, McGraw Hill.
4. Deepashree, Vanita Agarwal, “Macro Economics”, Ane Books Pvt Ltd, New Delhi

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**MRSPTU BACHELOR OF COMMERCE SYLLABUS
2024 BATCH ONWARDS**

BUSINESS MATHEMATICS AND STATISTICS

Subject Code: BCOMS5-204

L T P C

Duration: 60 Hrs

4 0 0 4

Course Objective: The objective of this course is

1. To familiarize students with the applications of Mathematics and statistical techniques in business decisions.
2. To learning statistical tools which can be used in day to day business transactions and covers the mathematical processes and techniques currently used in the fields of business and finance.
3. To solving monetary problems in business and personal finance.

Course Outcomes After completion of this course, students will be able to:

1. Understand the key terminology, concepts tools and techniques used in various business statistical analysis
2. Develop an understanding of the theory of probability, rules of probability and probability distributions.
3. Understand the meaning and importance of correlation and regression analysis including both simple and multiple correlation and regression

Unit I (15 Hrs.)

Business Mathematics: Matrices:- Definition of a matrix. Types of matrices. Algebra of matrices. Applications of matrices operations for solution to simple business and economic problems. Calculation of values of determinants up to third order. Finding inverse of a matrix through determinant method. Solution of system of linear equation up to three variables.

Basic Mathematics of Finance: Simple and compound interest. Rates of interest – nominal, effective and continuous – and their inter-relationships. Compounding and discounting of a sum using different types of rates.

Unit II (18 Hrs.)

Business Statistics: Uni-variate Analysis:- Measures of Central Tendency including Arithmetic mean, Geometric mean and Harmonic mean: properties and applications; Mode and Median. Partition values - quartiles, deciles, and percentiles. Measures of Variation: absolute and relative. Range, quartile deviation and mean deviation; Variance and Standard deviation: calculation and properties. **Bi-variate Analysis:** Simple Linear Correlation Analysis: Meaning, and measurement. Karl Pearson's co-efficient and Spearman's rank correlation. Simple Linear Regression Analysis: Regression equations and estimation. Relationship between correlation and regression coefficients.

Unit III (15 Hrs.)

Time-based Data: Index Numbers and Time Series Analysis

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Meaning and uses of index numbers; Construction of index numbers: Aggregative and average of relatives – simple and weighted, Tests of adequacy of index numbers, Construction of consumer price indices. Components of time series; additive and multiplicative models; Trend analysis: Finding trend by moving average method and Fitting of linear trend line using principle of least squares.

Unit- IV (12 Hrs)

Probability Theory: Addition & Multiplication Theorems, Bayes Theorem Conditional Probability, Probability Distribution: Binomial, Poisson and Normal.

Suggested Readings:

1. N. D. Vohra, Business Mathematics and Statistics, McGraw Hill Education (India) Pvt Ltd
2. J. K. Sharma, Business Mathematics, Ane Books Pvt. Ltd., New Delhi.
3. J.K. Thukral, Mathematics for Business Studies, Mayur Publications
4. J. K. Singh, Business Mathematics, Himalaya Publishing House.
5. E.T. Dowling, Mathematics for Economics, Schaum's Outlines Series, McGraw Hill Publishing Co.
6. Mizrahi and John Sullivan. Mathematics for Business and Social Sciences. Wiley and Sons.
7. Budnick, P. Applied Mathematics. McGraw Hill Publishing Co.
8. J. K. Sharma, Business Statistics, Pearson Education.
9. S.C. Gupta, Fundamentals of Statistics, Himalaya Publishing House.
10. S.P. Gupta and Archana Gupta, Elementary Statistics, Sultan Chand and Sons, New Delhi.
11. Richard Levin and David S. Rubin, Statistics for Management, Prentice Hall of India, New Delhi.
12. M.R. Spiegel, Theory and Problems of Statistics, Schaum's Outlines Series, McGraw Hill Publishing Co.

BUSINESS COMMUNICATION-II

Subject Code: BCOMS5-205

L T P C

Duration: 60 Hrs

2 0 4 4

Course Objectives: This course aims at:

1. Communicate effectively in Written and Unwritten form.
3. Effectively transfer the message with skills and manage the team as a team player.
4. Develop language skills for good employability.

Course Outcomes After completing this course, students will be able to:

1. Apply appropriate language skills in commerce activities
2. Develop language skills inside them for best opportunities.
3. Enrich in all forms of communication for employability.

Unit- I (18 Hrs)

Basic Listening Skills: Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations. The Language of Touch, Meta Communication, Types of Listening, Listening tips.

Reading Skills Introduction. Benefits of reading. Tips for effective reading. the SQ3R technique. Different stages of reading. Determining reading rate of students. Activities to increase the reading rate. Problems faced. Becoming an effective reader.

Unit- II (12 Hrs)

Effective Written Communication: Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication. Writing Effectively: Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message. Drawback of written communication. Business Writing, Business Letter, Format and Styles, Types of business letters, Art of writing correct and precise mails, Understand netiquette.

Unit- III (15 Hrs)

Speaking: Introduction, Communication process. Importance of communication, channels of communication. Formal and informal communication. Barriers to communication. Tips for effective communication. Tips for conversation.

Unit- IV (15 Hrs)

Presentation skills. Effective multi-media presentation skills. Speeches and debates. Combating nervousness. Patterns and methods of presentation. Oral presentation, planning and preparation.

**MRSPTU BACHELOR OF COMMERCE SYLLABUS
2024 BATCH ONWARDS**

Recommended Books: (Latest Edition)

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2 nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1 stEdition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1 stEdition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1 stEdition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2 ndEdition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1 stEdition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1 stEdition, Mc Graw Hill Education, 2011
11. Effective communication, John Adair, 4 thEdition, Pan Mac Millan,2009
12. Bringing out the best in people, Aubrey Daniels, 2 ndEdition, Mc Graw Hill, 1999

**MRSPTU BACHELOR OF COMMERCE SYLLABUS
2024 BATCH ONWARDS**

DATA ANALYSIS AND VISUALIZATION USING MS EXCEL

Subject Code: BCOMD5-211

L T P C

Duration: 60 Hrs

2 0 2 3

Course Outcome- After Completing this course, Students will be able to

1. Use spreadsheet software to manage monetary data.
2. Work with formulas and functions.
3. Develop professional-looking worksheets with charts and graphs, data tables by using web tools.
4. Use spreadsheet's solver for complex problems.

UNIT- I (15 Hrs)

Managing Spread Sheet: Introduction, Naming and Moving Worksheets, Copying Worksheets, Adding, Deleting and Hiding Worksheets, Grouping Worksheets Conditional Formatting, Date and Time Function: Date, Day, Month, Year, Edate, Eomonth, Network days, Workday, Weeknum, Weekday, Hour, Minute, Second, Now, Today Time Look Up Functions: Data Validation, Advanced Range Names, VLookUp, H LookUp

UNIT- II (15 Hrs)

Logical Functions: IF Function, Nested IF, CountIf, SumIf, IF with AND and OR, Average, Averagea, Averageif, Averageifs, Subtotal, Rand, Rand between, Roundup, Round down

UNIT-III (15 Hrs)

What if Analysis, Scenario Analysis, Sensitivity Analysis, Goal Seek, Advanced Pivot Table: Filtering Pivot Tables, Pivot Table Analysis, Proper Function, Trim Function, Advance Pivot Charts

UNIT-IV (15 Hrs)

Financial Functions: Time Value of Money- NPV/ IRR/ Discounting and other financial functions Statistical Function – Correlation, Regression

Suggested Readings

1. Greg Harvey, _Microsoft Excel 2016 All-in-One for Dummies, Wiley Publications
2. Lokesh Lalwani, _Excel 2019 All – In – One‘ BPB Publication
3. Manisha Nigam, _Data Analysis with Excel‘ BPB Publication
4. Paul McFedries, _Excel 2016- Formulas and Functions‘ Que Publications

**MRSPTU BACHELOR OF COMMERCE SYLLABUS
2024 BATCH ONWARDS**

PERSONALITY DEVELOPMENT AND SOFT SKILLS

Subject Code: BCOMD5-212

L T P C

Duration: 60 Hrs

2 0 2 3

Course Objectives: The course aims at

1. To cause a basic awareness about the significance of soft skills in professional and interpersonal communications and facilitate an all-round development of personality.
2. To cover key areas like conversation skills, group skills and persuasion skills required during the interview process in an organization.

Course Outcomes: At the end of the course, the student will be able to:

1. Demonstrate soft skills required for business situations.
2. Analyze the value of soft skills for career enhancement.
3. Apply soft skills to workplace environment.
4. Confidently participate in interview process.
5. To handle stress in their lives and future in a better way.

UNIT-1 (15 Hrs)

SOFT SKILLS- Introduction to Soft Skills, Aspects of Soft Skills, Identifying your Soft Skills, Negotiation skills, Importance of Soft Skills, Concept of effective communication. **SELF-DISCOVERY-** Self-Assessment, Process, Identifying strengths and limitations, SWOT Analysis Grid.

FORMING VALUES- Values and Attitudes, Importance of Values, Self-Discipline, Personal Values - Cultural Values-Social Values-some examples, Recognition of one's own limits and deficiencies.

UNIT-2 (15 Hrs)

BODY LANGUAGE - Introduction- Body Talk, Forms of body language, uses of body language, Body language in understanding Intra and Inter-Personal Relations, Types of body language, Gender differences, Gaining confidence with knowledge of Kinesics.

ETIQUETTE AND MANNERS- **ETIQUETTE-** Introduction, Modern Etiquette, Benefits of Etiquette, Taboo topics, Do's and Don'ts for Men and Women. **MANNERS-** Introduction, Importance of manners at various occasions, Professional manners, Mobile manners.

CORPORATE GROOMING TIPS- Dressing for Office: Do's and Don'ts for Men and Women, Annoying Office Habits.

UNIT-3 (15 Hrs)

STRESS MANAGEMENT - Introduction meaning positive and negative stress. Sources of stress. Case studies signs of stress. Stress management tips. Teenage stress.

TIME MANAGEMENT - Introduction, the 80-20 Rule, three secrets of Time Management, Time Management Matrix, Effective Scheduling, Time Wasters, Time Savers, Time Circle Planner, Difficulties in Time Management, Overcoming Procrastination.

UNIT-4 (15 Hrs)

INTERVIEW SKILLS - Introduction. Types of interview. Types of question asked. Reasons for rejections. Post-interview etiquette. Telephonic interview. Dress code at interview. Mistakes during interview. Tips to crack on interview. Contextual questions in interview skills. Emotional crack an interview. Emotional intelligence and critical thinking during interview process.

Recommended Books:

1. K. Alex, S. Chand Publishers.
2. R.C. Sharma and Krishna Mohan, 'Business Correspondence and Report Writing', TMH, New Delhi, 2016.
3. N. Krishnaswami and T. Sriraman, 'Creative English for Communication', Macmillan.
4. Penrose, John M., et al., 'Business Communication for Managers', Thomson South Western, New Delhi, 2007.
5. Holtz, Shel, 'Corporate Conversations', PHI, New Delhi, 2007.

**MRSPTU BACHELOR OF COMMERCE SYLLABUS
2024 BATCH ONWARDS**

DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION

Subject Code: BMNCC0-004

L T P C

Duration: 30 Hrs

2 0 0 0

Course Objectives The main aim of this course is:

1. To aware students about Consequences of Drug Abuse
2. To aware students about preventions of Drug Abuse
3. To aware various roles of society to prevent drug abuse

Course Outcomes After completing this course, Students will be able to:

1. Understand the responsibilities of society and family to prevent Drug Abuse
2. Understand the role of educational institutes in controlling Drug Abuse
3. Aware about various Psychological and Social management of Drug abuse
4. Understand the role of Media and Legislation to control the drug abuse.

UNIT-I (6 Hrs.)

Meaning of Drug Abuse: Meaning: Drug abuse, Drug dependence and Drug addiction. Nature and extent of drug abuse in India and Punjab.

UNIT-II (8 Hrs.)

Consequences of Drug Abuse Individual: Education, Employment, Income. Family: Violence. Society: Crime. Nation: Law and Order problem.

UNIT-III (8 Hrs.)

Prevention of Drug Abuse Role of Family: Parent-child relationship, Family support, supervision, shipping values, active scrutiny. School: Counselling, Teacher as role-model, Parent-teacher-health professional coordination, Random testing on students.

UNIT-IV (8 Hrs.)

Treatment and Control of Drug Abuse Medical Management: Medication for treatment and to reduce withdrawal effects. Psychological Management: Counselling, Behavioural and Cognitive therapy. Social Management: Family, Group therapy and Environmental intervention. Treatment: Medical, Psychological and Social Management. Control: Role of Media and Legislation.

Recommended Books

1. Ram Ahuja, 'Social Problems in India', Rawat Publications, Jaipur,
2. 'Extent, Pattern and Trend of Drug Use in India', Ministry of Social Justice and Empowerment, Govt. of India,
3. J.A. Inciardi, 'The Drug Crime Connection', Sage Publications, Beverly Hills,
4. T. Kapoor, 'Drug Epidemic among Indian Youth', Mittal Publications, New Delhi,
5. Kessel, Neil and Henry Walton, 'Alcoholism, Harmond Worth', Penguin Books,
6. Ishwar Modi and Shalini Modi, 'Addiction and Prevention', Rawat Publications, Jaipur,

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2024 BATCH ONWARDS**

7. 'National Household Survey of Alcohol and Drug Abuse', Clinical Epidemiological Unit, All India Institute of Medical Sciences, New Delhi,
8. Ross Coomber and Others, 'Key Concept in Drugs and Society', Sage Publications, New Delhi,

MRSPTU

MRSPTU MBA (AVIATION MANAGEMENT) 2023 BATCH ONWARDS**SEMESTER- FIRST****Total Contact Hours = 32****Total Marks = 800****Total Credits = 30**

SEMESTER 1 st		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext	Total	
MBADS1-121	CSR and Business Ethics	4	-	-	40	60	100	4
MBADS1-122	Organization Behaviour	4	-	-	40	60	100	4
MBADS1-123	Financial Statements Analysis and Reporting	4	-	-	40	60	100	4
MBADS1-124	Business Statistics and Analytics for Decision Making	4	-	-	40	60	100	4
MBADS1-125	Managerial Economics and Policy	4	-	-	40	60	100	4
MBADS1-126	Marketing Management	4			40	60	100	4
MBADS1-127	Business Communication	2	-	2	40	60	100	3
MBADS1-128	Computer Applications for Business	2	-	2	40	60	100	3
Total	Theory = 7 Labs = 2	28	0	4	320	480	800	30

SEMESTER - SECOND**Total Contact Hours = 32****Total Marks = 800****Total Credits = 28**

SEMESTER 2 nd		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
MBADS1-221	Legal and Business Environment	4	-	-	40	60	100	4
MBADS1-222	Business Research Methods	4	-	-	40	60	100	4
MBADS1-223	Corporate Finance	4	-	-	40	60	100	4
MBADS1-224	Human Resource Management	4	-	-	40	60	100	4
MBADS1-225	Operations Management	4	-	-	40	60	100	4
MBADS1-226	Entrepreneurship	4	-	-	40	60	100	4
MBADS1-227	Business Statistics Research Lab	-	-	4	60	40	100	2
MBADS1-228	Entrepreneurship and Innovation Project	-	-	4	60	40	100	2
Total	Theory = 7 Labs = 1	24	0	8	360	440	800	28

Note: Summer/Industrial Training for 6-8 weeks at the end of 2nd semester

MRSPTU MBA (AVIATION MANAGEMENT) 2023 BATCH ONWARDS

SEMESTER – THIRD

Total Contact Hours = 20

Total Marks = 600

Total Credits = 26

SEMESTER 3 rd		Contact Hrs.			Max Marks		Total	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
MBADS1-321	Project Management	4	-	-	40	60	100	4
MBADS1-322	Summer Internship Project	-	-	-	60	40	100	6
For Major Specialization								
XXXXXX	Compulsory Subject 1 (From Major Specialization)	4	-	-	40	60	100	4
XXXXXX	Compulsory Subject 2 (From Major Specialization)	4	-	-	40	60	100	4
XXXXXX	Department Elective 1* (From Major Specialization)	4	-	-	40	60	100	4
XXXXXX	Department Elective 2* (From Major Specialization)	4	-	-	40	60	100	4
For Dual Specialization								
XXXXXX	Compulsory Subject 1 (From 1 st Specialization)	4	-	-	40	60	100	4
XXXXXX	Compulsory Subject 2 (From 1 st Specialization)	4	-	-	40	60	100	4
XXXXXX	Compulsory Subject 1 (From 2 nd Specialization)	4	-	-	40	60	100	4
XXXXXX	Compulsory Subject 2 (From 2 nd Specialization)	4	-	-	40	60	100	4
Total	Theory = 6 Labs = 0	20	-	-	260	340	600	26

**Select any two subjects from the list of department elective subjects of major Specialization.*

List of Compulsory papers (for Major and Dual Specialization)

Semester - Third	
Subject & Paper Code	Compulsory Papers as per specialization
AVIATION	
MBADD7-321	Airline and Airport Management
MBADD7-322	Airline operation and Scheduling

List of Departmental Elective Subjects (For Major Specialization)

Semester - Third	
Subject & Paper Code	Subject
AVIATION	
MBADD7-323	Airline Marketing Management
MBADD7-324	Aircraft Rules And Regulations
MBADD7-325	Airline Finance
MBADD7-326	Aviation and Hospitality Management

MRSPTU MBA (AVIATION MANAGEMENT) 2023 BATCH ONWARDS

SEMESTER – FOURTH

Total Contact Hours = 20

Total Marks = 600

Total Credits = 24

SEMESTER 3 rd		Contact Hrs.			Max Marks		Total	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
MBADS1-421	Strategic Management	4	-	-	40	60	100	4
MBADS1-422	Dissertation	-	-	-	60	40	100	4
For Major Specialization								
XXXXXX	Compulsory Subject 1 (From Major Specialization)	4	-	-	40	60	100	4
XXXXXX	Compulsory Subject 2 (From Major Specialization)	4	-	-	40	60	100	4
XXXXXX	Department Elective 1* (From Major Specialization)	4	-	-	40	60	100	4
XXXXXX	Department Elective 2* (From Major Specialization)	4	-	-	40	60	100	4
For Dual Specialization								
XXXXXX	Compulsory Subject 1 (From 1 st Specialization)	4	-	-	40	60	100	4
XXXXXX	Compulsory Subject 2 (From 1 st Specialization)	4	-	-	40	60	100	4
XXXXXX	Compulsory Subject 1 (From 2 nd Specialization)	4	-	-	40	60	100	4
XXXXXX	Compulsory Subject 2 (From 2 nd Specialization)	4	-	-	40	60	100	4
Total	Theory = 6 Labs = 0	20	-	-	260	340	600	24

**Select any two subjects from the list of department elective subjects of major Specialization.*

List of Compulsory papers (for Major and Dual Specialization)

Semester - Third	
Subject & Paper Code	Compulsory Papers as per specialization
AVIATION	
MBADD7-421	Aircraft Maintenance Management
MBADD7-422	Aviation Advertising and Sales promotion

List of Departmental Elective Subjects (For Major Specialization)

Semester - Third	
Subject & Paper Code	Subject
AVIATION	
MBADD7-423	Aviation Law
MBADD7-424	Aviation Safety Management System and Accident Investigation
MBADD7-425	Operation Management
MBADD7-426	Customer relation Management

Course Description

Pedagogy

1. The medium of delivery of course will be English.
2. Subject wise small projects are given to students for better clarity of concepts in context of business scenario.
3. For sharpening the communication skills of students, presentations are conducted on individual basis or group basis.
4. Case Studies and Caselet are discussed in the class for enhancing the decision making and analytical skills of students.
5. Workshops, Expert lectures of industry persons and industrial visits are conducted to integrate the theoretical knowledge into practical one.
6. Relevant articles from Newspapers, Journals and Magazines are extracted and discussed in the class to update students with current global business issues.
7. Students are suggested to enroll in MOOC courses to enhance their knowledge in their interested areas.
8. Students are encouraged to participate in various competitive events (Sports/Cultural/Academics) in different colleges and universities for developing their overall personality.

Attendance

The attendance requirement shall be a minimum of 75% of the classes actually conducted in every course the student has registered for in the Academic Term

Scheme of Examination

The medium of instructions and examination will be English.

Distribution of Marks

Examinations	Marks
Internal	40
External	60

Internal Examinations

Category	Marks	Descriptions
MST (Mid Term Sessional Test)	24	There will be Two MSTs of 24 Marks. The average of marks of both MSTs will be taken.
Assignments	10	Four assignments will be submitted by students. Out of Four assignments, Two assignments will be theoretical and Two will be small projects based on the topics of the subject.
MCQs	6	There will be 2 MCQs of 30 Marks. The average of both MCQs will be taken. The marks will be scaled down to 6. (Divide the marks by 5)
Total	40	

Final Examination

1. The final examination will be of Three Hours. Total Marks will be 60.
2. The question paper will be comprised of Three Sections (A, B and C)
3. Section A (20 Marks) consists of 10 questions. Each question carries 2 Marks.
4. Section B (32 Marks) consists of Eight Questions (2 Question from each unit). Students have to attempt Four questions (One question from each unit). Each question carries 8 Marks.
5. Section C (8 Marks) consists of case study. It carries 8 Marks.

CSR and BUSINESS ETHICS

Subject Code: MBADS1-121

L T P C

Duration: 60 Hrs

4 0 0 4

Course Objective

The main aim of this course is:

1. To Discuss the various concepts of Corporate Social Responsibility (CSR).
2. To understand the importance of sustainability and social responsibility with context business and how they integrate into the vision and planning of the firm.
3. To understand the changing role of Business with context to the society.

Course Outcomes

After the completion of this course, students will be able to

1. Understand about CSR, Models and its strategies.
2. Evaluate corporate governance and its practices.
3. Understand sustainability and its relationship with CSR.
4. To understand about the reporting system of National Voluntary Guidelines on Social, Environmental and Economic Responsibilities of Business International Standards.

UNIT-I (15 Hrs)

Introduction to CSR: Meaning, Definition & Objectives of CSR, Chronological evolution of CSR in India; Need of CSR, Models of CSR in India, Carroll's model; Drivers of CSR; Major codes on CSR; Initiatives in India, Corporate citizenship-Business practices-Strategies for CSR-Challenges and implementation

Sustainability: Meaning and Scope, Corporate Social Responsibility and Corporate Sustainability-Sustainability Terminologies and Meanings-Why is Sustainability an Imperative

UNIT-II (12 Hrs)

Evolution of Corporate Governance-Governance practices and regulation-Structure and Development of boards-Role of capital market and government-Governance Ratings-Future of governance

Corporate Sustainability Reporting Frameworks, Global Reporting Initiative Guidelines, National Voluntary Guidelines on Social, Environmental and Economic

UNIT-III (15 Hrs)

Business Ethics: Characteristics, Principles, Types, Importance, Factors highlighting the importance of Business Ethics, Myths about Business Ethics. Ethical Values, Theories of Ethics, Absolutism verses Relativism, Teleological approach, the Deontological approach, Kohlberg's six stages of moral development (CMD), Ethics v/s Ethos, Indian v/s Western Management, Globalisation and Business Ethics. Emerging issues of Business Ethics

UNIT-IV (18 Hrs).

Managing Ethical Dilemma: Characteristics, Ethical Decision Making, Ethical Reasoning, the dilemma resolution process; Ethical dilemmas in different business areas: Finance, Marketing HRM and International Business.

Ethical Culture in Organization: Developing Codes of Ethics and Conduct, Ethical and Value Based Leadership. Role of scriptures in understanding ethics, Indian wisdom & Indian Approaches towards Business Ethics

Recommended Books

1. C.V. Baxi and Ajit Prasad, 'Corporate Social Responsibility: Concepts and Cases: The Indian Experience', Excel Books India, New Delhi, *Latest Edition*
2. Mike Blowfield and Alan Murray, 'Corporate Responsibility', Oxford University Press, *Latest Edition*
3. J.P. Sharma, Corporate Governance, Business Ethics & CSR, Ane Books Pvt Ltd, New Delhi. *Latest Edition*

ORGANIZATION BEHAVIOR

Subject Code: MBADS1-122

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives

The main aim of this course is:

1. To provide an understanding of basic concepts, theories and techniques in the organizational behaviour.
2. To understand the concept of motivation and its theories, job satisfaction and various leadership styles.
3. To provide an understanding of basic concepts, theories and techniques in the field of foundation of group behavior, group decision making and conflict management.
4. To understand human behaviour with its relevance to organizational functions.

Course Outcomes:

After the completion of this course students will be able to:

1. Understand the basic concepts of the organization behavior and personality
2. Understand the concept of motivation and its theories, job satisfaction and various leadership styles.
3. Understanding the concepts, theories and techniques of group behavior, and group decision making and conflict management.

UNIT-I (15 Hrs)

Organizational Behavior: Concepts, Theories and organization aspects of OB, Contributing Disciplines to OB, Challenges and opportunities for OB. Foundations of Individual Behavior: Biographical Characteristics, Learning, Theories of Learning, Ability, Attitudes, Attitude Change, Values & Beliefs, Prejudices

Personality: Determinants of Personality, Perception, Attribution Theory, Person's Perception.

UNIT-II (12 Hrs)

Motivation: Definition & Process, Early Theories of Motivation, Contemporary Theories of Motivation, Nature and process of Motivation, Application of Motivation Concept. **Job Satisfaction:** Nature & Significance of Job satisfaction

Leadership: Nature Significance & Theories; Leadership Effectiveness Model; Leadership in Indian Culture; Leadership Traits & Skills; Behavioural Styles in Leadership. Transactional Analysis, Life Position, Johari Window Model.

UNIT-III (20 Hrs)

Foundations of Group Behavior: Nature & Concept of Group Formation, Group properties: Roles, Norms, Status, Size and Cohesiveness, Stages of Group Formation, Theories of Group Formation. Teams, Work Teams, Difference between Group & Team.

Group Decision Making: Decision Making Process; Decision Making Styles; Advantages & Disadvantages of Decision Making; Techniques of Decision Making; Consensus Decision Making in Groups.

Conflict Management: Definition of Conflict, Transitions in Conflict thought; Functional Vs Dysfunctional Conflict; Conflict Process; Individual, Group Level Conflict and Organization level Conflict; Managing Organizational Conflict

UNIT-IV (13 Hrs)

Negotiations - Meaning & Definition, Negotiations Process; Issues in Negotiations

Organizational Change & Development: Understanding Organization, Managing Organization Culture and Technology, Organizational Change: Change Agents, Change Models, Resistance to Change. **Managing Power and Politics in Organization:** Nature & Concepts, Sources & Types of Power, Techniques of Politics.

Recommended Books

1. Robbins, 'Organization Behaviour', Pearson Education, ***Latest Edition***
2. Luthans, 'Organization Behaviour', Tata McGraw Hill, ***Latest Edition***
3. Hersey, 'Management of Organizational Behaviour', Prentice Hall India, ***Latest Edition***
4. Aswathappa, 'Organization Behaviour', Himalaya Publications, ***Latest Edition***
5. L.M. Prasad, 'Organisation Behaviour', Sultan Chand & Sons, ***Latest Edition***

FINANCIAL STATEMENT ANALYSIS AND REPORTING

Subject code – MBADS1-123

**L T P C
4 0 0 4**

Duration – 60 Hrs

Course Objectives

The main aim of this course is:

1. To acquaint the students regarding various accounting concepts and its application in managerial decision making.
2. To understand financial statements of cashflow and balance sheets.
3. To understand the appropriate accounting tools and techniques of financial accounting and management accounting for preparing and analyzing financial statements.
4. To make students understand about the financial reporting.

Course Outcomes

After the completion of this course students will be able to:

1. Identify and utilise value-relevant information contained within financial statement.
2. Explain the relationship between strategic business analysis, accounting analysis and financial analysis
3. Understand the impact of financial reporting choices on the usefulness of reported earnings to predict future performance.
4. Conduct applied business research (including locating, critically interpreting and evaluating firm-specific financial information);

UNIT-I (20 Hrs)

Accounting - Accounting as an Information System, Concepts, Convention and Principles of Accounting, Role of Accountant in an Organization, Branches of Accounting: Financial, Cost and Management Accounting and Their Inter-Relationships, Introduction of Accounting Standards.

Financial Statements - Need of Financial Statement, Nature, Objectives, Uses and Limitations of Financial Statement, Stakeholders of Financial Statements

UNIT-II (15 Hrs)

Readings of Financial Statements: Income Statement, Balance Sheet, Statement of Retained Earnings, Fund Flow Statement, Cash Flow Statement,

Cost Analysis: Marginal Costing, Break Even Analysis, Standard Costing, Variance Analysis, Introduction to Budgets and its Types.

UNIT-III (13 Hrs)

Analysis of Financial Statements with Managerial Perspective

Techniques of Financial Statement Analysis: Common Size Statements, Comparative Statements, Trend Analysis and Ratio Analysis (Liquidity, Leverage, Solvency, Turnover Ratio, Market Ratio and Profitability Ratio), Du Pont Analysis.

Analysis of Firm Performance: Time Series Analysis and Cross-Sectional Analysis,

UNIT-IV (12 Hrs)

Financial Reporting System - Content of Annual Reports, Quality of Financial Reporting, Consolidated Financial Statements, Indian Financial Reporting System, Ethical Issues in Financial Reporting (Window Dressing, Quality of Earnings, Financial Scams etc.)

Short Project

Students have to submit a mandatory project in group. The project will be equivalent to two regular assignments. (Maximum Three students can be part of one group). Students have to do financial analysis of two or more companies on the basis of their annual reports. A comparative study of Indian and Foreign companies is preferred)

Recommended Books

1. Narayanaswamy, R., 'Financial Accounting – A Managerial Perspective', 5th Edn., Prentice Hall of India. ***Latest Edition***
2. Gerald White, Ashwinder Paul Sondhi and Dov Fried, 'The Analysis and Use of Financial Statements', Wiley India Edn., ***Latest Edition***
3. Gokul Sinha, 'Financial Statement analysis', Prentice Hall of India, New Delhi, ***Latest Edition***
4. John J. Wild, K. R. Subramanyam and Robert F. Halsey, 'Financial Statement Analysis', Tata McGraw Hill Publishing company Ltd. New Delhi, ***Latest Edition***
5. Stephen H Penman, 'Financial Statement Analysis and Security Valuation', Tata McGraw Hill Publishing Company Ltd. New Delhi, ***Latest Edition***

BUSINESS STATISTICS AND ANALYTICS FOR DECISION MAKING

Subject Code – MBADS1-124

L T P C

Duration – 60 Hrs

4 0 0 4

Course Objectives

The main aim of this course is:

1. To understand the statistical methods which are applied in all functional areas of business: accounting, finance, management and marketing.
2. To enable students to understand the role and importance of Statistics in improving managerial decisions.
3. To make understanding of various research tools and techniques.

Course Outcomes

After completion of this course, students will be able to:

1. Understand the key terminology, concepts tools and techniques used in various business statistical analysis
2. Develop an understanding of the theory of probability, rules of probability and probability distributions.
3. Understand the meaning and importance of correlation and regression analysis including both simple and multiple correlation and regression

UNIT-I (20 Hrs)

Statistics: An Overview-Concept, Significance and Limitations, Importance and Scope of Statistics in Decision Making in Business Management.

Measure of Central Tendency: Objectives of Averaging. Requisites of Measure of Central Tendency, Mathematical Averages – Arithmetic Mean, Geometric Mean, Harmonic Mean, **Averages of Position** -Median and Mode, Partition Values- Quartiles, Deciles and Percentiles, Relationship Between Mean, Median and Mode.

Measure of Dispersion: Classification of Measure of Dispersion; Range and Inter Quartile Range, Deviation, Variance and Standard Deviation, Chebyshev's Theorem, Coefficient of Variation, Skewness and Kurtosis

UNIT-II (15 Hrs)

Correlation: Significance, Types, Methods of Correlation Analysis: Scatter Diagrams, Karl Pearson's Correlation Coefficient, Rank Correlation Coefficient, Properties of various types of Correlation

Regression: Concept of Regression and The Difference between Correlation and Regression, Lines and Equations of Regression.

UNIT-III (10 Hrs)

Time Series Analysis: Components of a Time Series, Determination of Secular Trend and Seasonal Variations in Business Data, Least Squares Method as a Tool for Forecasting.

Index Numbers: Different Methods of Constructing Price and Quantity Index Numbers. Fixed Base and Chain Base Index Numbers, Problems of Reversibility in Index Numbers

UNIT-IV (15 Hrs)

Probability: Definition, Types of Probability, Classical Approach, Relative Frequency and Subjective Approach to Probability, Theorems of Probability, Addition and Multiplication Laws, Bays Theorem and its Application. Probability Distributions

Recommended Books

1. Levin & Rubin, 'Statistics for Management', Prentice Hall
2. Beri, 'Business Statistics', Tata Mc Graw Hill
3. Croucher, 'Statistics: Making Business Decisions', Tata McGraw Hill
4. Gupta & Gupta, 'An Introduction to Statistical Methods', Vikas Publications
5. S P Gupta, 'Statistical Methods', Sultan Chand
6. C.R. Reddy, 'Quantitative Techniques for Management Decisions', Himalaya Publishing

MANAGERIAL ECONOMICS AND POLICY

Subject Code: MBADS1-125

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives

The main aim of this course is:

1. To enable students to understand various economic factors that influence business in India so and analyze associated opportunities, risks and challenges for managerial decisions.
2. Learn about Managerial Economics & its relation with other disciplines, and understand about Demand Analysis, Theory of Production, Theory of Cost and Market structure.
3. To teach students about basic tools of macroeconomics and apply them to real world economic policy.
4. To make students understand how monetary policy and fiscal policy can be used to influence short-run macroeconomic conditions.

Course Outcomes

After the completion of this course students will be able to:

1. Analyze the demand and supply conditions and assess the position of a company
2. Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets
3. Demonstrate the basic understanding of the economic implications of changes in government fiscal or monetary policy.
4. Calculate equilibrium national income levels and use various multipliers and convert nominal values to real values.

Unit-I (15 Hrs)

Introduction: Meaning, Nature, Scope & Relationship with other disciplines, Role of managerial economics in decision Making, Opportunity Cost Principle

Marginal Analysis: Law of diminishing marginal utility, Law of equi-marginal utility

Indifference Curve Analysis: Meaning Assumptions Properties, Consumer Equilibrium.

Unit-II (15 Hrs)

Demand Analysis: Law of Demand: Meaning, Determinants, Exceptions, Bandwagon and Snob effects, Demand function, Application of demand analysis in managerial decision making.

Elasticity of Demand: Meaning, Types & Degree of elasticity of demand, Methods of measuring price elasticity of demand, Factors determining the elasticity of demand, Demand Forecasting: Importance, Scope, Techniques of forecasting.

Theory of Production: Production function, Short run and Long run production analysis, Isoquants, Optimal combination of inputs, Application in managerial decision making.

Unit-III (15 Hrs)

Theory of Cost: Cost Analysis: Cost Concepts and Determinants of cost, Traditional and Modern Theory of Cost: Long run and Short run, Economy of scale, Revenue Curve

Market Structure: Price Output Decision under Perfect Competition, Monopoly, Monopolistic and Oligopoly Competition, Application in Managerial Decision Making. Behaviour of Firms and Game Theory: Nash Equilibrium, Prisoner's Dilemma.

Unit-IV (15 Hrs)

Macro Economics: Concept of National Income: Conceptual Framework, Measure of National Income, Methods of Measurements, Phillips Curve, Classical Keynesian Theory, Investment Multiplier and Foreign Trade Multiplier.

Business Cycle: Features and Phases, Effects and Control.

Inflation: Meaning, Types, Theories – Demand and Cost Push Inflation, Causes, Effects and Cures of Inflation through Price. Deflation

Macro-Economic Policy: Aspects of Monetary Management; Monetary Policy, Growth and Stabilization Effects of Monetary Policy Operations. Fiscal Policy - Nature and Components of Fiscal Policy; Fiscal Deficit and its Management.

Recommended Books

1. Peterson and Lewis, 'Managerial Economic', Prentice Hall of India
2. Froeb, 'Managerial Economics', Cengage Learning
3. Geetika, 'Managerial Economics', Tata McGraw Hills
4. K.K .Dewett, ' Modern Economic Theory', S. Chand Publication
5. D.M.Mithani, 'Managerial Economics Theory and Applications', Himalaya Publication
D.N.Dwivedi, 'Managerial Economic', Vikas Publications

MARKETING MANAGEMENT

Subject Code: MBADS1-126

L T P C

Duration: 60 Hrs

4 0 0 4

Course Objectives

The main aim of this course is:

1. To make students understand concepts, philosophies, processes and techniques of managing the marketing operations of a firm in turbulent business environment.
2. To provide better understanding of the complexities associated with marketing functions, strategies and provides students with the opportunity to apply the key concepts to practical business situations.
3. To understand the concept of Marketing, Marketing Information System and Marketing Mix
4. To learn about Consumer Behaviour and Buying behaviour

Course Outcomes

After the completion of this course students will be able to:

1. Understand the role of marketing as a fundamental organizational policy process
2. Analyze the interaction of marketing and environmental forces through an understanding of marketing decisions and practices with social, technological, economic, and political forces
3. Apply the knowledge, concepts, tools necessary to understand challenges and issues of marketing in a growing international and global context.
4. Interpret complex marketing issues and problems using relevant theories, concepts and methods with regard to ethical conduct

UNIT-I (15 Hrs)

Understanding Marketing and Consumers: Definition, Importance, Scope, Various Marketing Concepts, Marketing Mix, Marketing vs Selling, Effect of Liberalization and Globalization, Analyzing Marketing Environment: Micro, Macro

Corporate Strategic Planning: Defining Role Marketing Strategies, Marketing Planning Process. **Marketing Information System:** Concept and Components

Consumer Behaviour: Understanding Consumer Behaviour, Factors Influencing Consumer Buying Behaviour, Business Buying Process, Understanding Business Buyer Behaviour

UNIT-II (15 Hrs)

Creating and Managing Product: Market Segmentation & Targeting, Differentiation & Positioning, Competitors Analysis

Product Decisions: Product Mix, Packaging and Labelling Decisions, Branding & Brand Equity, Services Marketing, New Product Development, Consumer Adoption Process, Product Life Cycle and Strategies

Pricing Decisions: Objectives, Factors Affecting Pricing Decisions, Pricing Methods, Price Changes, Pricing Strategies

UNIT-III (18 Hrs)

Delivering and Promoting Product - Supply Chain Decisions: Nature, Types, Channel Design and Channel Management Decisions, Retailing, Wholesaling, Managing Logistics and Supply Chain.

Promotion Decisions: Communication Process, Promotion Mix, Advertising, Sales Promotion, Public Relations, Direct Selling and Online Marketing.

Personal Selling: Personal Selling Process, Managing the Sales Force, Designing Quota & Territories, Evaluating Performance.

UNIT-IV (12 Hrs)

Emerging Trends in Marketing: Green Marketing, Event Marketing, Network Marketing, Direct Marketing, Social Marketing, Buzz Marketing/ Viral Marketing, Consumerism, Customer Relationship Management (CRM), Customer Satisfaction, Loyalty, Retention, Global Marketing, Rural Marketing, **E-Commerce:** Marketing in Digital Age

Relevant Case Studies should be discussed in class.

Recommended Books

1. Ramaswamy&Namakumari, 'Marketing Management', McMillan
2. Etzel, Walker, Stanton, and Pandit, 'Marketing Management', Tata McGrawHill,
3. Kurtz & Boone, 'Principles of Marketing', Cengage Learning
4. Kotler & Koshy, 'Marketing Management', Pearsons Education
5. Kotler & Armstrong, 'Principles of Marketing', Prentice Hall
6. Biplab S. Bose, 'Marketing Management', Himalaya Publications

BUSINESS COMMUNICATIONS

Subject Code: MBADS1-127

**L T P C
2 0 2 3**

Duration: 45 Hrs

Course objectives

The main aim of this course is:

1. To provide students a comprehensive view of communication, its scope and importance in business as well as the role of communication in establishing a favourable image of the organization.
2. To develop students' ability to communicate correctly and effectively on matters having relevance to day-to-day business operations.
3. To make student understand the fundamentals of communication as well as oral, written and non-verbal communication skills.

Course Outcomes

After the completion of this course, students will be able to:

1. Know the dynamics of communication in the business world and Practice the different tools of communication
2. Enable them to speak effectively suited to the situation
3. To demonstrate a good understanding of effective business writing and effective business communications.
4. To acquire the skills of report writing and modern forms of communication such as email and usage of internet.

UNIT- I (12 Hrs)

Introduction to Communication: Meaning, Process, Importance of Communication in Business, Types of Information, Formal and Informal Communication, Internal and External Communication. Approaches to Effective Communication, Essentials of Effective Business Communication (7Cs model)

Developing Reading Skills: Identify the Purpose of Reading, Factors Effecting Reading, Learning How to Think and Read, Developing Effective Reading Habits, Reading Tactics and Strategies: Training Eye and Training Mind (SQ3R), Building Vocabulary.

Developing Listening Skills: Importance, Purpose of Listening, Art of Listening, Factors Affecting Listening, Components of Effective Listening, Process of Listening, Principles and Barriers to Listening, Activities to Improve Listening

UNIT –II (10 Hrs)

Developing Writing Skills: Basics, Advantages and Disadvantages, Covering letter, Need, Functions and Kinds, Layout of Letter Writing, Types of Letter Writing: Persuasive Letters, Request Letters, Sales Letters, Complaints and Adjustments, Business Proposals, Emails etc.

Report Writing: Structure, Types, Formats, Drafting of Various Types of Report. Writing

Departmental Communication: Meaning, Need and Types: Interview Letters, Promotion Letters, Resignation Letters, Newsletters, Circulars, Agenda, Notice, Office Memorandums, Office Orders, Press Release

UNIT- III (10 Hrs)

Developing Speaking Skills: Advantages and Disadvantages, Conversation as Communication, Art of Public Speaking, Just a Minute Presentation, How To Make Effective Presentations, Four P's of Presentation, Structuring, Rehearsing and Delivery Methods.

Workshop-Jam Feedback, Overcoming Stage Fright and Overcoming Glossophobia
Presentation–1 (Planning & Preparing) Presentation–2 (Visual Aids) Presentation–
3 (Delivery)

UNIT –IV (13 Hrs)

Group Discussion: Nature, Uses and Importance, Guidelines for GD Presentations

Resume Writing: Planning, Organizing Contents, Layout, Guidelines for Good Resume.

Interview Skills: Preparation Techniques, FAQs about How to Face an Interview Board, Proper Body Posture, Projecting a Positive Image, Steps to Succeed In Interviews, Practice Mock Interview in Classrooms.

The Case Method of Learning: Dimensions of a Case, Case Discussion, Usefulness of The Case Method, Training of Managers, Use The Case Method.

Report Writing: Structure, Types, Formats, Preparations and Presentation. **Feedback**

Recommended Books

1. Lesikar, Petit & Flatley, 'Lesikar's Basic Business Communication', Tata McGraw Hill
2. Raman Meenakshi 'Prakash Singh, Business Communication', Oxford University Press.
3. Rizvi Ashraf, 'Effective Technical Communication', Tata McGraw Hill
4. Krizan, Buddy, 'Merrier, Effective Business Communication', Cengage Learning
5. Diwan & Aggarwal, 'Business Communication', Excel
6. Devaraj, 'Executive Communication', Tata McGraw Hill
7. Ober, 'Effective Business Communication', Cengage Learning

COMPUTER APPLICATIONS FOR BUSINESS

Subject Code: MBADS1 -128

**L T P C
2 0 2 3**

Duration: 45 Hrs

Course Objectives

The main aim of this course is:

1. To provide an insight into basic features of computer systems and their applications in Managerial Decision Making.
2. To provide technical framework to students for understanding the emerging world in e-Business.

Course Outcomes

After the completion of this course students will be able to:

1. Understand the concepts of computer and various software related to it.
2. The usage of MS Office (Excel, Access & Power point) in different type of analysis and projection of reports related to the business management.

UNIT-I (12 Hrs)

Introduction to Computers: Types of Computers, Storage Devices and Memories, Input/Output, Devices. Introduction to Software, Types of software – Software, its Nature and Qualities, Representation of data in computer memory (Binary, Octal and Hexadecimal system)

Operating System: Introduction, Different Types of Operating Systems, features and Applications.

UNIT-II (12 Hrs)

Internet: Introduction to internet and its applications, Intranet and Extranet, World Wide Web, URL, IP addressing and Domain Naming System, Internet Applications Search Engines

E – Business: E-Business framework, Infrastructure for E-Business, Electronic Data Interchange. Indian e-Commerce Scenario; IT Act; Indian Convergence Bill; Cyber Appellate and PKI. Electronic Payment Systems. Electronic Wallets; Payment Gateways

UNIT-III (11 Hrs)

Computer Networks and E-Security: Basic Concept, Advantages, classification, topologies, Security and Privacy Issues related to E-Commerce, Cryptography, Ethical Hacking, Cyber Crime, Digital Signatures, Point of Sales.

UNIT-IV (10 Hrs)

Data Warehousing: Introduction, Data Warehousing, Advantages and Disadvantages of Data Warehousing, Data Warehouse, Data Mart, Aspects of Data Mart, Online Analytical Processing, Characteristics of OLAP, OLAP Tools.

Data Mining: Introduction, Definition of Data Mining, Data mining parameters, How Data Mining works? Kinds of Data which can be mined, Functionalities of Data Mining, Classification on Data Mining system, Various risks in Data Mining, Advantages and disadvantages of Data Mining

Recommended Books

1. Rainer and Potter, 'Introduction to Information Technology', John Wiley and Sons.
2. Joseph Brady & Ellen F Monk,' Problem Solving Cases in Microsoft', Excel Thomson Learning.
3. McLaren & McLaren: Data Warehousing and Data Mining, Tata McGraw-Hill, New Delhi
4. Richard T Watson: Data Management Data Bases and Organisations, John Wiley & Sons, Inc
5. Deepak Bharihoke, 'Fundamentals of Information Technology', Excel Books
6. Sahil Raj, 'Business Analytics', Cengage Publications

Second Semester

LEGAL AND BUSINESS ENVIRONMENT

Subject Code – MBADS1- 221

L T P C

Duration: 60 Hrs

4 0 0 4

Course Objectives

The aim of this subject is:

1. To study Law of Contract, Sale of Goods Act and Negotiable Instrument for legally smooth functioning of a business.
2. To highlight about Company Law as well as constitutional framework of taxation.
3. To provide insights about Business Environment, Complexity and Diversity of current business environment in the 21st century
4. To provide a deeper understanding of the environmental factors influencing Indian business organizations.

Course Outcomes

After successful completion of this course, students will be able to:

1. Understand the impact of legal environment in a business context and demonstrate knowledge of and need for sustainable development
2. Analyze the various facets of basic case laws of each Act from a legal and managerial perspective
3. Apply the legal provision of Acts in common business situations.

Unit I (15 Hrs.)

Law of Contract: Definition, offer and Acceptance, Consideration, Capacity of parties, Free Consent, Legality of Object, Performance and Discharge of Contract and Remedies for Breach of Contract. **Sale of Goods Act:** Meaning - Formation of contract, condition and warranties. Difference between Transfer of Property and Possession, Right of an Unpaid Seller, **Negotiable Instrument:** Types of negotiable **Law of Insurance:** Fundamentals Elements of Insurance.

Unit II (15 Hrs.)

Company Law Incorporation of companies Memorandum of Association and Articles of Association Membership of a company Prospectus, Issue of capital, Loans, investments, deposits and charges, Meetings, Accounts and Auditors, Amalgamation, reconstructions, arrangements and compromises Provision with respect to appointment and removal of Director, Meeting, Winding up by court. **Taxation:** Constitutional framework of taxation. Direct and indirect taxes. Basic features of Central excise, GST.

Unit –III (15 Hrs.)

Business Environment - Definition, components and overview of Business Environment, Need to scan the business environment and techniques of scanning the business environment. **Political Environment:** Three political institutions: Legislature, Executive and Judiciary. Brief note on Fundamental rights and Directive Principles of state policy, **Legal Environment:** Company Regulatory Legislations in India, FEMA, Latest. EXIM policy. Competition Law, Consumer Protection Act 1986, Right to Information Act 2005

Unit –IV (15 Hrs.)

Public Sector in India: Concepts, Philosophy and Objectives, Performance, Problems and Constraints. Disinvestment and Privatization, Joint sector and Cooperative sector in India. **Social Environment:** Corporate Social Responsibility, Cross-Cultural Business Environment, **Technological Environment:** Impact of Technology on Business, Technological Policy, Intellectual Property Rights, Import of Technology, Problems in Technology Transfer.

International Environment: Emergence of Globalization. Control of Foreign Direct Investment, Benefits and Problems from MNCs. WTO, its role and functions, Implications for India. Trading Blocks, Foreign Trade, Dumping and Anti-Dumping measures.

Relevant Case Studies should be discussed in class.

Recommended Books

1. Dr Francis Cherunilam, Business Environment Text & Cases, Himalaya Publishing
2. Paul Justice, Business Environment- Text and Cases, TATA McGraw Hill.
3. Aswathappa, Essential of Business Environment, Himalaya Publishing
4. Aggarwal & Diwan, Business Environment, Excel Books
5. Majumdar A. K. and Kapoor G. K. 'Company Law' Taxmann Publishers
6. Bansal C. L. 'Business Laws' Taxmann Publishers
7. Singhanian V. K. and Singhanian K. 'Direct Tax Laws and Practice' Taxmann Publishers.
8. Chawla, Garg and Sarin 'Mercantile Law' Kalyani Publishers.

BUSINESS RESEARCH METHODS

Subject Code – MBADS1-222

**L T P C
4 0 0 4**

Duration – 60 Hours

Course Objectives

The main aim of this subject is:

1. To understand the process of formulating research problem, significance of review of literature and in-depth knowledge of various types of research designs
2. To explain various methods of data collection, Sampling, Scaling techniques and their practical implementation in Research.
3. To learn about the functional knowledge of Statistical tests (Correlation, Regression, t-test, Z- test, F- test, Chi – Square, ANOVA) in SPSS with examples
4. To understand about factor analysis and Cluster Analysis in Research projects.

Course Outcomes

After the completion of this course students will be able to

1. Have an understanding of various kinds of research, objectives of doing research, research process research designs and sampling.
2. Develop data collection instrument according to the underlying theoretical framework
3. Construct and document an appropriate research design, including argumentation for data collection and analysis methods/techniques
4. write & develop independent thinking for critically analyzing research reports.

UNIT–I (15 Hrs)

Introduction to Research: Meaning, Definition, Objective and Process, Qualitative Research, Quantitative Research, Research Ethics

Research Design: Meaning, Types - Historical, Descriptive, Exploratory and Experimental

Research Problem: Necessity of Defined Problem, Problem Formulation, Understanding of Problem,

Literature Review: Identifying, Accessing and Managing Sources of Information and Scholarly Literature- Academic Writing and Referencing, Steps in Literature Review Development-Argumentation

Design of Experiment: Basic Principal of Experimental Design, Randomized Block, Completely Randomized Block, Latin Square, Factorial Design.

UNIT–II (15 Hrs)

Sources of Data: Primary and Secondary, Validation of Data

Data Collection Methods: Survey, Questionnaire: Process of Questionnaire Design, Information Required , Interview Method, Questionnaire Format and Question Composition, Individual Question Content, Questions Order, Form and Layout, Pilot Testing the Questionnaire

Sampling Design & Techniques – Probability Sampling and Non Probability Sampling

Scaling Techniques: Meaning & Types

Reliability: Test – Retest Reliability, Alternative Form Reliability, Internal Comparison Reliability and Scorer Reliability

Validity: Content Validity, Criterion Related Validity and Construct Validity

UNIT–III (15 Hrs)

Data Process Operations: Editing, Sorting, Coding, Classification and Tabulation

Analysis of Data: Statistical Measure and Their Significance, Central Tendency, Dispersion, Correlation: Linear and Multiple Regression.

Hypothesis: Introduction, Types, Formulation of Hypothesis, Type-I Error, Type –II Error

Testing of Hypothesis: Steps of Hypothesis Testing, T-test, Z- test, Chi Square, F-test, ANOVA

UNIT – IV (15 Hrs)

Multivariate Analysis: Factor Analysis, Discriminant Analysis, Cluster Analysis, Conjoint Analysis, Multi Dimensional Scaling

Report Writing: Essentials of Report Writing, Report Format

Research Proposal: Purpose, Nature and Evaluation - Content and Format

Practical Considerations - Timelines, Budgets, Supervision Management, Presentation and Defence of proposals

Statistical Software: Application of Statistical Softwares like SPSS, MS Excel, Eviews in Data Analysis

Recommended Books

1. R.I Levin and D.S. Rubin, ‘Statistics for Management’, Pearson Education New Delhi, Seventh Edition
2. N.K. Malhotra, ‘Marketing Research–An Applied Orientation’, Pearson Education New Delhi, Fourth Edition
3. Donald Cooper, ‘Business Research Methods’, Tata McGraw Hill New Delhi
4. Sadhu Singh, ‘Research Methodology in Social Sciences’, Himalaya Publishers
5. Darren George & Paul Mallery, ‘SPSS for Windows Step by Step’, Pearson Education New Delhi
6. C.R.Kothari, ‘Research Methodology Methods & Techniques’, New Age International Publishers, Second Edition.

CORPORATE FINANCE

Subject Code: MBADS1-223

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives

The main aim of this course is:

1. To provide an understanding of the functions and role of corporate financial management, covering the sourcing of finances and their issues in investment and operations.
2. To provide analytical knowledge of risk and return in portfolio.
3. To understand leverages, ROI and ROE concepts, simplifying the capital structure theories and dividend policies with illustrations.
4. To get interactive knowledge of Inventory management and receivable management, Estimation and forecasting of working capital requirements of company, functional knowledge of financing short term assets with illustrations and Case studies.

Course Outcomes

After completion of this course, students will be able to:

1. Demonstrate the applicability of the concept of Financial Management to understand the managerial Decisions and Corporate Capital Structure
2. Demonstrate how the concepts of financial management and investment, financing and dividend policy decisions could integrate while identification and resolution of problems
3. Analyse the complexities associated with management of cost of funds in the capital Structure

UNIT-I (20 Hrs)

Introduction: Nature, Scope and Objectives of Financial Management, Profit Maximization Vs Wealth Maximization, Role of Financial Manager, Agency Problem, Interface between Finance and other Business Functions, Financial Planning: Objectives, Factors affecting Financial Planning

Risk and Return: Risk and Return Concepts, Types of Risks, Relationship between Risk and Return Model - CAPM, Arbitrage Pricing Theory

Investment Decision: Nature and Significance of Investment Decision, Time Value of Money: Future Value of a Single Cash Flow, Annuity, Present Value of a Single Cash Flow, Annuity, Present Value of an Uneven Cash Flow

Capital Budgeting: Process and Techniques, Discounted and Non-Discounted Methods (Pay Back, ARR, NPV, IRR, Benefit Cost Ratio), Capital Rationing, Certainty Equivalent Factor

UNIT-II (15 Hrs)

Financing Decision: Cost of Capital, Computation of Cost of Equity, Debentures, Preference Shares and Retained Earnings, Weighted Average Cost Capital and Implications

Capital Structure – Introduction, Factors Affecting Capital Structure, Capital Structure Theories: Net Income Approach, Net Operating Income Approach, Traditional Approach, Modigliani-Miller Model (MM) , Criticisms of MM Models, Determinants of Capital Structures, EBIT - EPS Analysis

UNIT-III (10 Hrs)

Leverage: Introduction, Operating Leverage, Financial Leverage and Combined Leverage, Application of Leverage

Dividend Decisions: Meaning and Significance of Dividend, Dividend Models: Traditional Model, Walter Model, Gordon Model, Miller-Modigliani Position, Determinants of Dividend, Bonus Shares, Stock Splits, Dividend Capitalization Approach

UNIT-IV (15 Hrs)

Working Capital Decision: Meaning, Nature and Scope of Working Capital - Component of Working Capital –Factors affecting Working Capital, Working Capital Strategies, Cash Management, Inventory Management

Sources of Funds: Equity share, Preference shares, Debentures, Bonds, Warrants, Venture capital, Convertible Bonds/Debentures etc.

Recommended Books

1. Brigham, 'Financial Management : Text & Cases', Cengage Learning
2. Brealy&Myres, Principles of Corporate Finance', Tata McGraw Hill
3. John J.,' Financial Decision Making: Concept, Problem & Cases', Prentice Hall
4. I.M. Pandey, 'Financial Management', Vikas Publishers
5. Khan & Jain, 'Financial Management', Tata McGraw Hill

HUMAN RESOURCE MANAGEMENT

Subject Code: MBADS1- 224

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives

The main aim of this course is:

1. To understand meaning, roles and functions of Human Resource Management, meaning and process of HR Planning, Job Description, Job Specification, HRIS, Job Evaluation, Job Analysis, HRM and HRD
2. To understand the process of recruitment and selection, placement and induction, Training and Development, Career Planning, Coaching and Mentoring
3. To understand the meaning and concept of Performance Appraisal, Wage and salary administration, incentives and fringe benefits, promotion, transfer, separation, QWL, Health, safety, welfare, social security, job stress, counseling and monitoring, job satisfaction, morale and competency Mapping

Course Outcomes

After completion of this course, students will be able to:

1. Implement knowledge on Industrial relations, collective bargaining and participative management.
2. Handle various grievances.
3. Understand the need of quality circles.
4. Understand HR Audit

UNIT-I (20 Hrs)

Human Resources Management: Meaning, Scope, Objective, Functions, Roles and Importance. Interaction with other Functional Areas, HRM & HRD –A Comparative Analysis, Human Resource Management practices in India. Line and Staff Responsibility of HR Managers, HR as a Factor of Competitive Advantage,

Human Resource Planning: Concept, Process, Importance and Methods. Human Resource Information System (HRIS)

Job Analysis: Job Description, Job Specification. Job Evaluation – Concepts and Methods

UNIT-II (15 Hrs)

Recruitment & Selection: Concept, Process & Methods of Recruitment & Selections. Induction & Placement

Training & Development: Concept and Methods, Difference between Training & Development, Aligning Training to Business Needs, Training Need Analysis, Delivery Methodology, Evaluation, Capacity Building, Future of Training & Development.

Career Planning, Coaching & Mentoring

Internal Mobility: Promotion, Transfer, Demotion, Separation, Downsizing, Outplacement

UNIT-III (15 Hrs)

Performance Appraisal: Concept, Methods, Issues and Ethics in Performance Appraisal, Potential Appraisal.

Compensation Management: Wage & Salary Administration: Concept of Wage & Salary Administration, Elements & Methods of Wage & Salary, Incentive Plans, Bonus, ESOPs & Fringe Benefits.

Quality of Work Life (QWL): Concept, Development, Various Approaches and Techniques for improving QWL, Counselling and Monitoring, Morale and Productivity

UNIT IV (10 Hrs)

Industrial Relations: Concept, Importance and Difference between HR and IR.

Collective Bargaining: Meaning, Scope, Objectives, Issues and Strategies, Negotiations Skills and Strategies, Participative Management

Employee Grievances and Their Resolution: Model for Grievance Resolution Procedure, Fundamentals of Industrial Relations and Fundamentals of Labour Laws, Overcoming harassment at workplace

Recommended Books

1. Edwin B. Flippo, 'Personal Management, Tata', Mc Graw Hill
2. Bohlander, 'Snell & Vohra, Human Resource Management', Cengage Learning
3. Gary Dessler, 'Human Resource Management', McMillan
4. V.S.P.Rao, 'Human Resource Management', Excel Books
5. C.B. Memoria, 'Personnel Management', Himalaya Publications

OPERATIONS MANAGEMENT

Subject Code: MBADS1 - 225

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives

The main aim of this course is:

1. To understand the concept, functions, transformation process model of operation management, product design and development.
2. To understand the uses of production planning and control, facility layout and productivity.
3. To understand the significant role of quality management and acceptance sampling in production management.

Course Outcomes

After the completion of this course students will be able to:

1. Learn the role of operations on achieving various competitive capabilities.
2. Learn how to help an organization in improving productivity and meeting customer's competitive capabilities.
3. Conduct investigations of complex problems including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

UNIT – I (18 Hrs)

Operations Management: Concept, Functions, Transformation Process Model: Inputs, Process and Outputs; Classification of Operations; Responsibilities of Operations Manager, Nature of International Operations Management, Difference between Manufacturing and Service Operations

Operations Strategy: Operations Strategy, Competitive Capabilities and Core Competencies, Linkage between Corporate, Business, and Operations Strategy, Components of Operations Strategy, Global Strategies and Role of Operations Strategy

UNIT – II (12 Hrs)

Facility Location – Importance, Factors in Location Analysis, Location Analysis Techniques.

Facility Layout Planning: Introduction, Objectives of Layout, Classification of Facilities, Basis for Types of Layouts, Layout Planning

Process Selection- Project, Job, Batch, Mass and Process Types of Production Systems, Operations Management in Corporate Profitability and Competitiveness

UNIT – III (15 Hrs)

Optimization Techniques: Mathematical Formulations of LP Models for Product-Mix Problems; Graphical and Simplex Method of Solving LP Problems; Duality

Assignment Problems: Assignment problem: Solution using Hungarian Assignment Method.

Transportation Problems: Transportation problem: Initial feasible solution using North-west Corner Rule; Least Cost Method; and Vogel's Approximation Method. Testing optimality using MODI method

UNIT – IV (15 Hrs)

Game Theory: Concept of Game; Two-Person Zero-Sum Game; Pure and Mixed Strategy Games; Saddle Point; Odds Method; Dominance Method and Graphical Method for Solving Mixed Strategy Game

Sequencing Problem: Johnsons Algorithm for N Jobs and Two Machines, n Jobs and Three Machines, Two Jobs and M Machines Problems

Recommended Books

1. Buffa & Sarin, 'Modern Production/Operations Management', John Wiley, Latest edition
2. Chary, 'Production and Operations Management', Tata McGraw-Hill, Latest Edition
3. Krajewski & Ritzman, 'Operations Management', Pearson Education, Latest edition
4. Adam and Eben, 'Production & Operations', Prentice Hall, Latest edition
5. Anderson, David R., Dennis J. Sweeney and Thomas A. Williams, 'An Introduction to Management Science', South-Western.
6. Taha, Hamdy A., 'Operations Research – An Introduction', Prentice-Hall of India Private Ltd., New Delhi.
7. Hillier, Frederick S. and Gerald J. Lieberman, 'Introduction to Operations Research', McGraw Hill India (Pvt) Ltd.

ENTREPRENEURSHIP

Subject Code: MBADS1 - 226

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives:

The aim of this course is:

1. To develop the entrepreneurial intent among students
2. To build the necessary competencies and motivation for a career in Entrepreneurship.

Course Outcomes:

After completing this course, the students will be able to:

1. Know the parameters to assess opportunities and constraints for new business ideas.
2. Understand the systematic process to select and screen a business idea
3. Understand various funding opportunities available for start-up and new ventures

UNIT-I (15 Hrs)

Foundations of Entrepreneurship: Concept, Need, Definition & Role of Entrepreneurship, Definition, Characteristics & Scope of Entrepreneur, Role of entrepreneurship in economic development; entrepreneurship process; factors impacting emergence of entrepreneurship; managerial vs. entrepreneurial approach, Reasons for The Failure of Entrepreneurial Ventures Role of Venture Capital, Angel Investors in Developing Entrepreneurship

Forms of Business Organizations: Sole Proprietorship, Partnership Firms and Private Companies, Public and Govt. Companies

UNIT-II (12 Hrs)

Women Entrepreneurs: Meaning, Role, Problems & Reasons for Less Women Entrepreneurs. Various Institutes & Govt Schemes To Help & Uplift Women Entrepreneurs. Case Studies for Successful Women Entrepreneurs

Social Entrepreneurship: Definition, Characteristics of Social Entrepreneurship, Role of Social entrepreneurs in solving social and entrepreneurial problems, Challenges and Opportunities for Social Entrepreneurship, CSR and Social Entrepreneurship

UNIT-III (18 Hrs)

Business Opportunity Identification: Business ideas, Methods of Generating Ideas, and Opportunity Recognition

Feasibility Study: Environmental Scanning, Competitor and Industry Analysis; Market Feasibility, Technical/Operational Feasibility, Financial Feasibility

Preparing a Business Plan: Meaning and significance of a business plan, components of a business plan, Drawing business plan; Preparing Project Report; Presenting Business Plan to investors.

UNIT-IV (15 Hrs)

MSME- Small & Medium Enterprises - Small & Medium Industry: Meaning and Importance - Definition of SME – Role & importance in India Economy

Institutional support to Entrepreneurship: Role of Central Government and State Government in Promoting Entrepreneurship, Role of Directorate of Industries, District Industries, Centers (DICs), Industrial Development Corporation (IDC), State Financial corporation (SFCs), Commercial Banks. Small Scale Industries Development Corporations (SSIDCs), National Small Industries Corporation (NSIC), SIDBI

Recommended Books

1. Vasant Desai, 'Management of Small-Scale Industries', Himalaya Publishing
2. Angadi, Cheema, Das, 'Entrepreneurship, Growth, and Economic Integration', Himalaya Publication
3. Rizwana and Janakiran, 'Entrepreneurship Development', Excel Books
4. Murthy, 'Small Scale Industry and Entrepreneurial Development', Himalaya Publishing
5. Satish Taneja, Entrepreneur Development ", New Venture Creation.
6. Robert D.Hisrich, Michael P.Peters, " Entrepreneurship Development, Tata McGraw Hill

BUSINESS STATISTICS RESEARCH LAB

Subject Code – MBADS1- 227

**L T P C
0 0 4 2**

Duration: 30 Hrs

Course Objective

The main objective of this course is:

1. To give insights about Managing spreadsheets
2. To teach data analysis techniques to students
3. To give practical exposure of applying Financial Tools in Spreadsheets and Statistical Softwares

Course Outcomes

After completing this course, students will be able to

1. Apply Statistical analysis in Minor project and Major Projects
2. Implement Financial Analysis in their project work
3. Handle various corporate functions in spreadsheets

UNIT – I (3 Hrs)

Managing Spread Sheet: Introduction, Naming and Moving Worksheets, Copying Worksheets, Adding, Deleting and Hiding Worksheets, Grouping Worksheets Conditional Formatting,

Date and Time Function: Date, Day, Month, Year, Edate, Eomonth, Network days, Workday, Weeknum, Weekday, Hour, Minute, Second, Now, Today, Time

Look Up Functions: Data Validation, Advanced Range Names, VLookUp, H LookUp

UNIT -II (3 Hrs)

Logical Function: IF Function, Nested IF, CountIf, SumIf, IF with AND and OR, Average, Averagea, Averageif, Averageifs, Subtotal, Rand, Randbetween, Roundup, Rounddown

Pivot Table: Introduction, Create Pivot Table, Layout of Pivot Tables, Filtering Pivot Tables, Pivot Table Analysis, Proper Function, Trim Function,

UNIT – III (4 Hrs)

Data Analysis: What If Analysis, Goal Seek, Scenario Analysis

Introduction to Financial Analysis: PMT, NPV, IRR, Risk and Return, Volatility

UNIT- IV (5 Hrs)

Statistical Analysis Tools: Frequency Distribution, Graphs, Histograms, Descriptive Statistics, Normality of Data, Correlation and Regression Analysis, t-test, ANOVA, Forecasting, Chi Square, Factor Analysis.

Use of Bibliography Softwares

Note: Students have to prepare a research report on their interest area (Finance, HR, Marketing etc.) Students will have to apply all research report components like Introduction, Review of literature, Research Methodology, Statistical Techniques (Learn in Business Statistical Research Lab), Findings etc. in the report. The students will have to give presentation of 15-20 minute on the research report.

Recommended Books

1. Greg Harvey, 'Microsoft Excel 2016 All-in-One for Dummies, Wiley Publications
2. Lokesh Lalwani, 'Excel 2019 All – In – One' BPB Publication
3. Manisha Nigam, 'Data Analysis with Excel' BPB Publication
4. Paul McFedries, 'Excel 2016- Formulas and Functions' Que Publications

ENTREPRENEURSHIP AND INNOVATION PROJECT

Subject Code – MBADS1- 228

L T P C

Duration: 30 Hrs

0 0 4 2

Students will explore the various entrepreneurial opportunities in rural and urban areas and will prepare a business plan (Students will learn about preparation of Business Plan in Entrepreneurship subject). They will submit the project in the department and will give presentation on the basis of their project report. It may be individual or group project.

MRSPTU

3rd
SEMESTER

PROJECT MANAGEMENT

Subject Code – MBADS1-321

**L T P C
40 0 4**

Duration- 60 Hrs

Course Objectives

The aim of this subject is

1. To enhance competence as a Project Manager
2. To equip students with the process of feasibility analysis and risk analysis
3. To provide skill in project time management

Course Outcomes

After completing the course, students will be able to

1. Identify the project idea and analyze feasibility of project
2. Adopt holistic approach in evaluating and monitoring the performance of the project
3. Use statistical techniques for project time management and resource allocation
4. Provide basic project management skills with a strong emphasis on issues and problems associated with delivering successful projects

Unit -I (15 Hrs)

Introduction to Project Management: Meaning and Definition of Project, Characteristics of a Project, Project Life Cycle Phases, Role of a Project Manager, Need for Project Management

Generation and Screening of Project Ideas- Generation of ideas, Monitoring the environment, Tools for identifying investment opportunities, Corporate Appraisal, Preliminary Screening, Project Rating Index

Project Feasibility Analysis: Market Feasibility, Technical Feasibility

Unit II (15 Hrs)

Project Appraisal: Time Value of Money, Project Appraisal Techniques- Payback Period, Accounting Rate of Return, Net Present Value, Internal Rate of Return, Benefit Cost Ratio,

Risk Analysis: Measures of Risk, Sensitivity Analysis, Scenario analysis, Break-even method, Simulation Analysis

Unit III (15 Hrs)

Project Scheduling: Importance of Project Scheduling, Work Breakdown Structure Scheduling Techniques - Gantt Chart.

Network techniques for Project Management: Development of Project Network, time estimation, Determination of Critical Path, PERT and CPM models,

Unit- IV (15 Hrs)

Implementation of Project – Project Planning, Project Control, Human aspects of project management, Prerequisites for successful Project Implementation

Project Review and Administrative Aspects- Initial review, Performance evaluation, Post Audit, Abandonment analysis, Agency Problems

Project Quality Management: Benchmarking, Quality Circle, Six Sigma

Suggested Readings

1. Prasanna Chandra: Projects - Planning, Analysis, Selection, Implementation and Review, Tata McGraw Hill.
2. Larson, D. Project Management. Tata McGraw- Hill.
3. Desai, V. Project Management. Himalaya Publishing House.
4. Gopalakrishnan, P. Textbook of Project Management. Macmillan.
5. Maylor, Harvey. Project Management. Pearson

SUMMER INTERNSHIP PROJECT

Subject Code – MBADS1- 322

L T P C

0 0 0 6

Course Outcome - After completing this course, student will be able to:

1. Identify and utilize project related information contained during Training
2. Understand the real time working of various departments of organization
3. Find the solution of various contemporary business problems and effectively communicate in company
4. Present the findings of the projects executed during training through latest tools

Students will undergo Summer Internship of Six weeks to Eight weeks after Second semester.

A report based on the summer training shall be submitted within three weeks from the commencement of the third semester. Students will give presentation on the Summer Internship Project in the department.

Evaluation of Students will be done based on following criteria

1. Evaluation from Company Supervisor - 40 Marks*
2. Summer Internship Project Report - 40 Marks
3. Presentation - 20 Marks

*Company Supervisor will send the evaluation of student (out of 40 marks) to the department HOD email. These marks will be uploaded as external assessment on MRSPTU examination portal.

Detail about important project documents has been provided in the end of syllabus.

Course Objectives

To provide the knowledge of airport planning, management and operations that is required to begin an airport management career.

Course Outcomes

The student after the end of course will have knowledge about airport, its working regulation and traffic control system working at an airport.

UNIT- I INTRODUCTION (15 Hrs.)

Evolution of Management – History of Aviation – Organization, Global, Social, and Ethical Environment – History of Indian Airline Industry – Major Players in Airline Industry – SWOT analysis in Airline Industry- Market potential on Indian Airline Industry- Current Challenges in Airline Industry- Completion in Airline Industry

UNIT- II AIRPORT MANAGEMENT (15 Hrs.)

Airport Planning – Terminal planning, design and operation – Airport Operations – Airport Functions – Organization Structure of Airline sectors – Airport Authorities – Global and Indian scenario of Airport Management

UNIT- III AIR TRANSPORT SERVICES (15 Hrs.)

International Trends – Emerging Indian Scenario – Private Participation: International Developments- Private Participation in Indian Airports – Environmental regulations – Regulatory Issues – Meteorological Services in Aviation – Airport fees, rates and charges

UNIT- IV INSTITUTIONAL FRAMEWORK (15 Hrs.)

Roll of DGCA – slot allocation methodology followed by ATC and DGCA - Safety Regulation – Economic Regulation – Management of Bilateral – Aviation Security - Importance of Air Transportation Safety and Security-Airport- Airways- Terrorism- Hijacking – Security measures- Airport Security Programmed a Steps taken to Contend with Hijacking- Transportation security administration – International aviation safety assessment program

Traffic Control – Airspace and Navigational aids – Controlling Process – Coordination - Response to emergencies and airport securities – 6 Case Studies in Airline Industry

TEXT BOOKS

1. Graham.A. Managing Airports: An International Perspective – Butterworth – Heinemann, Oxford 2001
2. Wells.A. Airport Planning and Management, 4th Edition McGraw- Hill, London 2000

REFERENCES

1. Doganis. R. The Airport Business Routledge, London 1992
2. Alexander T. Wells, Seth Young, Principles of Airport Management, McGraw Hill 2003
3. P S Senguttavan Fundamentals of Air Transport Management, Excel Books 2007
4. Richard de Neufille, Airport Systems: Planning, Design and Management, McGraw-Hill London 2007

Course Objectives

To provide knowledge about the working of the airline, crew scheduling and operations at an airport.

Course Outcomes

After the completion of the course the student will be able to understand different network models of airline and operations and crew scheduling details.

UNIT -I OPTIMIZING FLOW OF NETWORKS (15 Hrs.)

Airline Schedule Planning – links to operations - Time space networks – Constrained Shortest Path - Multi Commodity Flow Models – Column and Row Generation Techniques – Branch and Bound – Branch and Price cut – Computational Exercises – Passenger Mix Model

UNIT -II FLEET ASSIGNMENT PROBLEM (15 Hrs.)

Basic Models and Solutions - Approaches – Shortcomings Itinerary based Fleet Assignment Model – Sub network based Fleet - Assignment Model and Solution Approach – Fleet Assignment Model Extensions

UNIT- III CREW SCHEDULING (12 Hrs.)

Crew pairing problem – Bidline Generation/ Rostering - Crew Pairing problem Models and solutions - Branch on Follow ons - Review of Results of Barnhart – Aircraft Routing Problem Models – Solutions – Approaches – Constrained Shortest Path – Branch and Price – Integrated Crew Paring – Aircraft routing

UNIT- IV OPERATIONS RECOVERY (18 Hrs.)

Overview of Operation Control Centre – Aircraft Passenger Delays – Flight Postponement and Cancellation Model–Airline Operation Recovery – Challenges- – Role of Simulation

ROBUST SCHEDULING

Robust Crew Scheduling – Crew Schedule Evaluation- Disruption Scenario Generation - Robust Aircraft Routing - Degradable Schedule Design; -preventing delays-minimizing the delays and disruption – maximizing recovery flexibility- Isolating delays and disruption – minimizing the expected cost of a schedule- Robust schedules by schedule planning Phase – performance metrics for Airline schedules

TEXT BOOKS

1. Barnhart, C., F. Lu, and R. Sheno. “Integrated Airline Scheduling.” In Operations Research in the Air Industry.

REFERENCES

1. Barnhart, C., and K. Talluri. “Airline Operations Research.”
2. Chebalov, S., and D. Klabjan. “Robust Airline Crew Scheduling: Move-up Crews.”

Course Objectives

To enable the students understand the principles of Marketing and the ways in which these principles can be applied in today's airline industry, the air transport market and its environment.

Course Outcomes

After the end of the course the student will be able to understand about air transportation services, airline marketing and market research for future year to come.

UNIT - I INTRODUCTION (12 Hrs)

Marketing conceptual frame work – marketing environment – customer oriented organization – marketing interface with other functional areas marketing in a globalized environment Marketing Mix - Stages in the Application of Marketing Principles to Airline Management

UNIT- II MARKET OF AIR TRANSPORT SERVICES (15 Hrs)

Customer – Definition – Apparent and True Needs – Industrial Buying Behavior – Customer in the Business Air Travel Market – Customer in Leisure Air Travel Market – Customer in the Air Freight Market – Market Segmentation in Air Passenger & Air Freight Market – Marketing Environment - Theoretical Basis of PEST Analysis – Building Customer Satisfaction

UNIT- III PRODUCT ANALYSIS IN AIRLINE MARKETING (18 Hrs)

Product – definition – Product Life Cycle – Product Life Cycles in Aviation Industry – Managing Product Portfolio – Balancing Risk and Opportunity – Fleet & Schedules related Product Features - Customer Service Related Product Features – Pricing Decisions – Building Blocks in the Airline Pricing Policy – Uniform and Differential Pricing – Distribution Channel Strategies – Travel Agency Distribution System – Global Distribution System - promotion methods. Advertisement and personal selling, public relations.

UNIT- IV MARKETING RESEARCH (15 Hrs)

Types, process – tools and techniques – application of marketing research – product launching, demand estimation, advertising, brand preferences, customer satisfaction, retail stores image, customer perception, distribution, customer relationship, competitor analysis and related aspects – preparation of marketing research report – sample case studies.

INFORMATION TECHNOLOGY IMPACT ON MARKETING DECISIONS

Online marketing – web based marketing programmes – emerging trends and challenges to marketers.

TEXT BOOK

1. Stephen Shaw “ Airline Marketing and Management “ Ashgate Sixth Edition

References

1. Philip Kotler: Marketing management (Millenium edition), Prentice Hall of India P (ltd), New Delhi 2001.
2. Micheal R.Czinkota & Masaaki Kotabe, Marketing Management, Vikas Thomson learning 2000.
3. Douglas, J.Darymple Marketing Management John Wiley & Sons, 2000
4. NAG, marketing successfully a professional perceptive, macmilan 2001.
5. Boyd Walker, Marketing Management, McGraw Hill, 2002
6. Aakar Day, Kumar, Essential of Marketing Research
7. Keith Flether, Marketing Management and Information Technology Prentice Hall, 1998.

AIRCRAFT RULES AND REGULATION

Subject Code: MBADD7- 324

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objectives

The main aim of this subject is to let the student know about the various rules and regulations of the aircraft industries.

Course Outcomes

After the completion of the course the student will be able to understand the different series of aircraft and the rules and regulation followed by them.

UNIT I. C.A.R SERIES ‘A’ - PROCEDURE FOR CIVIL AIR WORTHINESS REQUIREMENTS AND RESPONSIBILITY OPERATORS VIS-A-VIS AIR WORTHINESS DIRECTORATE: (15 Hrs)

Responsibilities of operators / owners - Procedure of CAR issue, amendments etc.,-

Objectives and targets of airworthiness directorate - Airworthiness regulations - safety oversight of engineering activities of operators.

C.A.R. SERIES „B“ - ISSUE APPROVAL OF COCKPIT CHECK LIST, MEL, CDL: Deficiency list (MEL& CDL); Preparation and use of cockpit check list and emergency list.

UNIT II. C.A.R. SERIES ‘C’ - DEFECT RECORDING, MONITORING, INVESTIGATION AND REPORTING (15 Hrs)

Reliability Programme (Engines) - Aircraft maintenance programme & their approval – On condition maintenance of reciprocating engines - TBO - Revision programme - Maintenance of fuel and oil uplift and consumption - records - Light aircraft engines - Fixing routine maintenance periods and component TBOs - Initial & revisions.

UNIT III. C.A.R. SERIES ‘E’ - APPROVAL OF ORGANISATIONS (15 Hrs)

Approval of organizations in categories A, B, C, D, E, F, & G; Requirements of infrastructure at stations other than parent base

C.A.R. SERIES ‘F’ - AIR WORTHINESS AND CONTINUED AIR WORTHINESS:

Procedure relating to registration of aircraft - Procedure for issue / revalidation of Type Certificate of aircraft and its engines / propeller - Issue / revalidation of Certificate of Airworthiness - Requirements for renewal of -Certificate of Airworthiness.

UNIT IV. C.A.R. SERIES ‘L’ - AIRCRAFT MAINTENANCE ENGINEER - LICENSING: (15 Hrs)

Issue of AME License - its classification and experience requirements - Complete Series „L“. C.A.R. SERIES „M“ MANDATORY MODIFICATIONS AND INSPECTIONS: Mandatory Modifications / Inspections.

C.A.R. SERIES ‘T’ - FLIGHT TESTING OF AIRCRAFT: 9 (15Hrs)

Flight testing of (Series) aircraft for issue of C of A - Flight testing of aircraft for which C or A had been previously issued.

C.A.R. SERIES 'X' - MISCELLANEOUS REQUIREMENTS:

Registration Markings of aircraft- Weight and balance control of an aircraft - Provision of first aid kits - Physician's kit in an aircraft - Use furnishing materials in an aircraft - Concessions – Aircraft log books - Document to be carried on board on Indian registered aircraft - Procedure for issue of tax permit - Procedure for issue of type approval of aircraft components and equipment including instruments.

References:

1. " Aircraft Manual (India) "; Volume - Latest Edition, The English Book Store, 17-1, Connaught Circus, New Delhi.
2. " Civil Aviation Requirements with latest Amendment (Section 2 Airworthiness) ", Published by DGCA, The English Book Store, 17-1, Connaught Circus, New Delhi.
3. " Aeronautical Information Circulars (relating to Airworthiness) ", from DGCA.
4. " Advisory Circulars ", from DGCA.

AIRLINE FINANCE

Subject Code: MBADD7- 325

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objectives

To provide understanding of airline financial statements and to address specific airline industry aspects such as treatment of frequent flyer programmes, aircraft leases and evaluation of airline performance by financial ratios.

Course Outcomes

After the end of course the student will be able to understand the financial management in aviation sector, different sources of finance and risk management and its importance in financial market.

UNIT- I FOUNDATION OF FINANCE (15Hrs)

Financial management – An overview, time value of money. Capital Budgeting: Principles and techniques, Nature of capital budgeting, Identifying relevant cash flows, Evaluation Techniques, Payback, Accounting rate of return, Net Present Value, Internal Rate of Return, Profitability Index, Comparison of DCF techniques, Project selection under capital rationing, Inflation and capital budgeting.

UNIT -II AIRLINE FINANCIAL PERFORMANCE (15 Hrs)

World Airline Financial results - Factor affecting Financial results - Airline Financial Statements - Airline Financial Ratios - Inter Airline Comparison of Financial Ratios - Valuation of Tangible Assets - Valuation of Intangible assets- valuation of Airline as a whole - Rating Agencies

UNIT- III SOURCES OF FINANCE (15 Hrs)

Sources of internal finance - sources of external finance - Institution evolved in Aircraft Finance - Equity Finance - Foreign Ownership Limits - Share trading and Share Market Listings - Initial Public Offerings - Airline Privatization - Full Privatization - Gradual Privatization – Partial Privatization

UNIT -IV AIRLINE FINANCIAL PLANNING (15 Hrs)

Budget Preparation and Control - Working capital Management - Principles of working capital: Concepts need; Determinants, issues and estimation of working capital, Accounts Receivables Management and factoring - Financial Planning

RISK MANAGEMENT & LEASING

Exchange rate volatility - Airline trading exposure to currency movements- Airline Foreign exchange risk management - Fuel price exposure - Aircraft leasing - Finance Lease – Operating Lease - Japanese Operating Lease - Wet Lease - Sale and Leaseback - Aircraft Securitizations

Text Book

1. Peter. S. Morrell, “AIRLINE FINANCE “, Third Edition Ash Gate.

References

1. I.M. Pandey Financial Management, Vikas Publishing House Pvt. Ltd., 8th edition, 1999\
2. M.Y. Khan and P.K.Jain Financial management, Text, Problems and cases Tata McGraw Hill Publishing company Ltd., 4th edition, 2004

Course Objectives

The Students were able to understand about the Aviation's History, its major players and its current trends and challenges.

Course Outcomes

By the end of this course, a student will

Perform operations involved in the Airport.

Know and interpret the Meteorological data's and to calculate the Airport fees, Rates and Charges.

Understand and adhere to the various Regulations involved Aviation Industry.

Define Navigational and ATC control process.

UNIT I Principles of Aviation (15 Hrs.)

The evolution of aviation growth Drivers, Issues and challenges. ATA, ICAO, National Aviation Authorities and Role of state and central government. Aviation law, freedoms of air & Civil Aviation conventions. Importance of personality development. Functional layout of an Airport, Ground handling & types of Airports. Airports –Civil, Military, Training, Domestic International, passenger's/cargo terminals. IATA Airline and Airport codes, Aviation abbreviations, National and International Airlines, types of Aircrafts.

UNIT- II Airport Operations (15 Hrs.)

Airline terminal Management- Flight Information counter reservation and ticketing, checking issue of boarding pass customs, security hold area and immigration Formalities- Coordination-security clearance. Baggage and Handling of expectant mother, Unaccompanied minors and disabled passengers- handling of stretcher passengers and human remains. Airport and aircraft security.

UNIT- III Hospitality (16 Hrs.)

Introduction of hospitality, industry and organization structure. Accommodations operations, front office and Guest rooms, collection and study of hotel brochures and tariff. Classification of Hotels, Hotel Chains Associations & Types of Rooms. Airline Catering and various bodies.

Accommodation Operations

Introduction to the accommodation operations, front office and guest rooms. Introduction to housekeeping, cleaning agents and equipment's. Use of cleaning equipment's, agents, dusting, cleaning methods in housekeeping, bed making, cleaning guest rooms, bathrooms, arranging maids trolley, room supplies, room linen and linen room. Flower arrangement and pest control.

UNIT IV Cabin Crew Duties and Responsibilities (14 Hrs.)

Documentation, Pre-flight check of safety equipment's, Pre boarding duties, Post boarding duties, Briefing for special handling passengers, Before Take-off duties, After Take-off duties, In flight service, Before Landing Duties, Post landing duties. Food and Beverage Service- practices and principles.

Suggested Readings:

- The Principles and Practice of International Aviation Law (English)(Paperback)-
2014 Gabriel S. Sanchez Brian F. Havel

MRSPTU MBA (AVIATION MANAGEMENT) 2023 BATCH ONWARDS

- Airport Management – World Class & Beyond Paperback – 2010 by P .C.K.Ravindran
- Civil Aircraft: 300 of the World's Greatest Civil Aircraft (Expert Guide Series)
- Handcover – Import. 1 Jul 2001
- Aviation Hospitality Management (English)(Paperback)) – by Ravi Sharma
- Academic Dictionary of Civil Aviation – by R K C Shekar – 2005
- Hotel Housekeeping – Operations and Management – se cond edition – 2011- by G.Raghubalan & Smritee Raghubalan
- Hotel Front Office – Operations and Management – 2010 – by Jatashankar R. Tewari
- Hotel Housekeeping & Management and Operations- 2010- by Sudhir Andrews
- Hotel Housekeeping – A Training Manual – Second Edition - 2011- by Sudhir Andre

MRSPTU MBA (AVIATION MANAGEMENT) 2023 BATCH ONWARDS

Summer Internship Project – Joining Report

Name of Student: _____

Roll No.: _____

Name of Company: _____

Company Address: _____

Date of Joining Internship: _____

Supervisor Detail

Name: _____

Designation: _____

Contact Number: _____

Email id: _____

Supervisor Signature

Send copy of this form to the department office within one week of joining the internship by email or post.

CERTIFICATE
(on Company Letter head)

This is to certify that Mr./Ms. _____ Roll No. _____
student of MBA (Batch _____) of University Business School (College Name), Maharaja
Ranjit Singh Punjab Technical University, Bathinda has worked with our company
during summer internship from (date) _____ to _____ (date) in the
_____ (department name) and has worked on _____
_____ (project title).

His / Her performance was found Satisfactory / Non-satisfactory during the period. This certificate
is being issued to meet the requirement of the University.

Date:

Signature of Supervisor

Name & Designation of Signatory

Seal / Stamp of Organisation

Company Supervisor Evaluation Performa

Name of Student

Course: MBA

Roll No. -

Title of Project

Evaluation Criteria

S. No.	Parameters	Maximum Marks	Marks given by Company Supervisor
1	Completion of given task on time	10	
2	Behaviour and Conduct during training	10	
3	Discipline, Punctuality and Regularity	10	
4	Quality of Project Undertaken and Findings	10	
	Total Marks	40	

Suggest improvement area / feedback for student

Date

Name & Designation of Supervisor

Signature of Supervisor

Name of Company

Company Seal / Stamp

(Project Title)

A Summer Training Report submitted to the **MRSPTU**
in partial fulfilment of the requirements
for the award of the Degree of
MASTER OF BUSINESS ADMINISTRATION

Submitted by

Student Name

Student Reg. No.

Under the Guidance of

Name & Designation of Faculty Guide

Name & Designation of Industry Guide



University Business School

Maharaja Ranjit Singh Punjab Technical University,

Dabwali Road, Bathinda -151001

Punjab (India)

Year (July 2021)

Summer Internship Project Guidelines

- All the students have to prepare and submit a written project at the end of the internship.
- Each student has to prepare two hard copies of internship project in the presubscribed form.
- The submission will be made within three weeks days after commencement of third semester.
- The report should include a certificate issued by a competent authority from the company.
- The report should include Company Supervisor Evaluation Report duly signed by supervisor in the company.

Structure of Report

Cover Page – It is the Outer cover of the report.

Front page – The format of Cover page & Front Page should be same.

Certificate

Acknowledgement

Executive Summary (Summary of Training and Project) (Maximum 2 Pages)

Table of Content

List of Tables

List of Figures/Charts

List of Abbreviations

Chapter 1 Introduction of Company

Company History (Establishment)
Mission & Vision of Company
Types of Products/ Services produced
Market Position of Company

Chapter 2 Organization Structure

Departments and Functions of Departments
Organization Hierarchy Chart

Chapter 3 Description of Work & responsibilities Taken

Describe the department you worked in
Job & Responsibilities taken

Chapter 4 Project (Given by Company)

Objective of Project
Scope
Research Methodology
Data Analysis
Findings & Recommendations

Chapter 5 Experienced Gained & Challenges Faced

What type of challenges you faced at work?
What did you learn?
How this learning will help you in your career?

References

Key Parameters

Length of Report	15000 – 20000 Words
Page Size	A 4 Size
Font Style	Times New Roman
Font Size (Chapter Heading)	16 (Bold)
Font Size (Sub Headings)	14 (Bold)
Font Size (Body Content)	12 (Justified from Both Left & Right Sides)
Line Spacing	1.5

Page Numbers

- Page numbers should be mentioned at the bottom side in the middle of page (in Numbers 1,2,3..)
- Page No. 1 should start from Chapter 1 (Introduction of company)
- Roman Numerals (i,ii,iii,iv) should be used for pages (certificate, acknowledgment etc.) before starting Chapter 1 and for the annexure and references (if any)

Tables & Figures

- Tables & Figures must be numbered according to the Chapters (1.1, 2.1 etc.)
- Title of table should be depicted at the top of the table.

4th
SEMESTER

STRATEGIC MANAGEMENT

Subject Code: MBADS1- 421

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives: The main objectives of this course are:

1. To understand the sustainable competitive advantages of the organization and identify the growth avenues.
2. To meet stakeholder interests through growth strategies based on ethical value
3. To conduct SWOT analysis and Competitive analysis through various tools and technologies.

Course Outcomes: After completing this course, students will be able to:

1. Apply holistic approach by integrating people, finance, marketing and organizational perspectives to develop appropriate organizational policies and strategies
2. Understand and investigate various sustainable competitive advantage of company in current business and economic scenario
3. Identify different strategic options available and their relation with dynamic environment
4. Apply knowledge of strategic tools in determining the firm's vision, mission, objectives and ethical operations for the organisations' success.

UNIT-I (15 Hrs)

Introduction - Definition, Nature, Scope, and Importance of Strategy and Strategic Management (Business Policy). Strategic Decision Making, Process of Strategic Management Defining Strategic Intent: Vision, Mission, Business Definition, Goals and Objectives, Environmental Appraisal: Concept of Environment, Components of Environment (Economic, Legal, Social, Political and Technological), Environmental Scanning Techniques- ETOP, QUEST and SWOT (TOWS).

UNIT-II (15 Hrs)

Internal Appraisal – The Internal Environment, Organisational Capabilities in Various Functional Areas and Strategic Advantage Profile. Methods and Techniques Used For Organisational Appraisal (Value Chain Analysis, Financial and Non- Financial Analysis, Industry Standards and Benchmarking, Balanced Scorecard and Key Factor Rating). Identification of Critical Success Factors (CSF)

UNIT- III (15 Hrs)

External Analysis - Porters's Five Forces Model,

Corporate Level Strategies: Stability, Expansion, Retrenchment and Combination Strategies, Corporate Restructuring, Synergy. Mergers & Acquisitions, Corporate Restructuring,

Business Level Strategies: Porter's Framework of Competitive Strategies; Conditions, Risks and Benefits of Cost Leadership, Differentiation and Focus Strategies. Location and Timing Tactics, Core Competence.

Strategic Analysis and Choice: Corporate Level Analysis (BCG, GE Nine Cell, and Shell Directional Policy Matrix)

UNIT-IV (15 Hrs)

Implementation and Control: Qualitative Factors in Strategic Choice, Strategy Implementation: Resource Allocation, Projects and Procedural Issues. Organisation Structure and Systems in Strategy Implementation. Leadership and Corporate Culture, Values, Ethics and Social Responsibility. Operational and Derived Functional Plans to Implement Strategy, Integration of Functional Plans, Strategic Control and Operational Control, Techniques of Strategic Evaluation

Relevant case studies related to the topics should be discussed.

Suggested Readings

1. A Kazmi, 'Business Policy & Strategic Management', Tata McGraw Hill
2. Thomson & Strickland 'Strategic Management: Concept & Cases,' Tata McGraw Hill
3. S. Reddy, 'Strategic Management', Himalaya Publication
4. Wheelen & Hungar 'Strategic Management & Business Policy' Addison- Wesley
5. Johnson & Scholes, 'Exploring Corporate Strategy', Prentice Hall India

DISSERTATION

Subject Code: MBADS1-422

L T P C

0 0 0 6

Course Outcome - After the completion of this course, students will be able to

1. Identify the contemporary business and social problems
2. Apply various statistical tools to analyze the data for finding the solutions
3. Prepare and presenting the project reports as per academic standards
4. Develop communication and presentation skills

Under the guidance of his/her supervisor, Students will identify the problem from the area of their specialization. The problem should be relevant to current business or social scenario. The student will do literature review, set the objectives, collect data (primary/Secondary) regarding the problem, apply statistical techniques and document the findings of the study with the justification how these findings will solve the existing problem in business/society.

Student will submit the report (Hard Binding) and give presentation and final oral viva.

AIRCRAFT MAINTENANCE MANAGEMENT

Subject Code: MBADD7- 421

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives

To understand the various organization related to aviation fields, economics benefits of aviation and maintenance of aircraft with reference to new technology.

Course Outcomes

After the end course the student will be able to understand about the aircraft maintenance, flight preparation scheduling of flights and different organization in aviation sector.

UNIT-I INTRODUCTION (12 Hrs)

Development of air transportation, comparison with other modes of transport – Role of IATA, ICAO – The general aviation industry airline – Factors affecting general aviation, use of aircraft, airport: airline management and organization – levels of management, functions of management, Principles of organization planning the organization – chart, staff departments & line departments.

UNIT- II AIRLINE ECONOMICS (15 Hrs)

Forecasting – Fleet size, Fleet planning, the aircraft selection process, operating cost, passenger capacity, load factor etc. – Passenger fare and tariffs – Influence of geographical, economic & political factors on routes and route selection -FLEET PLANNING: The aircraft selection process – Fleet commonality, factors affecting choice of fleet, route selection and Capitol acquisition – Valuation & Depreciation – Budgeting, Cost planning – Aircrew evaluation – Route analysis – Aircraft evaluation.

UNIT- III PRINCIPLES OF AIRLINES SCHEDULING (15 Hrs)

Equipment maintenance, Flight operations and crew scheduling, Ground operations and facility limitations, equipment's and types of schedule – hub & spoke scheduling, advantages / disadvantages & preparing flight plans – Aircraft scheduling in line with aircraft maintenance practices.

UNIT- IV AIRCRAFT RELIABILITY (18 Hrs)

Aircraft reliability – The maintenance schedule & its determinations – Condition monitoring maintenance – Extended range operations (EROPS) & ETOPS – Ageing aircraft maintenance production.

Technology in aircraft maintenance

Airlines scheduling (with reference to engineering) – Product support and spares – Maintenance sharing – Equipment's and tools for aircraft maintenance – Aircraft weight control – Budgetary control. On board maintenance systems – Engine monitoring – Turbine engine oil maintenance – Turbine engine vibration monitoring in aircraft – Life usage monitoring – Current capabilities of NDT – Helicopter maintenance – Future of aircraft maintenance.

TEXT BOOKS

1. FEDRIC J.H., "Airport Management", 2000.
2. C.H. FRIEND, "Aircraft Maintenance Management", 2000.

REFERENCES

1. GENE KROPF, "Airline Procedures".
2. WILSON & BRYON, "Air Transportation".

MRSPTU MBA (AVIATION MANAGEMENT) 2023 BATCH ONWARDS

3. PHILIP LOCKLIN D, “Economics of Transportation”.
4. “Indian Aircraft manual” – DGCA Pub.
5. ALEXANDER T WELLS, “Air Transportation”, Wadsworth Publishing Company, California, 1993.

MRSPTU

AVIATION ADVERTISING AND SALES PROMOTION

Subject Code: MBADD7- 422

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives

To make the students understand about aviation advertisement and different sales promotion techniques.

Course Outcomes

After the end of course the student will be able to understand between print and digital media. Contribution of radio, tv and web advertisement, sales promotion techniques and its different models.

UNIT- I INTRODUCTION TO ADVERTISEMENT (15 Hrs)

Concept and definition of advertisement – Social, Economic and Legal Implications of Advertisements – setting advertisement objectives – Ad. Agencies – selection and remuneration – advertisement campaign.

UNIT- II ADVERTISEMENT MEDIA (15 Hrs)

Media plan – type and choice criteria – reach and frequency of advertisements – cost of advertisements related to sales – media strategy and scheduling.

UNIT -III DESIGN AND EXECUTION OF ADVERTISEMENTS (15 Hrs)

Message development – different types of advertisements – layout – design appeal – copy structure – advertisement production – print – Radio. T.V. and web advertisements – Media Research – testing validity and reliability of ads – measuring impact of advertisements.

UNIT- IV AIRLINE ADVERTISING (15 Hrs)

Anatomy of sale - AIDA and SPIN Model – Marketing Communication Techniques – Airline Advertising – Selling in Air Freight Market – Case studies

Sales promotion campaign

Sales promotion – Requirement identification – designing of sales promotion campaign – involvement of salesmen and dealers – outsourcing sales promotion national and international promotion strategies – Integrated promotion – Co-ordination within the various promotion techniques – online sales promotions.

REFERENCES:

1. Kenneth Clow. Donald Baack, “Integrated Advertisements, Promotion and Marketing communication”, Prentice Hall of India, New Delhi, 2003.
2. S.H.H.Kazmi, Satish K Batra, “Advertising & Sales Promotion”, Excel Books, New Delhi, 2001.
3. George E Belch, Michel A Belch, “Advertising & Promotion”, McGraw Hill, Singapore, 1998.
4. Julian Cummings, “Sales Promotion”, Kogan Page, London 1998.
5. E.Betch and Michael, Advertising and Promotion, MC. Graw Hill.
6. Stephen Shaw “ Airline Marketing and Management “ Ashgate Sixth Edition.

AVIATION LAW

Subject Code: MBADD7- 423

**L T P C
4 0 0 4**

Duration: 60 Hrs

COURSE OBJECTIVES

This course offers an in-depth analysis of legal concepts related to the aviation industry, including aircraft operations, airports, fixed based operators (FBOs), contracts, insurance and liability, regulatory statutes, and case law. The historical development of aviation law is included.

COURSE OUTCOMES

At the end of the course the student will be to understand about the history and development of air laws in India, Aviation liability and ownership, punishment and penalty of the aviation industry.

UNIT-I HISTORY AND DEVELOPMENT OF AIR LAW IN INDIA (15 Hrs)

Introduction - Paris Convention on Air Navigation 1919 - First Indian Air Board - Birth of Indian Air Companies - Indian Aircraft Act 1934 - Aircraft Rules 1937 - Civil Aviation pre and post Second world war - Nationalization of Air Services - International Airports Authority in India - History of Aviation - Survey of Current Air law in India.

UNIT II INTERNATIONAL AIR TRANSPORTATION (15 Hrs)

Air regime prior to the Chicago convention - Chicago conference - Convention on the international Civil Aviation - Rules for Air Navigation - Liberalization of International Air transportation - Bermuda Agreement - Multilateralism for Liberalization - Application of GATT Principles to International Air Transportation - Environmental Protection Measures - India and Bilateral Services Agreement.

UNIT III AVIATION LIABILITY (15 Hrs)

Liability of the Carrier under the Indian Carriage by Air Act 1972 - Warsaw Convention 1929 - International Carriage - Hague Protocol 1955 - Montreal Interim Agreement 1966 - Guatemala City Protocol 1971- Montreal Protocol 1975 - Consumer Protection Act and Air carriage Claims.

UNIT IV AIRLINES OWNERSHIP (15 Hrs)

Introduction - Privatization - Policy issues - Current Situation - Changing Trends of Liberalization and Ownership in Air Services - Airspace Management in India.

Aviation in India Past - present - Future Overview - Air law and Aviation Policy in India - Air Routes and Aerodromes in India - Aviation Security - Development of Civil Aviation and Air law and Policy in India - Development in Aviation in India and Future Outlook for National Airlines

TEXT BOOK

1. S. Bhatt, V.S. Mani & V. Balakista Reddy, "Air Law and Policy in India"

AVIATION SAFETY MANAGEMENT SYSTEM AND ACCIDENT INVESTIGATION

Subject Code: MBADD7- 424

**L T P C
4 0 0 4**

Duration: 60 Hrs

COURSE OBJECTIVES

To help the students an understanding of flight safety and other key safety issues in the aviation industry.

COURSE OUTCOMES

After the end of the course the student will be able to understand the aviation safety with regard to human factors, airline and aircraft safety manual and instructions of safety.

UNIT I INTRODUCTION (15 Hrs)

Aviation safety - Meaning - Need - Economic of Aviation Safety - Safety Vs Mission - Randomness of Damage and Injury - Zero Accident Rate - Accident causes - Multiple Vs Single Cause - Aircraft Accident - Aircraft Mishap - Aircraft Incident - Building Aviation Safety Program - Prevention Methodology - Risk Management.

UNIT II HUMAN FACTORS IN AVIATION SAFETY (15 Hrs)

Theory of Risk - Changing the Behavior of the risk takers - Attitudes - Discipline - Punishment - Protection of Safety - Motivating Safe Behavior - Human factors difficulties - Training involving human factors - Human Performance Concerns - Human Performance Factors.

UNIT III AVIATION SAFETY PROGRAM ELEMENTS (14 Hrs)

Internal Reporting Systems - Information Distribution systems - Aviation Safety Committees - Aviation Safety Inspection Programs - Aviation safety program Evaluation - Flight Operation Safety Inspection

Safety Inspection report Format - Aviation Safety Education and Training - Aviation Safety Awards Programs - Accident Preparation and Investigation.

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UNIT IV AIRCRAFT MAINTENANCE SAFETY (16 Hrs)

Aircraft Discrepancies - Delayed and Deferred Discrepancies - Training - Configuration Control - Maintenance Engine Runs and Taxiing - Maintenance Test Flights - maintenance Analysis - Tool Control - Hazardous Waste Disposal - Bogus parts - Technical Data - maintenance Inspections - Flight Line Practices - Maintenance Safety Programs - Maintenance Safety Inspections.

Airports and heliports Airport Certification Manual - Airport Emergency Plan - Airports/Heliports criteria - Airfield Criteria - Airspace Criteria - Foreign Object Control - Bird Hazards - Snow and Ice Removal - Fuel Handling - Vehicle Control - Airport and Heliport Safety Inspections.

TEXT BOOK

Aviation Safety Programs - A Management Handbook - Richard H. Wood

OPERATION MANAGEMENT

Subject Code: MBADD7- 425

**L T P C
4 0 0 4**

Duration: 60 Hrs

Course Objectives

To understand the planning and designing of airport with special reference to TQC and Automation operations.

Course Outcomes

After the completion course the student will be able to understand about the operating part of management like job design, planning and control introduction and production operations.

UNIT-I (14 Hrs)

Systems Approach-Historical Development of OM, JIT, TQC &Automation-Operating Decisions-Why study OM Concepts of Costing, Finance and Accountancy in OM-Operations Costing-Financial Management and Financial Analysis.

UNIT-II (15 Hrs)

Job Design-Principles of Job Design-Behavioral Approaches to Job Design-Benefits of Sound Job Design- Process for Job design-Key factors in Job Design Introduction to Work Study-Productivity-Evolution and Development-Objectives of Work Study-Method Study-Application of Method Study-Performance Rating.

UNIT-III (15 Hrs)

Introduction to Production Planning &Control-Aggregate Production Planning-Documents used in PPC. Demand Forecasting for Production Planning-Forecasting Approaches-Linear Regression Analysis-Time Series Methods-Simple Moving Averages-Weighted Moving Averages-Exponential Smoothing Methods.

UNIT-IV (16 Hrs)

Aggregate Planning-Three dimensions of Aggregation-Purpose of Aggregate Planning-Techniques for Aggregate Planning, Master Production Scheduling-Benefits of Good Scheduling-Developing Master Production Schedules.

Detailed Scheduling Methods for Single Machine & Dispatching-Benefits of Good Scheduling-Gantt Chart Line Balancing-Production Line-Steps in Line Balancing Procedure-Production Flow Control.

TEXT BOOKS:

1. Productions and operations management by Everest E Adam and Ebert.
2. Operations management (theory and problems) –Joseph G monks
3. Productions and operations management by S.N.Chary.

REFERENCE BOOKS:

1. Modern production and operations management by E.S .Buffa.
2. Production and operations management by Hunawalla and Patil.

CUSTOMER RELATION MANAGEMENT

Subject Code: MBADD7- 426

**L T P C
4 0 0 4**

Duration: 60 Hrs

COURSE OBJECTIVES

To understand the importance of customer relationship in management and to understand the concept of CRM in planning and implementation.

COURSE OUTCOMES

After the end of course the student will be able to understand the relationship and significance of the customer, database and profile analysis of the customer and its planning and implementation.

UNIT –I (15 Hrs.)

INTRODUCTION

Definitions - Concepts and Context of relationship Management – Evolution - Transactional Vs Relationship Approach – CRM as a strategic marketing tool – CRM significance to the stakeholders.

UNIT- II (15 Hrs.)

UNDERSTANDING CUSTOMERS

Customer information Database – Customer Profile Analysis - Customer perception, Expectations analysis – Customer behavior in relationship perspectives; individual and group customer's - Customer life time value
– Selection of Profitable customer segments.

UNIT- III (15 Hrs.)

CRM STRUCTURES

Elements of CRM – CRM Process – Strategies for Customer acquisition – Retention and Prevention of defection – Models of CRM – CRM road map for business applications.

UNIT –IV (15 Hrs.)

CRM PLANNING AND IMPLEMENTATION

Strategic CRM planning process – Implementation issues – CRM Tools- Analytical CRM – Operational CRM – Call center management – Role of CRM Managers.

Trends in crm trends in crm e- CRM Solutions – Data Warehousing – Data mining for CRM – an introduction to CRM software packages. CRM Implementation–A comprehensive model- Developing CRM vision and strategy Management support.

TEXT BOOKS

1. G.Shainesh, Jagdish, N.Sheth, Customer Relationships Management Strategic Perspective, Macmillan 2005.
2. Alok Kumar et al, Customer Relationship Management: Concepts and applications, Biztantra, 2008

REFERENCE BOOKS

1. H.Peeru Mohamed and A.Sahadevan, Customer Relation Management, Vikas Publishing 2005.
2. Jim Catheart, the Eight Competencies of Relationship selling, Macmillan India, 2005.
3. Assel, Consumer Behavior, Cengage Learning, 6th Edition.
4. Kumar, Customer Relationship Management - A Database Approach, Wiley India, 2007.
5. Francis Buttle, Customer Relationship Management: Concepts & Tools, Elsevier, 2004.

VII Semester

Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA)

Sr. No.	Subject Code	Name of the Subject	Contact Hours		Marks Distribution			Credit
			Theory	Practical	Internal	External	Total	
1	BAGRS1-751	Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA)	0	40	80	120	200	20
Total			0	40	80	120	200	20

Course outcomes

1. Gain practical knowledge in rural agricultural practices through village attachment.
2. Develop hands-on skills in agro-industrial operations during unit attachment.
3. Enhance understanding of agricultural research through KVK/Research Station attachment.
4. Demonstrate expertise in plant clinic management, project report preparation, presentation, and evaluation.

Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA)				
No.	Activities	No. of weeks	Credit Hours	Modules
1	General orientation & On campus training by different faculties	1		The students will be apprised of various issues related to Punjab agriculture and shall be acquainted with different technologies & techniques.
2	Village attachment	8	8	The students will be deputed to work in villages in small groups (one group in each village) by Department to work on various aspects as allotted
	Unit attachment in Univ./ College. KVK/ Research Station Attachment	5	5	The students will be attached to various KVKs in small groups (one group in each KVK/RRS). They will be involved in different activities of the KVK viz: Farm management, subsidiary units, training programs, seed sale etc.
3	Plant clinic	2	3	Small batches of students will be attached in Plant Clinic for 2 weeks where experts from the Agronomy, Soil Science, Plant Protection, Fruit Science & Vegetable Science will co- ordinate their training
4	Agro-Industrial Attachment	3	4	The students will be get training from Agro-Industry and submit the experience certificate along with report in the Department
5	Project Report Preparation, Presentation and Evaluation	1		
	Total weeks for RAWE & AIA	20	20	

Agro- Industrial Attachment: The students would be attached with the agro-industries for a period of 3 weeks to get an experience of the industrial environment and working.

Educational tour will be conducted in break between VI & VII Semester or VII & VIII Semester

RAWE Component-I: Village Attachment Training Programme

S. No.	Activity	Duration
1	Orientation and Survey of Village	1 week
2	Agronomical Interventions	1 week
3	Plant Protection Interventions	1 week
4	Soil Improvement Interventions	1 week
5	Fruit and Vegetable Production Interventions	1 week
6	Food Processing and Storage Interventions	1 week
7	Animal Production Interventions	1 week
8	Extension and Transfer of Technology Activities	1 week

RAWE Component-II Agro Industrial Attachment

Students shall be placed in Agro-and Cottage industries and Commodities Boards for 03 weeks.

Industries include Seed/Sapling production, Seed Industries, Herbicide Formulators, Pesticides-insecticides, Post harvest-processing-value addition, Agri-finance institutions, Commercial Honey Production, Hive and Apicultural Equipment and Honey Processing Manufacturing Units; Honey Trading, Processing, Packaging, Exporting and Marketing Units. Nursery Raising and Plant propagation Industry, Beekeeping, Fishery; Animal based Industry, and Agriculture implements Industry Biocontrol Agents Production Units, Plant Quarantine Station, Virus free Potato Tuber Production Units, Fruit and Vegetables Industry, Beverages Industry, Cereal Industry, Commercial Flower Nurseries Flower Marketing Firms, Flower Seed Production and Landscaping Units, Milk Industry, Forest based Industry, High-tech Nursery (Tree Planting Stock Production), Commercial Fruit Nurseries, Commercial Hybrid Seed Production Units, Fertilizer Industries, Vermicompost Units, Bio-fertilizer Units, Commercial Vegetable Nurseries, Farms of Progressive Vegetable Growers, Mushroom Production Units etc.

S.No.	Activities and Tasks during Agro-Industrial Attachment Programme
1	Acquaintance with industry and staff
2	Study of structure, functioning, objective, and mandates of the industry
3	Study of various processing units and hands-on trainings under supervision of industry staff
4	Ethics of industry
5	Employment generated by the industry
6	Contribution of the industry to promoting the environment
7	Learning the business network, including outlets of the industry Skill development in all crucial tasks of the industry
8	Documentation of the activities and tasks performed by the students
9	Performance evaluation, appraisal, and ranking of students

Attendance:

As the program is enterprise oriented, students and faculty are expected to work even on holidays and without any time limit or restriction of working hours. The minimum attendance required for this program is 85%. Any student in the event of recording shortage of attendance has to re-register, when offered next.

A separate certificate will be issued to the students after successful completion of each component

EVALUATION OF RURAL AGRICULTURAL WORK EXPERIENCE (RAWE)

S.No.	Parameter	Max Marks	Evaluation by
1	RAWE Planning and Writing	20	Internal
2	General orientation & On campus training by different faculties	20	Internal
3	Village attachment	20	Internal
4	Unit attachment in University/College/ KVK/ Research Station	20	External
5	Plant clinic	20	External
6	Agro-Industrial Attachment	20	External
7	Attendance	20	Internal
8	Final Presentation	20	External
9	Project report	40	External
	Total	200	

RAWE Evaluation (Internal and External)**Internal Evaluation Criteria (Total Marks: 80)**

Internal marks will be evaluated by the Program Coordinators/Faculty based on the following parameters:

1. RAWE Planning and Writing

- Quality and completeness of RAWE plan.
- Clarity and coherence in writing.
- Relevance and feasibility of proposed activities.

2. General Orientation & On-campus Training by Different Faculties

- Attendance and participation in training sessions.
- Interaction with faculty members.
- Understanding and application of knowledge gained.

3. Village Attachment

- Engagement with village community.
- Implementation of planned activities.
- Impact assessment and feedback from villagers.

4. Attendance

- Consistency and punctuality in attending RAWE-related activities. Minimum required attendance percentage.

The Program Coordinator will assess these parameters based on:

- Attendance records.
- Daily work reports.
- Checking diaries.
- Monthly internal viva.

External Evaluation Criteria (Total Marks: 120)

The external evaluation committee will include:

1. Head of Department
2. RAWE Coordinators
3. External Expert

This committee will conduct:

- Final presentation assessment.
- External viva on work done in unit attachment, plant clinic, agro-industrial attachment.
- Project report evaluation.

VIII Semester

Sr. No.	Subject Code	Name of the Subject	Contact Hours		Marks Distribution			Credit
			Theory	Practical	Internal	External	Total	
1	BAGRS1-851	Experiential Learning Programme-1	0	20	40	60	100	10
2	BAGRS1-852	Experiential Learning Programme-2	0	20	40	60	100	10
Total			0	40	80	120	200	20

Course Outcome

1. Develop practical farming skills for sustainable agriculture practices.
2. Cultivate entrepreneurial acumen in agribusiness management.
3. Foster innovation and problem-solving abilities in agricultural contexts.
4. Enhance teamwork and communication skills for collaborative agricultural projects.

Modules for Skill Development and Entrepreneurship: A student has to register 20 credits opting for two modules of (0+10) credits each (total 20 credits) from the package of modules in the VIII semester. (ELP)

Title of the Module (ELP)	Credits
Production Technology for Bioagents and Biofertilizer	0+10
Seed Production and Technology	0+10
Mushroom Cultivation Technology	0+10
Soil, Plant, Water and Seed Testing	0+10
Commercial Beekeeping	0+10
Poultry Production Technology	0+10
Commercial Horticulture	0+10
Floriculture and Landscaping	0+10
Food Processing	0+10
Agriculture Waste Management	0+10
Organic Production Technology	0+10
Commercial Sericulture	0+10

Evaluation of Experiential Learning Programme for one module

S.N.	Parameters	Max. Marks	Evaluation by
1	Project Planning and Writing	10	Internal
2	Presentation	10	External
3	Regularity	10	Internal
4	Monthly Assessment	10	Internal
5	Output Delivery	10	External
6	Technical Skill Development	10	External
7	Entrepreneurship Skills	10	External
8	Business Networking Skills	10	External
9	Report Writing Skills	10	Internal
10	Final Presentation	10	External
Total		100	

Internal Evaluation (40 Marks Total): Conducted by the ELP Faculty.

Based on:

1. **Project Planning and Writing:** Evaluation of how well the project is planned and documented.
2. **Regularity:** Assessment of the student's regularity in attending and participating in the project activities.
3. **Monthly Assessment:** Regular checks of the unit progress and work done.
4. **Report Writing Skills:** Quality of the report documenting the project.

External Evaluation (60 Marks Total):

- Conducted by a committee consisting of the Head of Department, ELP Coordinators, and an External Expert.

Based on: **Viva, Final Presentation & ELP Report**

Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001



SYLLABUS

FOR

B.SC. NON-MEDICAL (COMPUTER SCIENCE)

2024 BATCH ONWARDS

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16/7/24
Supriya

**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

ABOUT THE PROGRAMME

B.SC. NON-MEDICAL (COMPUTER SCIENCE): It is an Under Graduate (UG) programme in Physical Sciences (Physics, Mathematics, Computer Science) of 03 years (6 semesters) duration and is in accordance with UGC Choice Based Credit System (CBCS).

ELIGIBILITY FOR ADMISSION: Should have passed 10+2 examination with at least 50% marks with English, Physics, Mathematics, Chemistry/ Electronics/ Computer Science

COURSE STRUCTURE: As per the UGC guidelines, it includes Core Courses (CC), Ability Enhancement Compulsory Courses (AECC), Discipline Specific Electives (DSE), Skill Enhancement Courses (SEC) and Non Credit Courses (NCC).

On the basis of these guidelines, the course structure for **B.SC. NON-MEDICAL (COMPUTER SCIENCE)** has been designed as detailed below.

Distribution of Credits in various type of Courses:

Course Type	Details of credits in various type of courses				Total Credits in Semester
	AECC	CC	SEC	DSE	
Semester-I	2	18	0	0	20
Semester-II	3	18	0	0	21
Semester-III	0	18	2	0	20
Semester-IV	0	18	2	0	20
Semester-V	0	0	2	18	20
Semester-VI	0	0	2	18	20
Total Credits in Courses:	5	72	8	36	121

Supriya

**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

(STUDY SCHEME)

1 st Semester		Course Type	Contact Hrs.			Marks			Credits
Sub. Code	Subject		L	T	P	Int.	Ext.	Total	
BHSMC0-042	English	AECC-I	2	0	0	40	60	100	2
BNMCS1-101	Mechanics	CC-I	4	0	0	40	60	100	4
BNMCS1-102	Object Oriented Programming in C++	CC-II	4	0	0	40	60	100	4
BNMCS1-103	Calculus-I	CC-III A	3	0	0	40	60	100	3
BNMCS1-104	Algebra-I	CC-IV A	3	0	0	40	60	100	3
BNMCS1-105	Mechanics Lab	CC-I Lab	0	0	4	60	40	100	2
BNMCS1-106	Object Oriented Programming in C++ Lab	CC-II Lab	0	0	4	60	40	100	2
Total			16	0	8	320	380	700	20

2 nd Semester		Course Type	Contact Hrs.			Marks			Credits
Sub. Code	Subject		L	T	P	Int.	Ext.	Total	
BHSMC0-041	Environmental Science	AECC-II	3	0	0	40	60	100	3
BNMCS1-201	Electricity, Magnetism and EMT	CC-V	4	0	0	40	60	100	4
BNMCS1-202	Data Structures and File Processing	CC-VI	4	0	0	40	60	100	4
BNMCS1-203	Calculus-II	CC-III B	3	0	0	40	60	100	3
BNMCS1-204	Algebra-II	CC-IV B	3	0	0	40	60	100	3
BNMCS1-205	Electricity, Magnetism and EMT Lab	CC-V Lab	0	0	4	60	40	100	2
BNMCS1-206	Data Structures and File Processing Lab	CC-VI Lab	0	0	4	60	40	100	2
			17	0	08	320	380	700	21

Dr. S. R. Saini
Head

**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

3 rd Semester		Course Type	Contact Hrs.			Marks			Credits
Sub. Code	Subject		L	T	P	Int.	Ext.	Total	
BNMCS1-301	Thermal Physics and Statistical Mechanics	CC-VII	4	0	0	40	60	100	4
BNMCS1-302	Numerical Computing	CC-VIII	4	0	0	40	60	100	4
BNMCS1-303	Differential Equations-I	CC-IX A	3	0	0	40	60	100	3
BNMCS1-304	Real Analysis-I	CC-X A	3	0	0	40	60	100	3
BNMCS1-305	Mathematical Physics	SEC-I	2	0	0	40	60	100	2
BNMCS1-306	Thermal Physics and Statistical Mechanics Lab	CC-VII Lab	0	0	4	60	40	100	2
BNMCS1-307	Numerical Computing Lab	CC-VII Lab	0	0	4	60	40	100	2
Total			16	0	8	320	380	700	20

4 th Semester		Course Type	Contact Hrs.			Marks			Credits
Sub. Code	Subject		L	T	P	Int.	Ext.	Total	
BMNCC0-041	Drug abuse: problem, management and prevention	AECC-III	2	0	0	100	00	100	0
BNMCS1-401	Waves and Optics	C-XI	4	0	0	40	60	100	4
BNMCS1-402	Design and Analysis of Algorithms	CC-XII	4	0	0	40	60	100	4
BNMCS1-403	Differential Equations-II	C-IX B	3	0	0	40	60	100	3
BNMCS1-404	Real Analysis-II	CC-X B	3	0	0	40	60	100	3
BNMCS1-405	Analytical Geometry	EC-II	2	0	0	40	60	100	2
BNMCS1-406	Waves and Optics Lab	CC-XI Lab	0	0	4	60	40	100	2
BNMCS1-407	Design and Analysis of Algorithms Lab.	CC-XII Lab	0	0	4	60	40	100	2
Total			18	0	8	420	380	800	20

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

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**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

5 th Semester		Course Type	Contact Hrs.			Marks			Credits
Sub. Code	Subject		L	T	P	Int	Ext	Total	
BNMCS1-501	Basic Electronics	DSE-I	4	0	0	40	60	100	4
BNMCS1-502	Operating Systems	DSE-II	4	0	0	40	60	100	4
BNMCS1-503	Probability and Statistics	DSE-III	5	1	0	40	60	100	6
BNMCS1-504	Basic Electronics Lab	DSE-I Lab	0	0	4	60	40	100	2
BNMCS1-505	Operating Systems Lab	DSE-II Lab	0	0	4	60	40	100	2
BNMCS1-506	Data Visualization Lab	SEC-III	0	0	4	60	40	100	2
Total			13	1	12	300	300	600	20

6 th Semester		Course Type	Contact Hrs.			Marks			Credits
Subject Code	Subject		L	T	P	Int.	Ext	Total	
BNMCS1-601	Quantum Mechanics	DSE-IV	4	0	0	40	60	100	4
BNMCS1-602	Computer Networks	DSE-V	4	0	0	40	60	100	4
BNMCS1-603	Linear Algebra	DSE-VI	5	1	0	40	60	100	6
BNMCS1-604	Modeling and Simulation	SEC-IV	2	0	0	40	60	100	2
BNMCS1-605	Quantum Mechanics Lab	DSE-IV Lab	0	0	4	60	40	100	2
BNMCS1-606	Computer Networks Lab	DSE-V Lab	0	0	4	60	40	100	2
Total			15	1	8	280	320	600	20

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**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

Subject

ENGLISH

Subject Code: BHSMC0-042

L T P C
2 0 0 2

Duration:30 Hrs.

UNIT-I (8 Hours)

Communication Skills: Introduction, Definition, the Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context

Barriers to communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers

UNIT-II (7 Hours)

Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment.

Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication.

UNIT-III (7 Hours)

Communication Styles: Introduction, The Communication Styles Matrix with example for each Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style.

Basic Listening Skills: Introduction, Self-Awareness, Active Listening, becoming an Active Listener, Listening in Difficult Situations

UNIT-IV (8 Hours)

Interview Skills: Purpose of an interview, Do's and Don'ts of an interview

Giving Presentations: Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery

Group Discussion: Introduction, Communication skills in group discussion, Do's and Don'ts of group discussion.

Recommended Books;

1. Ruther Ford A. J., 'Basic Communication Skills for Technology', 2nd Edition, Pearson Education, 2011.
2. Kumar S. and Pushplata, 'Communication Skills', 1st Edition, Oxford Press, 2011.
3. Stephen P, Robbins, 'Organizational Behaviour', 1st Edition, Pearson, 2013.
4. Gill H., 'Brilliant-Communication Skills', 1st Edition, Pearson Life, 2011.
5. Gopalawamy R., 'The Ace of Soft Skills: Attitude, Communication and Etiquette for Success', 5th Edition, Pearson, 2013.
6. Dalley D., Burton L. and Margaret G., 'Developing your Influencing Skills', Green Hall, 1st Edition, Universe of Learning LTD,2010.
7. Konarnira, 'Communication Skills for Professionals', 2nd Edition, PHI, 2011.
8. Mitra B. K., 'Personality Development and Soft Skills', 1st Edition, Oxford Press, 2011.
9. 'Soft Skill for Everyone', Butter Field, 1stEdition, Cengage Learning India Pvt. Ltd., 2011.
10. Francis Peters S.J., 'Soft Skills and Professional Communication', 1st Edition, McGraw Hill Education, 2011.
10. John A., 'Effective Communication', 4th Edition, Pan MacMillan, 2009.
11. Aubrey D., 'Bringing out the Best in People', 2nd Edition, McGraw Hill,1999

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**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

MECHANICS

Subject Code: BNMCS1-101

L T P C

Duration: 60Hrs.

4 0 0 4

Course Outcome (CO): After the completion of the course, student will be able to:

CO1: Understand the concepts of vector calculus and basic laws of motion

CO2: Gain the knowledge about gravitational motion, and global positioning system

CO3: Understand the concepts of harmonic oscillations.

CO4: Learn the concept of theory of Relativity.

UNIT-I (15 Hrs)

Vector algebra: Position, Area, Volume, Velocity and Acceleration in Cartesian, Cylindrical and Spherical Polar Coordinate systems. Frame of reference: Laboratory frame and center of mass frame, interrelation of physical quantities in these frames.

Conservation Laws: Conservation of linear, angular momentum and energy and their applications: Motion of variable mass system (vertical motion) and Leakage of Fluid from a moving container (horizontal motion).

UNIT-II (15Hrs)

Dynamics of Rigid body: Moment of inertia, Rotation about fixed axis, behavior of angular momentum vector, moments and product of inertia, Euler's equations, rigid two particle rotator, gyroscope.

Motion under central force field: potential energy and force between point mass and spherical shell. Concept of reduced mass, two body problem: vibration of di-atomic molecule, orbital motion of binary stars. Coriolis force (Concept Only)

UNIT-III (15Hrs)

Oscillations: Differential equation of SHM and its solutions, Damped oscillations, Type of damping (qualitative only), Equation of forced oscillator, transient and steady state response of forced oscillator, solution of equation of forced mechanical oscillator. Amplitude, velocity, acceleration in forced oscillations, variation of displacement, velocity, acceleration and phase with driving force frequency. Power in forced mechanical oscillator and its variation with force frequency, Energy dissipation, Power absorption, Resonance, Quality Factor and bandwidth of sharpness in resonance. Solution of forced electrical oscillator and its behavior under different conditions.

UNIT-IV (15 Hrs)

Special Theory of Relativity: Concept of Inertial and non-inertial frames, Concept of ether, Constancy of speed of light, Michelson-Morley Experiment, Galilean transformation, Postulates of Special Theory of Relativity, Lorentz transformation, Length contraction. Time dilation, Relativistic addition of velocities.

Recommended Books:

- 1.University Physics. FW Sears, MW Zemansky and HD Young13/e, 1986. Addison Wesley
- 2.Mechanics Berkeley Physics course, volume.1: Charles Kittel, et. Al. 2007, Tata McGraw Hill.
- 3.Physics – Resnick, Halliday & Walker 9/e, 2010, Wiley.
- 4.Engineering Mechanics, Basudeb Bhattacharya, 2nd edn., 2015, Oxford University Press.
- 5.University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

Subject C

**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

OBJECT ORIENTED PROGRAMMING USING C++

Subject Code: BNMCS1-102

L T P C
4 0 0 4

Duration: 60Hrs

Course Outcomes:

- CO1: Students will be able to explain the principles of Object-Oriented Programming (OOP), its basic features, and differentiate it from Procedure-Oriented Programming (C).
- CO2: Students will be proficient in defining classes and objects, understanding and implementing member functions, access specifiers, and arrays of objects.
- CO3: Students will understand and implement various types of inheritance (single, multiple, multilevel, hierarchical, hybrid) in C++
- CO4: Students will gain practical skills in file handling, including opening, closing, reading, and writing files in C++.

Unit-I (14 hours)

Principles of Object Oriented programming: Introduction to OOP and its basic features, Basic components of a C++, Program and program structure, Compiling and Executing C++ Program. Difference between Procedure Oriented Language (C) and Object Oriented Language

Unit-II (15 hours)

Classes and Objects: Defining Classes, Defining Member Functions, Declaration of Objects To Class, Access to Member Variables from Objects, Different Forms of Member functions, Access specifiers (Private, public, protected), Array of Objects.

Concept of Constructors: Introduction To Constructors, Parameterized Constructor, Copy Constructor, Multiple Constructors in Class, Dynamic Initialization of Objects, Destructors.

Unit-III (17 hours)

Inheritance and Operator Overloading: Introduction to Inheritance, Types Of Inheritance:- Single Inheritance, Multiple Inheritance, Multilevel inheritance, Hierarchical inheritance, Hybrid inheritance, Defining Operator Overloading, Overloading of Unary and Binary operators, Rules for overloading operators.

Unit-IV (14 hours)

Polymorphism and File Handling: Early Binding, Late Binding, Virtual Functions, pure virtual functions, Abstract Classes. Opening and Closing File, Reading and Writing a file.

Reference Books:

1. E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw-Hill.
2. Herbert Schildt, The Complete Reference C++, Tata McGraw-Hill.
3. Deitel and Deital, C++ How to program, Pearson Education.
4. Robert Lafore, *Object Oriented Programming in Turbo C++*, Galgotia Publications.
5. BajaneStautrup, *The C++ Programming Language*, Addition,-Wesley Publication Co.
6. Stanley B. Lippman, LoseeLajoic, C++. Primer; Pearson Education.
7. D. Ravichandran, Programming with C++, Tata McGraw-Hill Publishing Company Ltd.

G. S. N. Vajay Singh

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**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

CALCULUS-I

Subject Code: BNMCS1-103

L T P C

Duration: 45 Hrs.

3 0 0 3

Course Outcomes:

- CO1: Understand the concept of Continuity and Differentiability.
 CO2: Develop the skill to sketch the curves in a plane using its mathematical properties in the different coordinate systems of reference.
 CO3: Understand the concept of Partial Differential Equation.
 CO4: Apply derivatives for the computation of directional derivative and optimization.

Unit-I (12Hrs.)

Limit and Continuity (ϵ and δ definition), Types of discontinuities, Differentiability of functions, Successive differentiation, Leibnitz's theorem.

Unit-II (11Hrs.)

Curvature of a curve at a point, Radius of curvature for cartesian, parametric and polar curves, Asymptotes, Singular points, Tracing of cartesian, parametric and polar curves.

Unit-III (11 Hrs.)

Partial differentiation - Function of two variables, Partial derivatives of higher order, Homogeneous functions, Euler's theorem and its extension (with proof), Composite functions, Total derivative, Differentiation of implicit functions and composite functions, Jacobians and its properties.

Unit-IV (11 Hrs.)

Tangent plane and normal to a surface, Maxima and Minima of functions of two variables, Working rule to find the extreme values of a function $z = f(x, y)$, Lagrange's method of undetermined multipliers, Gradient, Curl and Divergence and their basic properties, Directional Derivative.

Recommended Books:

- 1) H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002.
- 2) G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2007.
- 3) Zafar Ahsan: Differential Equations and Their Applications, Second Edition, Prentice Hall of India Private Limited, New Delhi.
- 4) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
- 5) Erwin Kreyszig: Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

Subject Code

Course

ALGEBRA-I

Subject Code: BNMCS1-104

L T P C

Duration: 45 Hrs.

3 0 0 3

Course Outcomes (CO's):

- CO1: Understand the concept of groups and its properties.
- CO2: Understand the concept of cyclic group, permutation group, groups of symmetries and apply the concepts of homomorphism, isomorphism.
- CO3: Analyze & demonstrate different types of algebraic structures such as subgroups, cyclic subgroups, cosets, and their properties.
- CO4: Understand the concept of normal subgroup and Lagrange's theorem.

Unit-I (11Hrs.)

Definition and examples of groups, examples of abelian and non-abelian groups, the group Z_n of integers under addition modulo n and the group $U(n)$ of units under multiplication modulo n , complex roots of unity.

Unit-II (10Hrs.)

Cyclic groups from number systems, the general linear group $GL_n(n, R)$, groups of symmetries of an isosceles triangle, an equilateral triangle, a rectangle, and a square, Homomorphism, Isomorphism, Automorphism, Permutation of group, Even and Odd permutation.

Unit-III (12Hrs.)

Subgroups, cyclic subgroups, the concept of a subgroup generated by a subset, and the commutator subgroup of a group, examples of subgroups include the center of a group, Cosets.

Unit-IV (12Hrs.)

Index of subgroup, Lagrange's theorem, order of an element, Normal subgroups: their definition, examples, and characterizations, Quotient groups.

Recommended Books:

1. John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.
2. M. Artin, Abstract Algebra, 2nd Ed., Pearson, 2011.
3. Joseph A Gallian, Contemporary Abstract Algebra, 4th Ed., Narosa, 1999.
4. George E Andrews, Number Theory, Hindustan Publishing Corporation, 1984.
5. Surjeet Singh and Qazi Zameeruddin, 'Modern Algebra.' 7th Ed, Vikas Publishing House, New Delhi, 1993.
6. Herstein, I.N., 'Topics in Algebra.' 2nd Ed, Vikas Publishing House, 1976.

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**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

MECHANICS LAB

Subject Code: BNMCS1-105

L T P C
0 0 4 2

Duration: 60Hrs.

Course Outcomes (COs): After the completion of the course, Student will be able to

- CO1: Use basic measurements tools like Vernier caliper, screw gauge etc.
- CO2: Find the Moment of Inertia of a Flywheel.
- CO3: Determine the Modulus of elasticity
- CO4: Learn about motion of Bar Pendulum and Kater's Pendulum.

List of Experiments:

1. Measurements of length (or diameter) using Vernier caliper, screw gauge and travelling microscope.
2. To determine the Height of a Building using a Sextant.
3. To determine the Moment of Inertia of a Flywheel.
4. To determine the Young's Modulus of a Wire by Optical Lever Method.
5. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
6. To determine the Elastic Constants of a Wire by Searle's method.
7. To determine g by Bar Pendulum.
8. To determine g by Kater's Pendulum.
9. To determine g and velocity for a freely falling body using Digital Timing Technique.
10. To study the Motion of a spring and calculate (a) Spring Constant (b) Value of g

Recommended Books:

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
2. Advanced level Physics Practical's, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.
3. Engineering Practical Physics, S. Panigrahi & B. Mallick, 2015, Cengage Learning India Pvt. Ltd.
4. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.

**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

OBJECT ORIENTED PROGRAMMING USING C++ LAB

Subject Code: BNMCSI-106

L T P C
0 0 4 2

Duration: 60 Hrs.

Course Outcomes:

- CO1: To learn programming from real world examples.
- CO2: To understand an object oriented approach for finding Solutions to various problems with the help of C++ language.
- CO3: To create computer based solutions to various real-world problems using C++.
- CO4: To learn various concepts of object oriented approach towards problem solving.

This laboratory course will comprise of following assignments and projects:

1. Write a program to enter mark of 6 different subjects and find out the total mark (Using Cin and Cout statement)
2. Write a function using reference variables as arguments to swap the values of pairs of integers.
3. Write a function to find the largest of three numbers.
4. Write a program to find the factorial of a number.
5. Define a class to represent a bank account which includes the following members as:

Data Members:	Member Functions:
a) Name of the depositor	a) To assign initial values
b) Account Number	b) To deposit an amount
c) Withdrawal amount	c) To withdraw an amount after checking the balance
d) Balance amount in the account	d) To display name and balance.

6. Write the above program for handling n number of account holders using an array of objects.
7. Write a C++ program to compute the area of right angle triangle, equilateral triangle, isosceles triangle using function overloading concept.
8. Consider an example of declaring the examination result. Design three classes: student, exam and result. The student has data members such as roll no, name. Create the class exam by inheriting the student class. The exam class adds data members representing the marks scored in 5 subjects. Derive the result from exam Class and it has its own data members like total, avg.
9. Write a program for overloading the Unary ++ operator.
10. Write a program for overloading of Binary + operator.
11. Write a program of Virtual Functions.
12. Write a program of Abstract Classes.
13. Write a program to read and write from a file.

Reference Books:

1. E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw-Hill.
2. Herbert Schildt, The Complete Reference C++, Tata McGraw-Hill.
3. Deitel and Deital, C++ How to program, Pearson Education.
4. Robert Lafore, Object Oriented Programming in Turbo C++, Galgotia Publications.
5. Bajane Stautrup, The C++ Programming Language, Addition, -Wesley Publication Co.
6. Stanley B. Lippman, Losee Lajoic, C++. Primer; Pearson Education.
7. D. Ravichandran, Programming with C++, Tata McGraw-Hill Publishing Company Ltd.

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ENVIRONMENTAL SCIENCE

Subject Code: BHSMC0-041

L T P C
3 0 0 3

Duration: 45 Hrs.

Course Objectives:

1. To familiarize the student with the basic concept of Environmental and Environmental Chemistry.
2. To elaborate the ecosystem and their properties.
3. To understand the concept of Environmental Pollution and its diverse effect of pollution.
4. To understand the concept of sustainable and unsustainable development and its importance.

Course Outcomes: On completion of this course, students will be able to:

- CO1: Understand the basics of Environment chemistry
- CO2: Analyze the general concept of ecosystem and their components.
- CO3: Comprehend the applicability of social issues and Environment,
- CO4: Recognize the Environment Pollution and control measures of urban and industrial wastes.

Unit-I (08 Hours)

The Multidisciplinary nature of environmental studies, Natural Resources: Renewable and non-renewable resources

Unit-II (15 Hours)

Natural resources and associated problems: a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.

Unit-III (12 Hours)

Ecosystems, Concept of an ecosystem, Structure and function of an ecosystem, Introduction, types, characteristic features of the ecosystems (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit- IV (10 Hours)

Environmental Pollution: Air pollution; Water pollution; Soil pollution

Recommended Books:

1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd, Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India.
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p.
5. Clark R.S., Marine Pollution, Clarendon Press Oxford.
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
8. Down of Earth, Centre for Science and Environment

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om: 45 Hrs.

**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

ELECTRICITY, MAGNETISM AND EMT

Subject Code: BNMCS1-201

L T P C

Duration: 60 Hrs.

4 0 0 4

Course Outcome (CO): After the completion of the course, Student will be able to

- CO1: Understand the concepts of vector Algebra.
- CO2: Understand the basic concepts of electrostatics
- CO3: Gain the knowledge about the basic concepts of magneto-statics
- CO4: Learn the concept of Maxwell equation and electromagnetic waves.

UNIT-I (15Hrs)

Electrostatics: Scaler and vector fields, gradient of scaler field, divergence and curl of vector field along with their significance. Gauss's divergence theorem, Stokes' theorem (statement only), Gauss's law and its applications: electric fields due to spherical charge distributions and finite flat sheets of charge. Poisson's and Laplace's equations and their applications.

Electric Field in matter: Free and bound charges, field of a polarized object, Physical interpretation of bound charges, Gauss's law in the presence of a dielectric. Relation between displacement vector and polarization.

UNIT-II (15Hrs)

Magnetostatics: Biot-Savart's law, divergence and curl of the magnetic field, magnetic vector potential, Ampere's Circuital law and its applications (solenoid and toroid), and the Hall Effect.

Magnetic Field in matter: Dia-, Para-, and Ferro-magnetic materials, torque and force on magnetic dipoles, effect of magnetic field on atomic orbits, domain theory of ferromagnetism, bound current (concept only), magnetization, magnetic induction, magnetic field intensity their interrelationship.

UNIT-III (15Hrs)

Sinusoidal and time varying fields, transformation of electric field from stationary to moving frame, Nature of electric field due to an accelerated charge force on a charge moving through an electric field in the above two frames. Transformation of and magnetic field from stationary to moving frame, Faraday Law and electromagnetic induction, Lenz's law, displacement current, mutual induction and reciprocity theorem, self-inductance, Coupling of electrical circuits.

UNIT-IV (15 Hrs)

Maxwell's equations and Electromagnetic wave propagation: Equation of continuity of current, Displacement current, Maxwell's equations, Poynting vector, energy density in electromagnetic field, electromagnetic wave propagation through vacuum and isotropic dielectric medium, transverse nature of EM waves, polarization.

Recommended Books:

1. Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education.
2. Mechanics Berkeley Physics course, volume.1: Charles Kittel, et. Al. 2007, Tata McGraw Hill.
3. Electricity and Magnetism, J.H. Fewkes & J. Yarwood. Vol. I, 1991, Oxford Univ. Press.
4. Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
5. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
6. D.J. Griffiths, Introduction to Electrodynamics, 3rd Edn, 1998, Benjamin Cummings

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DATA STRUCTURES AND FILE PROCESSING

Subject Code: BNMCSI-202

L T P C

Duration: 60Hrs

4 0 0 4

Course Outcomes:

- CO1: Use appropriate data structures for problem solving and programming.
- CO2: Understand basic data structures such as arrays, linked lists, stacks and queues and solve problems involving graphs, trees and heaps.
- CO3: Apply appropriate searching and/or sorting techniques for application development.
- CO4: Students will be able to identify and apply appropriate data structure to solve computational problems.

UNIT-I (14 Hrs.)

Introduction to Data Structures: Algorithms and flowcharts, basics analysis on algorithm, complexity of algorithm, introduction and definition of data structure, classification of data, arrays, various types of data structure, static and dynamic memory allocation, function and recursion.

Arrays, Pointers and Strings: Introduction to arrays- definition, one dimensional array and multidimensional arrays, pointer, pointer to structure, array and pointer, strings- introduction to strings, definition, library functions of strings.

UNIT-II (15 Hrs.)

Stack: Introduction to stack, definition, stack implementation, operations of stack, applications of stack, multiple stacks- implementation of multiple stacks.

Queue: Introduction to queue, definition, queue implementation operations of queue, circular queue, de-queue and priority queue.

UNIT-III (17 Hrs.)

Linked List: Introduction, representation and operations of linked lists, singly linked list, doubly linked list, circular linked list, and circular doubly linked list.

Tree: Introduction to tree, tree terminology binary tree, binary search tree, strictly binary tree, complete binary tree, tree traversal, threaded binary tree, avl tree.

Graphs: Introduction, representation to graphs, graph traversals, shortest path algorithms.

UNIT-IV (14 Hrs.)

File Organizations: Sequential, indexed sequential, direct, inverted, multi-list, directory systems, Indexing using B-tree, B+ tree and their variants, hashing – hash function, collision handling methods, extendible hashing.

Reference Books:

1. Horowitz & Sawhaney: Fundamentals of Data Structures, Galgotia Publishers.
2. Tenenbaum, Y. Lanhghsam and A. J. Augenstein, "Data Structures Using C and C++", Prentice Hall of India.
3. Seymour Lipschutz "Theory & Practice of Data Structures", McGraw Hill..

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**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

CALCULUS-II

Subject Code: BNMCSI-203

L T P C

Duration: 45 Hrs.

3 0 0 3

Course Outcomes:

- CO1: Apply the knowledge of advanced concepts of calculus in order to study theoretical development of different mathematical techniques and their applications.
 CO2: CO2: Develop the knowledge of computing arc length, area and volume by using integration. CO3: Understand the concept of integration and different kind of functions.
 CO3: CO4: Expand the knowledge of multiple integrals and vector integrals.

Unit-I (12Hrs.)

Arc formula for the Cartesian equation $y = (x)$, other expressions for lengths of arcs, Areas under curves, Area formulas for parametric, Polar equation, Area of the closed curve, Volume and surfaces of revolution of curves.

Unit-II (10Hrs.)

Definite integral, Properties of definite integral, Reduction formulae for integrals of rational, Trigonometric, Exponential and Logarithmic function and of their combinations.

Unit-III (12Hrs.)

Double integrals (Cartesian), Change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: Areas and volumes, Triple integrals (Cartesian), Simple applications involving cubes, Sphere and rectangular parallelepipeds.

Unit-IV (11Hrs.)

Scalar line integrals, Vector line integrals, Scalar surface integrals, Vector surface integrals, Theorems of Green, Gauss and Stokes.

Recommended Books:

1. G. B. Thomas, M. D. Weir, J. Hass: Thomas' Calculus (Twelfth Edition), Pearson Education.
2. Gorakh Prasad: Integral Calculus, Fourteenth Edition, Reprint 2007, Pothishala Private Limited, Allahabad.
3. Zafar Ahsan: Differential Equations and Their Applications, Second Edition, Prentice Hall of India Private Limited, New Delhi.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
5. Erwin Kreyszig: Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

Subject C

ALGEBRA-II

Subject Code: BNMCS1-204

L T P C
3 0 0 3

Duration: 45 Hrs.

Course Outcomes:

- CO1: Understand the concept of Ring and their properties.
- CO2: Apply the concepts of isomorphism, homomorphism, ideal and integral domain for rings to solve different types of problems.
- CO3: Access the idea of inner product space and determine its orthogonality on vector space.
- CO4: Understand the basic concepts of linear transformations, algebra of transformations, Eigenvalues and corresponding eigenvectors.

Unit-I (12Hrs.)

Definition and examples of a ring, its properties, Integral domains, Characteristics of ring, Division rings and Fields.

Unit-II (11Hrs.)

Subrings and ideals, Integral domains and fields, examples of fields: Z_p , Q , R , and C , Field of rational functions, Ring homomorphism, isomorphism, and related theorems.

Unit-III (12Hrs.)

Field of quotients, polynomial rings, Euclidean ideal domain, Euclidean domain, definition of fields and its properties, subfield

Unit-IV (10Hrs.)

Inner product, Length, Inner product spaces, Orthogonality, Orthogonal projections, Cauchy-Schwartz inequality, Gram-Schmidt orthogonalization process.

Recommended Books:

1. David S. Dummit and Richard M Foote, 'Abstract Algebra,' John Wiley & Sons, 2004.
2. Surjeet Singh and Qazi Zameeruddin, 'Modern Algebra.' 7th Ed, Vikas Publishing House, New Delhi, 1993.
3. Herstein, I.N., 'Topics in Algebra' 2nd Ed., Vikas Publishing House, 1976.
4. John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.

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**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

ELECTRICITY, MAGNETISM AND EMT LAB

Subject Code: BNMCS1-205

L T P C
0 0 4 2

Duration: 60 Hrs.

Course Outcome (CO): After the completion of the course, Student will be able to

- CO1: Take measurements by using Multimeter.
- CO2: Learn the measurement of charge, current and resistance using Method.
- CO3: Determine resonance in LCR circuit.
- CO4: Verify the Thevenin, Norton theorem and Maximum Power Transfer Theorem

List of Experiments:

1. To use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, and (d) checking electrical fuses.
2. Ballistic Galvanometer: (i) Measurement of charge and current sensitivity (ii) Measurement of CDR (iii) Determine a high resistance by Leakage Method (iv) To determine Self Inductance of a Coil by Rayleigh's Method.
3. To compare capacitances using De' Sauty's bridge.
4. Measurement of field strength B and its variation in a Solenoid (Determined B/dx).
5. To study the Characteristics of a Series RC circuit.
6. To study the a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor
7. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor.
8. To determine a Low Resistance by Carey Foster's Bridge.
9. To verify the Thevenin and Norton theorem
10. To verify the Superposition, and Maximum Power Transfer theorem.

Recommended Books:

1. Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, Asia Publishing House.
2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
3. Engineering Practical Physics, S.Panigrahi & B.Mallick, 2015, Cengage Learning India Pvt. Ltd.
4. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.

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**B.SC. NON-MEDICAL (COMPUTER SCIENCE)
STUDY SCHEME & SYLLABUS 2024 BATCH ONWARDS**

DATA STRUCTURES AND FILE PROCESSING LAB

Subject Code: BNMCSI-206

L T P C
0 0 4 2

Duration: 60 Hrs.

Course Outcomes:

- CO1: Students will understand and apply fundamental data structures like arrays, stacks, queues, linked lists, and trees.
- CO2: Students will analyze and implement efficient algorithms for searching, sorting, and traversing.
- CO3: Students will gain expertise in various file organization techniques and efficient file processing methods.
- CO4: Students will enhance their coding skills, particularly in dynamic memory management and complex data structure implementation.

This laboratory course will comprise of following programs:

1. Program to implement one-dimensional and multi-dimensional arrays.
2. Program to demonstrate static and dynamic memory allocation.
4. Program for implementing Stack using array.
5. Program for converting infix to postfix form.
6. Program for implementing Queue using array.
7. Program for implementing Binary Search Tree.
8. Program for implementing singly Linked list.
9. Program to perform tree traversal (in-order, pre-order, post-order).
10. Program for Breadth First Search (BFS) for graph traversal.
11. Program for Depth First Search (DFS) for graph traversal.
12. Program to process sequential and indexed sequential files.
13. Program to implement hash table with collision handling.

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**MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
2021 BATCH ONWARDS**

Semester 5th		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BGWDS1-501	Multimedia 2D & 3D Designing	3	1	0	40	60	100	4
BGWDS1-502	Lighting and Rendering	3	1	0	40	60	100	4
BGWDS1-503	Social media And Web Analytics	3	0	0	40	60	100	3
BGWDS1-504	Software Lab XV (Based on Multimedia 2D & 3D Designing Laboratory)	0	0	4	60	40	100	2
BGWDS1-505	Software Lab XVI (Based on Lighting and Rendering Laboratory)	0	0	4	60	40	100	2
BGWDS1-506	Software Lab XVII (Based on social media And Web Analytics)	0	0	4	60	40	100	2
BGWDS1-507	Mentoring and Professional Development	0	0	1	25	--**	25	1
YYYY	Department Elective – I	3	0	0	40	60	100	3
Total		12	2	13	365	360	725	21

** The Mentoring and Professional Development course will have internal evaluation only. (See guidelines at the last page of this file)

Department Elective –I Course Title:

Cyber Attack (BGWDD1-511)

Software Testing & Quality Assurance (BGWDD1-512)

Artificial Intelligence (BGWDD1-513)

**MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
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Semester 6th		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BGWDS1-601	Animation Art	3	1	0	40	60	100	4
BGWDS1-602	Motion Graphics & Compositing	3	1	0	40	60	100	4
BGWDS1-603	Introduction to Gaming	3	1	0	40	60	100	4
YYYY	Department Elective -II	3	0	0	40	60	100	3
BGWDS1-604	Software Lab-XVIII (Based on Animation Art)	0	0	4	60	40	100	2
BGWDS1-605	Software Lab-XIX (Based on Motion Graphics & Compositing)	0	0	4	60	40	100	2
BGWDS1-606	Software Lab -XX (Based on Introduction to Gaming)	0	0	4	60	40	100	2
BGWDS1-607	Project	0	0	2	60	40	100	1
BGWDS1-608	Mentoring and Professional Development	0	0	1	25	--**	25	1
Total		12	3	15	425	400	825	23

** The Mentoring and Professional Development course will have internal evaluation only. (See guidelines at the last page of this file)

Department Elective - II Course Title

Cyber Forensics (BGWDD1-611)

Machine Learning (BGWDD1-612)

Software Architectural & Design Pattern (BGWDD1-613)

5TH
SEMESTER

**MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
2021 BATCH ONWARDS**

MULTIMEDIA 2D & 3D DESIGNING

Subject Code- BGWDS1-501

L T P C

Total Hours: 60 hrs.

3 1 0 4

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8
CO1	Learn the tools and processes required to create simple animation of cartoons.	2	2	1	1	-	-	-	-
CO2	Create and animate any type of Graphic Design & cartoon in the software.	2	1	1	2	-	-	-	-
CO3	Gain knowledge about tools and interface of 2D & 3D animation software.	2	2	1	2	-	-	-	-
CO4	Learn about the mechanics of motion.	1	2	1	2	-	-	-	-

UNIT 1(14 Hrs.)

Introduction: An introduction of the various drawing and painting software tools and their uses and procedures. Working with timeline, key frames and frame rate. Shape Tween, Motion Tween and Symbols by using shape hints.

Bitmaps, Masks, Text and Special Effects:

Importing and modifying photos and bitmapped images.

UNIT II (15 Hrs.)

Character Animation and Inverse Kinematics Creating and animating armatures.

Sound, Layout and Final Production:

Importing sound files. Cuing and synchronizing sound with timeline animation. Lip Syncing to dialogue. Scene layout procedures and proper scene set up in preparation of final production.

UNIT III (17 Hrs.)

Character Animation: Explaining gestures, Role of expression, emotion in acting and animation.

Introductory exercises: creativity, ideas, inspiration for stories, acting methods. Getting into character: Acting exercises that illustrate personality and character. Situations & character-driven scenarios. Focus on Shape, Postures, Gestures & key poses

UNIT IV (14 Hrs.)

Working with the recorded voice: Accents, dialects, mouth movements & facial expressions: characterization & performance choices dialogue in Animation. Introduction timing and spacing:

MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
2021 BATCH ONWARDS

Directing skills, acting exercise, Timing for Acting how Timing is a very important principle for not only creating believable movements but also for creating more appealing in your animations.

Reference Books:

1. The Complete Digital Animation Course: The Principles, Practice and Techniques of Successful Digital Animation, Andy Wyatt, Thames & Hudson, 2010.
2. Cartoon Animation: (Collector's Series), Preston Blair, Walter Foster, 1994.

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**MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
2021 BATCH ONWARDS**

LIGHTING AND RENDERING

Subject Code- BGWDS1-502

L T P C

Total Hours: 60 hrs.

3 1 0 4

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Learn about the available lights in software for character designing.	2	2	1	1	-	-	-	-
CO2	Experiment with lighting using interior and exterior scenes.	1	1	1	2	-	-	-	-
CO3	Get a hand on experience of creating moods with lights.	2	2	1	2	-	-	-	-
CO4	Get clear idea of the rendering process of animation.	1	2	1	2	-	-	-	-

UNIT-I (14 Hrs.)

Fundamentals of Lighting Tools and light behavior: How light works in real world and difference between light in Real world & CG workspace. Introduction of light properties, moods.

Maya Shaders: Working with Shader - Working with Shader Properties - Ambient, Diffuse, Specular, Shininess etc.

UNIT-II (15 Hrs.)

Lighting in CG: Type of Light- Ambient Light, Directional Light, Point Light, Spotlight, Area Light, Volume light, Common attributes of lights- Type, Color, Intensity, Illuminates by Default, Emit Diffuse and Emit Specular,

Working with spotlight- Decay rate, working on Shadows, Depth Map and Retracing Shadows, Shadow Intensity and Color, Linking and Unlinking Lights.

UNIT-III (17 Hrs.)

Three Point light setup. Mental Ray Light- Mia photometric light, mia_physicalsun, mia_portal light etc. **Rendering:** Render Setup- Choosing a Filename, Image Format, Frame Range, Camera, Setting Resolution, selecting a Render Engine, Render Quality, Render View Window Saving /Loading an Image, Keeping/Removing Image.

UNIT-IV (14 Hrs.)

Introduction to Lighting, Mental Ray Physical Sun and Sky, Reflection and Refractions: Vector and Mental Ray, Mental Ray Settings, Global Illumination, Image Based Lighting, Mental Ray Physical Sun and Sky, Reflection and Refractions, Quality Settings- Sampling Mode, Number

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2021 BATCH ONWARDS

of Samples, Anti- aliasing Contrast, Multi-Pixel Filtering Heading, Sample Options, Caustic sand Photons.

Reference Books:

1. Introducing Autodesk Maya 2014, Dariush Derakhshani, Wiley, 2013.
2. Mastering Autodesk Maya 2012, Todd Palamar, Wiley India Private Limited, 2011.

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**MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
2021 BATCH ONWARDS**

SOCIAL MEDIA AND WEB ANALYTICS

Subject Code- BGWDS1-503

**L T P C
3 0 0 3**

Total Hours: 45 hrs.

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO 2	PO 3	PO4	PO5	PO6	PO7	PO8
CO1	Apply design principles and techniques to create visually appealing websites, graphics, and social media content.	2	2	1	1	-	-	-	-
CO2	Integrate social media strategies with web designing practices to optimize user engagement and brand visibility.	2	1	1	2	-	-	-	-
CO3	Analyze and evaluate the effectiveness of design strategies and social media campaigns using web analytics and metrics.	2	2	2	2	-	-	-	-
CO4	Integrate social media strategies with web design practices to enhance user engagement and brand visibility.	2	2	1	2	-	-	-	-

UNIT-I (9 Hrs.)

Introduction to social media marketing: platforms, strategies, trends, Content creation for social media: images, videos, info graphics, memes, Understanding audience behavior and preferences on social media

Social media analytics and metrics: measuring engagement, reach, and conversions.

UNIT-II (11 Hrs.)

Strategies for integrating social media elements into website design, Creating social media-friendly content and interfaces, Optimizing websites for social media sharing and engagement, Implementing social media sharing buttons, embedded feeds, and user-generated content

UNIT-III (13 Hrs.)

Introduction to web analytics tools: Google Analytics, social media insights Analyzing website traffic, user behavior, and social media engagement metrics, Evaluating the effectiveness of social media campaigns and design strategies, Using data-driven insights to optimize web design, content creation and social media marketing

MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
2021 BATCH ONWARDS

UNIT-IV (12 Hrs.)

Applying graphic design principles to digital media: posters, banners, social media graphics
Designing multimedia content for web and social media: animated GIFs, short videos, Techniques for visual storytelling and narrative design in digital marketing campaigns, Using typography and imagery effectively to convey brand messages and values

Reference Books:

1. Williams, R. (2014). The Non-Designer's Design Book. Peachpit Press.
2. Sponder, M. (2011). Social Media Analytics: Effective Tools for Building, Interpreting, and Using Metrics. McGraw-Hill Education.

**MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
2021 BATCH ONWARDS**

**SOFTWARE LAB XV (BASED ON MULTIMEDIA 2D & 3D DESIGNING
LABORATORY)**

Subject Code: BGWDS1-504

L T P C

Total Hours: 60 hrs.

0 0 4 2

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Learn about critical principles of animation like size and overlapping action.	2	2	1	1	-	-	-	-
CO2	Know about technical skills needed and support character animations for all 2D & 3D Animation.	2	1	1	2	-	-	-	-
CO3	Learn to animate the character the recorded voice in animation.	1	2	2	1	-	-	-	-
CO4	Learn about timing and spacing in animation	1	2	1	2	-	-	-	-

Instructions:

1. Assignment on adding life to characters using expressions.
2. Assignment on character eye movements, blinking, talking, and making various gestures.
3. Assignment on animate a character to depict a perfect normal human walk and run.
4. Assignment on human walk and run cycle with appropriate movement from head to toe.
5. Assignment on character to perform an action – Kicking a football - Jump over a small ditch/hole, climbing a wall – Opening a door, going out & then closing the door.
6. Assignment on character animation with perfect gestures, role of expression, emotion in acting.
7. Assignment on shape, Postures, Gestures & key poses of animation object.
8. Assignment on creating short animation scene by adding Accents, dialects, mouth movements & facial expressions.
9. Assignment on adding time frame keys in animation.
10. Assignment on creating design by mixing of Primary, Secondary and Tertiary Colors.
11. Assignment on text and as image combined with animate cartoons.

Reference Books:

1. Timing for Animation, Harold Whitaker, CRC Press, 2009
2. Basics Animation: Digital Animation, Andrew Chong, Bloomsbury Publishing India Private Limited, 2007

MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
2021 BATCH ONWARDS

SOFTWARE LAB XVI (BASED ON LIGHTING AND RENDERING LABORATORY)

Subject Code: BGWDS1-505

L T P C
0 0 4 2

Total Hours: 60 hrs.

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Gain the knowledge of using GI, FG, IBL, Raytraced reflections and refraction.	1	2	2	1	-	-	-	-
CO2	Learn about character designing and animation.	2	1	2	2	-	-	-	-
CO3	Learn about adding voice, songs and objects in the animation.	1	2	1	2	-	-	-	-
CO4	Know about the time and space in the animation.	1	2	1	2	-	-	-	-

Instructions

1. Assignment on lighting techniques in the animation.
2. Assignment on designing cartoon with hand and eye movements.
3. Assignment on Ambient & Diffuse animation.
4. Assignment on lights (Ambient Light, Directional Light, Point Light, Spot light, Area Light, Volume light)
5. Assignment on working with type of characters, Color & Intensity.
6. Assignment on animation by adding spot light- Decay rate, Cone Angle, Penumbra Angle, Drop-off, aiming lights.
7. Assignment on digital workflow (Digital black and white photography).
8. Assignment on Working on Shadows, Depth Map and Retracing Shadows.
9. Assignment on Lighting an Interior Scene.
10. Assignment on Render Setup with Image Format, Frame Range, Camera, Setting Resolution, Selecting a Render Engine, Render Quality.

Reference Books:

1. Advanced Maya Texturing and Lighting, Lee Lanier, Second Edition, Wiley Publishing Inc.
2. Exploring Autodesk Revit 2017 for Structure, Sham Tickoo/TIET, BPB publisher, 2017

**MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
2021 BATCH ONWARDS**

**SOFTWARE LAB XVII (BASED ON SOCIAL MEDIA AND WEB ANALYTICS
LABORATORY)**

Subject Code: BGWDS1-506

**L T P C
0 0 4 2**

Total Hours: 60 hrs.

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Integrate Social Media Strategies with Web Design	1	2	2	1	-	-	-	-
CO2	Optimize Websites for social media and Search Engines	2	1	2	2	-	-	-	-
CO3	Create Visual Content for Social Media Campaigns	1	2	1	2	-	-	-	-
CO4	Analyze Social Media Metrics to Inform Design Decisions	1	2	1	2	-	-	-	-

Instructions

1. Design a website layout for a fictional brand or organization, integrating social media elements such as sharing buttons, embedded feeds, and user-generated content.
2. Identify trends, patterns, and insights to inform website design decisions and social media marketing strategies.
3. Creating Visual Content for Social Media Campaigns
4. Designing Social Media Content Calendar and Strategy
5. Design a visual analytics dashboard to monitor and track key performance indicators (KPIs) for social media and web analytics.
6. Create multiple versions of ad creatives (e.g., images, videos, carousel ads) for a social media advertising campaign.
7. Design a gamified experience to drive user engagement on social media platforms.
8. Develop a visual content strategy for a social media campaign targeting a specific audience segment.
9. Redesign a website to be fully responsive and optimized for social media integration.
10. Create a logo, color palette, typography, and visual elements that reflect the brand's values and personality.

Reference Books:

1. Content Strategy for the Web, Halvorson, K., & Rach, M, 2012
2. The Non-Designer's Design Book, Williams, 2014

**MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
2021 BATCH ONWARDS**

CYBER ATTACK

Subject Code- BGWDD1-511

L T P C

Total Hours: 45 hrs.

3 0 0 3

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	To define cyber attack terminology and present various reports and trends.	2	2	1	1	-	-	-	-
CO2	To illustrate modus-operandi of well-known attacks and analyze their impacts.	2	1	1	2	-	-	-	-
CO3	To introduce ethical hacking and demonstrate assessment and testing practices.	2	2	1	2	-	1	-	-
CO4	To perform experimental analysis of various attack artifacts.	1	2	1	2	-	2	1	-

UNIT I (14 Hours)

Introduction: Cyber Threat, Definition of Cyber Crime, Classification, Current Threats and Trends, Diversity of Cyber Crime, Cyber Hate Crimes, Cyber Terrorism. Types of Cyber Attacks: Denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks, Manin- the-middle (MitM) attack, Phishing and spear phishing attacks, Drive-by attack, Password attack, SQL injection attack, Cross-site scripting (XSS) attack, Zero-day exploit, Eavesdropping attack, Malware attack, DNS Tunneling.

UNIT II (11 Hours)

Ethical Hacking: Ethical Hacking Concepts and Scopes, Threats and Attack Vectors, Information Assurance, Threat Modelling, Enterprise Information Security Architecture, Vulnerability Assessment and Penetration Testing.

UNIT III (10 Hours)

Attack Artifacts: Virus, Worm, Trojan horse, Rootkits, Botnet, Social Engineering: Types of Social Engineering, Social Engineering Targets and Defence Strategies, Logic Bomb, Time Bomb.

UNIT IV (10 Hours)

Malware and Keylogger Analysis: Malware Analysis and Investigation – Introduction to Malware – Static Malware Analysis - Mobile Phone Hacking & Penetration Testing - Introduction of Keylogger: Art of Spying.

References Books:

1. Protecting National Infrastructure by Edward Amoroso. 2010.
2. Martti Lehto, Pekka Neittaanmäki. Cyber Security: Analytics, Technology and Automation edited, International Publishing Switzerland 2015.

**MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
2021 BATCH ONWARDS**

SOFTWARE TESTING & QUALITY ASSURANCE

Subject Code- BGWDD1-512

**L T P C
3 0 0 3**

Total Hours: 45 hrs.

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Analyse different approaches to software testing and quality assurance	2	2	1	1	-	-	-	-
CO2	Analyse optimal solutions for different situations and projects.	1	2	1	2	-	-	-	-
CO3	Conduct independent research in software testing and quality assurance and apply that knowledge in their future research and practice.	2	2	1	2	-	1	-	-
CO4	Evaluate the work of peers constructively by following proven methods of peer-review, and by using the principles of research ethics.	1	2	1	2	-	1	2	-

Unit-I (10 Hrs.)

Testing Principles: Need of testing, Basic concepts—errors, faults, defects, failures, test bed, unit testing, integration testing system, system testing, regression testing, alpha, beta and acceptance testing, functional testing, performance testing, white box testing, black box testing, verification and validation

Unit-II (11 Hrs.)

Test Management: Testing Life Cycle—Roles and activities, Test Planning, Develop test plan review, Test Cases design strategies. Black box approach: random testing, equivalence class partitioning and boundary value analysis.

Unit-III (12 Hrs.)

Software Metrics: Scope of software metrics, Classifying software measures, Measurement basics – representational theory, scales, meaningfulness, What to measure—GOM technique, Control flow structure, product quality metrics – MTF, defect density, customer problems, customer satisfaction, function point.

Unit- IV (12 Hrs.)

Quality Standards: Basic concept of—ISO 9000 & 9001, CMM, six sigmas. Development of CMM—Following KPAs: requirements management (RM), software project tracking and oversight (SPTO), software configuration management (SCM), organization process definition (OPD), software product engineering (SPE), peer reviews (PR), quantitative process management (QPM), process change management.

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Recommended Books:

1. Glenford J. Myers, 'The Art Of Software Testing', 3rd Edn., Wiley, 2015

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2021 BATCH ONWARDS**

ARTIFICIAL INTELLIGENCE

Subject Code- BGWDD1-513

L T P C

Total Hours: 45 hrs.

3 0 0 3

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Understand the significance and domains of Artificial Intelligence and knowledge Representation.	2	2	1	1	-	-	-	-
CO2	Examine the useful search techniques; learn their advantages, disadvantages and Comparison.	2	1	1	2	-	1	-	1
CO3	Understand important concepts like Expert Systems, AI applications.	2	2	1	2	-	-	1	1
CO4	Be exposed to the role of AI in different areas like NLP, Pattern Recognition etc.	1	2	1	2	-	1	-	-

Unit-I (12 Hours)

Introduction: What is intelligence? Foundations of artificial intelligence (AI). History of AI. AI problems: Toy Problems, Real World problems- Tic-Tac-Toe, Water Jug, Question-Answering, 8-puzzle, 8-Queens problem. Formulating problems, searching for Solutions.

Knowledge Representation: Propositional Logic, Propositional Theorem Proving Inference and Proofs, Proof by Resolution, Horn Clauses and definite Clauses, Forward and Backward chaining; First order Logic, Inference in First Order Logic

Unit-II (11 Hours)

Uncertain Knowledge and Reasoning: Basic probability, Bayes rule, Belief networks, Default reasoning, Fuzzy sets and fuzzy logic.

Structured Knowledge: Associative Networks, Frame Structures, Conceptual Dependencies and Scripts.

Unit-III (12 Hours)

Uninformed Search strategies- Breadth-first search, Uniform-cost search, Depth-first search, Depth-limited search, Iterative deepening depth-first search, Bidirectional search, Comparing uninformed search strategies.

Informed (Heuristic) Search Strategies- Hill Climbing, Simulated Annealing, Genetic Algorithm, Greedy best-first search, A* and optimal search, Memory- bounded heuristic search.

Unit- IV (10 Hours)

Natural language processing: Grammars, Parsing.

Pattern Recognition: Recognition and Classification Process-Decision Theoretic Classification,

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2021 BATCH ONWARDS

Syntactic Classification; Learning Classification Patterns, Recognizing and Understanding Speech.

Recommended Books:

1. Linux: The complete reference by Richard Petersen, Published by Tata McGraw-Hill Publication.
2. Linux in a Nutshell: A Desktop Quick Reference, 6th Edition by Stephen Figgins, Arnold Robbins, Ellen Siever & Robert Love Published by O'Reilly Media

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2021 BATCH ONWARDS

**** Guidelines regarding Mentoring and Professional Development**

The objective of mentoring will be development of:

- Overall Personality
- Aptitude (Technical and General)
- General Awareness (Current Affairs and GK)
- Communication Skills
- Presentation Skills

The course shall be split in two sections i.e. outdoor activities and class activities. For achieving the above, suggestive list of activities to be conducted are:

Part – A (Class Activities)

1. Expert and video lectures
2. Aptitude Test
3. Group Discussion
4. Quiz (General/Technical)
5. Presentations by the students
6. Team building Exercises

Part--B (Outdoor Activities)

1. Sports/NSS/NCC
2. Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club, etc.

Evaluation shall be based on rubrics for Part – A & B Mentors/Faculty in charge shall maintain proper record student wise of each activity conducted and the same shall be submitted to the department.

6TH
SEMESTER

**MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
2021 BATCH ONWARDS**

ANIMATION ART

Subject Code- BGWDS1-601

**L T P C
3 1 0 4**

Total Hours: 60 hrs.

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO 4	PO 5	PO6	PO7	PO8
CO1	Learn the different mediums of Drawing and its importance for animation	3	1	3	1	-	-	-	-
CO2	Know about the different medium and techniques of drawing pencils and painting brushes.	3	1	3	2	1	1	-	-
CO3	Draw landscape with proper sketching sense, draw trees, plants, buildings, sky and to create the animation backgrounds.	3	1	2	1	1	1	-	-
CO4	Learn about the light and shadow and surface and texture sketching.	1	1	1	2	-	-	-	-

UNIT-I (17 Hrs.)

Introduction: Starting with the tools for drawing: Types of pencils:- (HB, B, 2B,4B, 6B,8B, 10B, 12B), Charcoal Pencil, Clutch Pencil. Sheets:-Cartridge, Hand Made, Ivory, Art Card, duplex, News Print, Mount board sheet etc. Colors:- Poster color, Water Color, Pastel color, Pencil Color, waterproof ink. Brushes:- Round and Flat.

Object Drawing: Principles of object drawing, Draw common shapes, forms on a Two Dimension (2D) surface with geometry - structure, surface and texture, perspective and points of view, Knowing about line and make effects that can build, definition of light and shadow on objects and an assignment.

UNIT-II (15 Hrs.)

Rendition of the effect of light on simple forms and objects mood changing, quality of surface, solidity, drama, and impact.

Viewpoint Drawing: Viewpoint Drawing. Theory of viewpoint, one point and two point perspective as applied to objects, furniture, interior and exteriors of the buildings, study of light and shade etc.

Unit-III (14 Hrs.)

Study of Living World: Drawing from Nature, Location drawing and learning to represent trees, plants, bushes, shrubs, insects, birds, and animals with attention to structure and morphology, proportion, volume, and behavior.

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UNIT-IV (14 Hrs.)

Human Creativity: Explanation to human figure drawing –Drawings from Mannequin, Sketching of person figure from outside as well as inside. To know and catch the signs of the human form, weight, balance, Rhythm and proportion.

Making Storyboard What is storyboard, usage of story board, drawing on storyboard, understand and draw movements of camera in story board.

Reference Books:

1. The Complete Book of Drawing Techniques: A Complete Guide for the Artist, Peter Stanyer, Arcturus Publishing, 2004.
2. Drawing for the Absolute and Utter Beginner, Watson- Gupill, 2018.

**MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
2021 BATCH ONWARDS**

MOTION GRAPHICS & COMPOSITING

Subject Code- BGWDS1-602

L T P C
3 1 0 4

Total Hours: 60 hrs.

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Learn the practical knowledge about broadcasting methods used in industry.	3	3	2	1	1	1	-	-
CO2	Learn the fundamentals of motion graphics and television related animations.	2	2	1	1	-	3	-	-
CO3	Animate the videos with effects.	3	3	3	1	1	1	3	-
CO4	Learn about Motion Graphics in detail.	2	2	3	1	-	-	-	-

UNIT-I (14 Hrs.)

Introduction to Motion Graphics: Briefing about compositing and its basic fundamentals. A round-up of broadcast design concepts, looking at specific examples of teasers, promos, typography, openers and pack shots. Introduction to Motion graphics and Principles of Motion Graphics. Workflow for creating motion graphics.

Introduction to Adobe after Effects: Basics of GUI and related terminologies, Managing and setting up workspace. Different file formats. Using project panel, Footage, Composition, Timeline, Effects and Presets. Importing and Organizing footages and files, Using Ram preview for playback.

UNIT-II (15 Hrs.)

Compositions and Layers: Creating, saving and back up of projects. Broadcasting fundamentals, Pixel aspect ratios, frame rates and various terminologies behind broadcasting. Trimming, Splitting and concept of in and out points. Layer stacks, modes and switches. Shape layers and solid layers. Mask and transparent layers. Pre-composing, nesting, and Pre-rendering.

Layer effects: Using color depth and HDR colors. Color correction and color adjustment. Color Management, color profiles and broadcast safe colors. Using layer markers, composition markers and XMP metadata. Using 3D layers and coordinate systems in Adobe after Effects. Light Layer, Null Layer and Adjustment Layer.

UNIT-III (17 Hrs.)

Animation and Dynamics: Animation basics in after effects. Introduction to graph editor. Applying, selecting, editing, moving, copying and deleting keyframes. Animating objects with Motion paths, motion blur and smoothing animation. Adding Randomness to key values. Learning Interpolation types like Linear, Bezier and Auto Bezier, Continuous Bezier Interpolation and Hold Interpolation. Controlling speed of the animation. Using time remapping and frame blending. Animating footage using Expressions.

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UNIT-IV (14 Hrs.)

Audio and Transitions: Fundamentals of Audio. Technical terminologies related to audio and Sound. Using Audio files, Synchronizing and editing audio, Controlling Pitch and Temp, Adding effects like Echo, Reverb etc. Separating Bass and Treble and Audio equalizing.

Rendering: Fundamentals of rendering and exporting, Using Render Queue. Using proxies. Exporting still images and sequences. Learning output formats, codec, compression ratios and other terminologies related to rendering. Converting footages from NTSC to Pal. Using Pull down.

Reference Books:

1. Broadcast Graphics on the Spot, Richard Harrington, Routledge, 1 Edition, 2017.
2. Adobe after Effects CC Classroom in a Book, Lisa Fridsma, Pearson Education, 1st edition, 2018. Emails and Transactional Emails, Drawbacks of Email Marketing.

**MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
2021 BATCH ONWARDS**

INTRODUCTION TO GAMING

Subject Code- BGWDS1-603

**L T P C
3 1 0 4**

Total Hours: 60 hrs.

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Know the entire development process from a concept to a final playable game, in an easier and simulated environment.	1	3	2	1	1	3	1	-
CO2	Know about video games, their various forms and the career options available within.	1	1	1	2	1	1	-	-
CO3	Know practically dabble in making small video games and get real-time experience of game development and create small playable segments of a game.	3	2	2	1	1	1	1	-
CO4	Know the electronic game design and development careers	1	1	2	2	3	1	-	-

Unit-I (14 hours)

Introduction to Gaming: Introduction to gaming. The definitions of “Game”. History, current affairs, popular titles of today, etc. Different Genres of gaming. Different platforms where games exist and how they differ.

Unit-II (15 hours)

Gaming Roles: Different roles that exist in Game Development. Some on Programming for games. A general overview of what fields exists inside programming for games and how, they differ.

Unit-III (17 hours)

Different theories of Game Designing: An introduction to different theories of fun and flow (Extremely basic to let them know there is a LOT to study about). Level Design: Various approaches: A description of different ways studios makes levels and real life examples of level design from Theme parks: a roller-coaster ride and a Disneyland “Haunted Mansion” to illustrate a level.

Unit-IV (14 hours)

Game Level designing in build Box: A case study of a popular game by the faculty to practically showcase all the concepts of game design and Elements that constitutes a game.

Reference Books:

1. Level Up! The Guide to Great Video Game Design, Scott Rogers John Wiley & Sons; 2nd edition, 2014

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2. The Art of Game Design: A Book of Lenses, Jesse Schell, A K Peters/CRC Press, 2edition, 2014

SOFTWARE LAB XVIII (BASED ON ANIMATION ART)

Subject Code- BGWDS1-604

**L T P C
0 0 4 2**

Total Hours: 60 hrs.

Course Outcomes (Cos) and mapping with program outcomes (POs)

Cos	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Create basic shapes and forms on a two-dimensional surface using geometry	3	2	2	1	1	1	-	-
CO2	Learn observation, visualization and visually experiencing the content.	2	1	3	1	1	1	-	-
CO3	Study about human figure for character drawing	3	3	3	1	-	-	-	-
CO4	Develop skills in digital drawing and animation techniques, including keyframing, tweening, rigging, and character animation.	1	2	1	1	1	1	1	1

Instructions:

1. Assignment on sketching by using Drawing pencils:- (HB, B, 2B,4B, 6B,8B, 10B, 12B), Charcoal Pencil, Clutch Pencil.
2. Assignment on drawing scenery by using colors (poster color, Water Color, Pastel color, Pencil Color, waterproof ink).
3. Assignment on poster designs with shades by using sheets (Cartridge, Hand Made, Ivory, Art Card, duplex, News Print, Mount board sheet etc.).
4. Assignment on Round and Flat brush painting.
5. Assignment on design based on geometry - structure, surface and texture.
6. Assignment on light and shadow on objects and an assignment.
7. Assignment on design based on objects mood changing, quality of surface, solidity, drama, and impact.
8. Assignment on one point and two point perspective.
9. Assignment on furniture, interior and exteriors of the buildings Designs.
10. Assignment on drawing Nature & Location scene.
11. Assignment on Design based on light and shade of the pencils and brushes.

Reference books:

1. Sketching for Animation: Developing Ideas, Characters and Layouts in Your Sketchbook, Peter

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Parr, Fairchild Books, 2016.

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SOFTWARE LAB XIX (BASED ON MOTION GRAPHICS & COMPOSITING)

Subject Code- BGWDS1-605

L T P C
0 0 4 2

Total Hours: 60 hrs.

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Learn about the color keying, tracking and the Effects panel in After effects.	2	3	3	1	1	1	-	-
CO2	Learn about the color keying, tracking and the Effects panel in After effects.	2	3	3	1	1	1	-	-
CO3	Edit or create animation, dynamics and composition for visual effects.	1	2	2	1	1	1	-	-
CO4	Know about audio and rendering after implementation of visual effects on footage	1	2	3	1	1	2	1	1

Instructions:

1. Assignment on A round-up of broadcast design concepts.
2. Assignment on designing teasers, promos, typography, openers and pack shots with motion effects
3. Assignment on short logo motion video using project panel.
4. Assignment on motion video of poster using Footage, Composition, Timeline, Effects and Presets.
5. Assignment on workflow for creating motion graphics.
6. Assignment on editing video with managing and setting up workspace.
7. Assignment on combining different motion effects together (text effect & background).
8. Assignment on one point and two point perspective.
9. Assignment on project panel, Footage, Composition, Timeline, Effects and Presets.
10. Assignment on editing short text motion video with layer effect (by using color depth and HDR colors)

Reference Book:

1. Motion Graphics with Adobe Creative Suite 5 Studio Techniques, Richard Harrington, Adobe Press; 1 edition, 2010.

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SOFTWARE LAB XX (BASED ON INTRODUCTION TO GAMING)

Subject Code- BGWDS1-606

L T P C
0 0 4 2

Total Hours: 60 hrs.

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO 1	Learn the elements of game mechanics	1	3	2	1	1	3	1	-
CO 2	Know about game testing.	1	1	1	2	1	1	-	-
CO 3	Know about the entire game designing process from the concept to final playable game.	3	2	2	1	1	1	1	-
CO 4	Know about Game Assets Development, efficient Import/ Export of assets for Games.	1	1	2	2	3	1	-	-

Instructions:

1. Assignment on creating Gaming background by adding background.
2. Assignment on theme based character visualization design.
3. Assignment on designing realistic, Semi Realistic cartoons.
4. Assignment on designing the gaming props, weapons and accessories according to the theme.
5. Assignment on game theme and creating game map according to scene.
6. Assignment based on layout designing, creating illustrations for levels.
7. Assignment based on Audio Formats- Digital and Analogue practical assignments and practice.
8. Assignment on Game Environment design.
9. Assignment based on creating architecture stuff based on the theme of the game.
10. Assignment based on compiling the scene of the game.

Reference Book:

1. Creating 3D Game Art for the iPhone with Unity: Featuring modo and Blender pipelines, Wes McDermott, Routledge, 1 edition, 2010

**MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
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CYBER FORENSICS

Subject Code- BGWDD1-611

L T P C

Total Hours: 45 hrs.

3 0 0 3

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO7	PO8
CO 1	Understand the fundamentals of Cyber-crimes and analyze its impact on the society.	1	3	1	2	1	3	3	2
CO 2	Examine the evidence collected and apply it for the reconstruction of past events.	1	1	3	2	2	2	3	1
CO 3	Understand the legal and ethical aspects of Cyber-crimes.	1	3	1	2	1	3	3	2
CO 4	Design and develop a security architecture for an organization.	2	2	3	1	2	3	3	2

UNIT I (10 Hours)

Overview of Cyber Crime: Nature and Scope of Cyber Crime, Types of Cyber Crime, Introduction to Cyber forensics: Information Security Investigations, Corporate Cyber Forensics, Scientific method in forensic analysis, investigating large scale Data breach cases. Analyzing malicious software.

UNIT II (12 Hours)

Types of Computer Forensics Systems: Internet Security Systems, Intrusion Detection Systems, Firewall Security Systems, Storage Area Network Security Systems, Network Disaster Recovery Systems, Public Key Infrastructure Systems, Wireless Network Security Systems, Satellite Encryption Security Systems, Instant Messaging (IM) Security Systems, Net Privacy Systems, Identity Management Security Systems, Identity Theft, Biometric Security Systems.

UNIT III (14 Hours)

Ethical Hacking: Essential Terminology, Windows Hacking, Malware, Scanning, Cracking. Digital Evidence in Criminal Investigations: The Analog and Digital World, Training and Education in digital Ethical Hacking: Essential Terminology, Windows Hacking, Malware, Scanning, Cracking. Digital Evidence in Criminal Investigations: The Analog and Digital World, Training and Education in digital evidence, Evidence Collection and Data Seizure: Why Collect Evidence, Collection Options Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collection, Artifacts.

UNIT IV (9 Hours)

Identification of Data: Timekeeping, Forensic Identification and Analysis of Technical Surveillance Devices, Reconstructing Past Events: How to Become a Digital Detective, Useable

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File Formats, Unusable File Formats, Converting Files, Investigating Network Intrusions and Cyber Crime, Network Forensics and Investigating logs, Investigating network Traffic, Investigating Web attacks, Router Forensics. Cyber forensics tools and case studies.

Reference Books:

1. John R VACCA, Computer Forensics: Computer Crime Scene Investigation, Firewall Media, 2009 edition Reprint 2012.
2. Bill Nelson, Amelia Phillips, Christopher Stuart Cengage, Guide to Computer Forensics and Investigations, Learning publications, latest edition.

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MACHINE LEARNING

Subject Code- BGWDD1-612

L T P C

Total Hours: 45 hrs.

3 0 0 3

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Know about the Learning methodologies of Artificial Neural Networks	2	3	3	1	2	3	-	-
CO2	Learn the concept of clustering	2	2	3	1	1	2	-	-
CO3	Differentiate supervised and unsupervised learning	2	2	2	1	1	1	1	-
CO4	Understand the concept of Reinforcement learning	1	1	2	2	-	-	-	-

Unit-I (8 Hours)

Introduction: What is Machine Learning, Unsupervised Learning, Reinforcement Learning Machine Learning Use-Cases, Machine Learning Process Flow, Machine Learning Categories, Linear regression and Gradient descent.

Unit-II (14 Hours)

Supervised Learning: Classification and its use cases, Decision Tree, Algorithm for Decision Tree Induction: Creating a Perfect Decision Tree, Confusion Matrix, Random Forest. What is Naïve Bayes, How Naïve Bayes works, Implementing Naïve Bayes Classifier, Support Vector Machine, Illustration how Support Vector Machine works, Hyper parameter Optimization, Grid Search Vs Random Search, Implementation of Support Vector Machine for Classification.

Unit-III (11 Hours)

Clustering What is Clustering & its Use Cases, K-means Clustering, How Kmeans algorithm works, C-means Clustering, Hierarchical Clustering, How Hierarchical Clustering works.

Unit- IV (12 Hours)

Why Reinforcement Learning, Elements of Reinforcement Learning, Exploration vs Exploitation dilemma, Epsilon Greedy Algorithm, Markov Decision Process (MDP) Q values and V values, Q – Learning, α values.

Recommended Books:

1. Pattern Reorganization and Machine learning by Christopher M. Bishop.
2. The elements of Statistical learning by Jeromeh. Friedman, Robert Tivshirani and Trevorhaspie.
3. Introduction to Machine Learning by Ethem Alpaydin. PHI Publisher.

**MRSPTU B.SC. (GRAPHICS AND WEB DESIGNING) SYLLABUS
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SOFTWARE ARCHITECTURAL & DESIGN PATTERN

Subject Code- BGWDD1-613

L T P C
3 0 0 3

Total Hours: 45 hrs.

Course Outcomes (Cos) and mapping with program outcomes (POs)

COs	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Design and implement codes with higher performance and lower complexity.	2	2	2	1	1	-	-	-
CO2	Be aware of code qualities needed to keep code flexible	2	3	3	1	1	1	3	-
CO3	Capable of applying these principles in the design of object-oriented systems.	2	3	2	1	1	2	-	-
CO4	Demonstrate an understanding of a range of design patterns.	2	3	2	1	1	2	2	-

Unit-I (12 Hours)

Introduction: Introduction to design pattern, describing design patterns, the catalog of design pattern, organizing the catalog, how design patterns solve design problems, how to select a design pattern, how to use a design pattern. object-oriented development, key concepts of object-oriented design, other related concepts, benefits and drawbacks of the paradigm.

Unit-III (11 Hours)

Analysis a System: Overview of the analysis phase, stage 1: gathering the requirements functional requirements specification, defining conceptual classes and relationships, using the knowledge of the domain. Design and Implementation, discussions and further reading.

Unit- III (13 Hours)

Interactive systems and the MVC architecture: Introduction, The MVC architectural pattern, analyzing a simple drawing program , designing the system, designing of the subsystems, getting into implementation, implementing undo operation , drawing incomplete items, adding a new feature , pattern based solutions.

Unit- IV (9 Hours)

Designing with Distributed Objects: Client server system, java remote method invocation, implementing an object-oriented system on the web (discussions and further reading) a note on input and output, selection statements, loops arrays.

Recommended Books:

1. Object-oriented analysis, design and implementation, brahma dathan, sarnath rammath, universities press, 2013
2. Design patterns, erich gamma, Richard helan, Ralph johman, john vlissides, PEARSON Publication, 2013

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**** Guidelines regarding Mentoring and Professional Development**

The objective of mentoring will be development of:

- Overall Personality
- Aptitude (Technical and General)
- General Awareness (Current Affairs and GK)
- Communication Skills
- Presentation Skills

The course shall be split in two sections i.e. outdoor activities and class activities. For achieving the above, suggestive list of activities to be conducted are:

Part – A (Class Activities)

1. Expert and video lectures
2. Aptitude Test
3. Group Discussion
4. Quiz (General/Technical)
5. Presentations by the students
6. Team

building

Exercises Part

– B (Outdoor

Activities)

1. Sports/NSS/NCC
2. Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club, etc.

Evaluation shall be based on rubrics for Part – A & B Mentors/Faculty in charge shall maintain proper record student wise of each activity conducted and the same shall be submitted to the department.

Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001



FACULTY OF ARCHITECTURE AND PLANNING
SYLLABUS
FOR
INTEGRATED/DUAL DEGREE BFA-MFA (APPLIED ARTS)
2023 BATCH ONWARDS

Note: (i) Copy rights are reserved.

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Defaulters will be prosecuted.

(ii) Subject to change in the syllabi at any time.

Please visit the University website time to time.

Significance of Integrated Degree BFA -MFA

BFA MFA (Bachelor of Fine Arts and Master of Fine Arts) is a five-year programme that combines a bachelor's and master's degree in the same field. The dual degree programme of Bachelor of Fine Arts and Master of Fine Arts allows students to gain expertise and experience in a variety of specializations. BFA MFA are abbreviations for Bachelor of Fine Arts and Master of Fine Arts, respectively. Drawing, sculpture, cinematography, writing, and animation etc. are among the subjects covered in the (BFA) degree programme. The Master of Fine Arts (MFA) is a postgraduate degree programme that focuses on visual and performing arts. The BFA MFA dual degree is a bachelor's and master's degree in fine arts that covers all aspects of the particular field, The BFA MFA programme is designed to assist creative people to develop their skills so that they can create more significant, intriguing, and polished art forms.

Benefits & Scope of Integrated Degree BFA-MFA

BFA MFA degree not only trains but also improves students' capabilities, enabling them towards becoming artists in their desired field. An individual obtains a sense of the professional world after obtaining a BFA MFA degree. Individuals with a BFA MFA can develop and utilize visual and performing arts talents, as well as pursue a variety of employment options. Students who successfully complete this dual degree programme can work in marketing, manufacturing, art studios, publishing companies, magazines, and a number of other industries.

What Integrated Degree BFA- MFA(Applied Art) is all about:

A Bachelor of Fine Arts (Applied Arts) and Master of Fine Arts (Applied Arts) is a degree that produces design professionals artist. This degree will help a student to become a part of a growing employment sector which is visual arts and design. This program offers students an overall view of the creative industry. The program serves as a creative and academic knowledge for artist-designers and scholars and gives an edge over regular program. It focuses on refinement of ability to conceptualize and strategize contextual solutions within all realms of communications, and specifically within visual integrated domains.

It propels to investigate and integrate within a range of techniques, crafts, and knowledge, of various forms of arts to apply them efficiently for various communication requirements, within society in general and industry.

It brings awareness about the latest Digital publishing techniques and Print Technology for optimisation of outputs on parameters of visual results and economy.

Name of Degree - Integrated BFA- MFA(Applied Art)

Duration – 5 Year (10 Semesters)

Degree Level - Under Graduation / Post Graduation

Total Seats - 30

Course Eligibility - Aspiring candidates should have completed 10+2 in any stream with 50% marks or 45% for St Category from any recognized institution board.

10th and Art & Craft two years Diploma from any recognized (University or College.)
Institute.

Lateral Entry - 12th and Art & Craft two years Diploma with 50% marks for Gen. or 45% for St Category from any recognized institution board.

Reservation Policy- As per Punjab govt. norms.

Fee Structure - As per university norms and rules.

With Exit Policy - BFA (Bachelor in Fine Arts) Degree in Applied Arts after 4 year
Advanced Diploma in Applied Arts after 3 year
Diploma after 2 year Certificate Course after 1 year

**Integrated/ Dual Degree BFA- MFA(Applied Art)
Career Employment and Job Areas**

The most essential employment options available to students with a BFA MFA dual degree.

- **Animator:** Animators create films for advertisements, computer games, music videos, and websites using sequential pictures of drawings, puppets, and models. They are frequently employed in media and publishing companies. They play a crucial role in visual media. They can also operate as independent contractors.
- **Cartoonist:** Cartoonists use sketchbooks or computers to create cartoons or drawings. Magazines, newspapers, publishing businesses, print and digital media, game companies, and studios all. A cartoonist may specialize in political commentary, comic strips, installation guides, or user manuals.
- **Photographer:** Photographers capture moments in time to create memories and make them unforgettable. They use digital and film cameras and equipment to shoot people, landscapes, products, and other subjects.
- **Graphic Designer:** Graphic designers play a critical role in helping businesses who use art to connect with their customers. They can work for ad agencies, public relations firms, product packaging firms, and publishing houses etc.

**How is Integrated/ Dual Degree BFA- MFA(Applied Art)
Beneficial other than Jobs?**

- This degree course enables the students to go for Fine Arts programs as the creative arts that includes miniature artworks, cultural heritage themes, composition, portraiture, and visual arts.
- It paves the way for higher degree programs in respective subjects, e.g., M.Phil.PhD Degree, etc.
- Third, another place where candidates can find jobs; include artist in residence, developing art-related activities in schools, hospitals, prisons, or bidding for fixed-term funding to carry out a project or commission.

**MRSPTU INTEGRATED/DUAL DEGREE BFA –MFA (APPLIED ARTS) SYLLABUS
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SCHEME

1 st Semester		Type of course	Contact Hrs.				Marks			Credits	Duration of Exam. Hrs.
Subject Code	Subject		L	S	T	P	Int.	Ext	Total		
BMFAS1-101	History of Indian Art (Pre- Historic to 6 th Cent)	Core	2	-	-	-	40	60	100	2	3
BMFAS1-102	Fundamentals of Applied Art	Core	2	-	-	-	40	60	100	2	3
BMFAS1-103	Communication Skills	Skill	2	-	-	-	40	60	100	2	3
BMFAS1-104	Drawing & Painting	Skill	1	4	-	4	60	40	100	5	No Exam (External Viva Voce)
BMFAS1-105	Letter Writing	Skill	1	4	-	4	60	40	100	5	No Exam (Viva-voce on portfolio)
Disciplinary Elective - I (Any one of the Following)											
BMFAD1-111	Clay Modeling	Disciplinary Elective -I	1	2	-	4	60	40	100	4	No Exam (Viva-voce on portfolio)
BMFAD1-112	New Media										
Disciplinary Elective - II (Any one of the Following)											
BMFAD1-121	2 D-Design	Disciplinary Elective -II	1	2	-	4	60	40	100	4	No Exam (Viva-voce on portfolio)
BMFAD1-122	Print Making										
Total			10	12	-	16	360	340	700	24	-----

*Minimum 4 Expert Lectures to be conducted.

**One week compulsory workshop during semester.

***Educational Tour of duration up to 04 days during the semester may be undertaken.

**MRSPTU INTEGRATED/DUAL DEGREE BFA –MFA (APPLIED ARTS) SYLLABUS
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Total Contact Hours = 34

Total Marks = 700

Total Credits = 24

2 nd Semester		Type of course	Contact Hrs.				Marks			Credits	Duration of Exam. Hrs.
Subject Code	Subject		L	S	T	P	Int.	Ext	Total		
BMFAS1-201	History of Modern Art (18th cent. To 20th cent.)	Core	2	-	-	-	40	60	100	2	3
BMFAS1-202	Principle of Art	Core	2	-	-	-	40	60	100	2	3
BMFAS1-203	Computer Graphics (Level-1)	Skill	2	2	-	2	60	40	100	4	No Exam (Internal Viva-voce)
BMFAS1-204	Product Design	Skill	2	2	-	2	60	40	100	4	6* (Evaluation by External Viva-voce)
BMFAS1-205	Calligraphy	Skill	2	2	-	2	60	40	100	4	No Exam (Internal Viva-voce)
Disciplinary Elective-III (Any one of the Following)											
BMFAD1-211	Geometry & Perspective	Disciplinary Elective -III	2	2	-	2	60	40	100	4	No Exam (Internal Viva-voce)
BMFAD1-212	Photography										
Disciplinary Elective-IV (Any one of the Following)											
BMFAD1-221	3 D-Design	Disciplinary Elective -IV	2	2	-	2	60	40	100	4	No Exam (Internal Viva-voce)
BMFAD1-222	Screen Printing										
Total			14	10	-	10	380	320	700	24	-----

*03+03 hours with one hour break of subject Product Design (BMFAS1 -204).

** Minimum 4 Expert Lectures to be conducted.

***One week compulsory workshop during semester

***Educational Tour of duration up to 04 days during the semester may be undertaken.

**MRSPTU INTEGRATED/DUAL DEGREE BFA –MFA (APPLIED ARTS) SYLLABUS
2023 BATCH ONWARDS**

Total Contact Hours = 35

Total Marks = 600

Total Credits = 23

3 rd Semester		Type of course	Contact Hrs.				Marks			Credits	Duration of Exam. Hrs.
Subject Code	Subject		L	S	T	P	Int.	Ext	Total		
BMFAS1-301	Advertising Art and Ideas-I	Core	3	-	-	-	40	60	100	3	3
BMFAS1-302	Computer Graphics (Level-2)	Skill	1	4	-	4	60	40	100	5	No Exam (External Viva-voce)
BMFAS1-303	Corporate Identity	Skill	1	4	-	4	60	40	100	5	No Exam (Internal Viva-voce)
BMFAS1-304	3D- Modelling	Skill	1	4	-	4	60	40	100	5	No Exam (External Viva-voce)
Disciplinary Elective-V (Any one of the Following)											
BMFAD1-311	Punjab Art and Culture	Disciplinary Elective -V	3	-	-	-	40	60	100	3	3
BMFAD1-312	Art of 20 th Century										
Open Elective-I (Select any one)			2	-	-	-	40	60	100	2	3
Total			11	12	-	12	300	300	600	23	-

* Minimum 4 Expert Lectures to be conducted.

**One-week compulsory workshop during semester

***Educational Tours of duration up to 04 days may be undertaken during the semester.

****Art Festival shall be conducted of duration up to 04 days during the semester.

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Total Contact Hours = 26

Total Marks = 400

Total Credits = 18

4 th Semester		Type of course	Contact Hrs.				Marks			Credits	Duration of Exam. Hrs.
Subject Code	Subject		L	S	T	P	Int.	Ext	Total		
BMFAS1-401	Seminar	Core	4	-	-	-	40	60	100	4	No Exam (Internal Viva-voce)
BMFAS1-402	Fresco Mural	Core	1	4	-	4	60	40	100	5	No Exam (Internal Viva-voce)
Inter-Disciplinary Elective (Any one of the Following)											
BMFAD1-411	Art and Indian Aesthetics - I	Inter-Disciplinary Elective	4	-	-	-	40	60	100	4	3
BMFAD1-412	Art and Western Aesthetics –I										
Disciplinary Elective-VI (Any one of the Following)											
BMFAD1-421	Study from Life	Disciplinary Elective -VI	1	4	-	4	60	40	100	5	No Exam (External Viva-voce)
BMFAD1-422	Illustration										
Total			10	8	-	8	200	200	400	18	-

* Minimum 4 Expert Lectures to be conducted.

**One-week compulsory workshop during semester

***Educational Tour of duration up to 04 days may be undertaken during the semester.

FIRST SEMESTER

HISTORY OF INDIAN ART (Pre Historic to 6th cent)

Subject Code: BMFAS1 -101

**L S T P C
2 0 0 0 2**

Duration: 30 Hrs.

Course Objectives:

Define several major areas in the history of Indian art

1. Identify aesthetic traits found throughout Indian art
2. To intended to familiarize the student to ancient Indian art traditions and stimulate an interest for the appraisal of ancient aesthetics.

Course Outcomes:

1. The course will enable the student to appreciate the ancient aesthetics and knowledge of construction, and also stimulate interest to know the subject in detail.
2. The course helps to develop observational & systematic analytical skills and have their own opinions on different projects.
3. Students can relate present Indian and western art to the ancient Indian art.
4. The prehistoric and proto-historic phases are presented as background for the emergence of art activity in succeeding periods.
5. The course surveys through phases of Indian art as well as various forms of art.

UNIT-I (7 Hrs)

Pre- Historic Rock shelters in India

1. Bhima- Bhetaka (Location, Discovery, Rock Paintings, Technique, Subject matter)

UNIT-II (8 Hrs)

Early medieval cave paintings in India

1. Ajanta Caves (Location, Discovery, Phases of Development, Technique, Subject and Characteristics, Murals) Bagh Caves (Location, Excavation, Subject and Characteristics, Technique, Murals)

UNIT-III (7 Hrs)

1. Indus Valley Civilization (Town Planning, Sculpture, Seals)
2. Maurayan Art (Transition from wood to stone, Sculptures, Pillars, Symbols and Motifs used)

UNIT-IV (8 Hrs)

1. Bharhut (Location, Reliefs and Sculptures, Subject Matter)
2. Sanchi (Structure of Stupa, Location, Relief Carvings, Subject Matter)

Recommended Text Books/Reference Books:

S.No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Zimmer. H.	Art of Indian Asia	2001	Princeton University Press
2	A.K. Coomaraswamy.	History of Indian and Indonesian Art	2009	Munshiram Manoharlal New Delhi
3	B. Rowland	Art & Architecture of Indian	1998	Penguin Books, Melbourne
4	A.K. Coomaraswamy.	Introduction to Indian Art	1988	Munshiram Manoharlal New Delhi
5	Moti Chander	Studies in Early Indian Painting	1969	Asia Publishing House

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6	W.G. Archer	Indian Paintings in the Punjab Hills	1973	Victoria & Albert Museum, London
7	-	Lalit Kala Akademi	1997	New Delhi, Publications of Indian Modern Art
8	-	Cultural History of Indian	2011	Bhartiya Vidya Bhavan Publication.
9	S.K.Sarswati	A survey of Indian Sculpture	2001	Firma K.L. Mukhopadhyay, Calcutta
10	Percy Brown	Indian Architecture	2009	D.B. Taraporevala, Bombay
11.	BenjaminRowland	ThePelicanhistoryofArt	1998	PenguinBooks Ltd)
12.	LCSharma	ABriefHistoryofIndianPainting	1988	KrishnaPrakashanMeerut
13.	EdithTömöry	HistoryofFineArts in India&theWest	1969	OrientLongman,Bombay
14.	StellaKramrisch	IndianSculpture	1973	Motilal Banarsidaspvt ltdDelhi)

List of Assignments/Tests:

- 1 Submission of two Assignments on given topic.
- 2 Submission of one Assignment with presentation.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing six questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (at least one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

FUNDAMENTALS OF APPLIED ART

Subject Code: BMFAS1 -102

**L S T P C
2 0 0 2**

Duration: 30Hrs.

Course Objectives:

1. This course is the basic introduction to applied art, its history, potential and limitations.
2. The objective of this course is to provide students with a fundamental understanding of advertising art in business, branding and society.

Course Outcomes:

1. Students will understand and use correctly most of the special terms used in the field of applied art.
2. Understand the use of good design and composition principles in solution to problems.
3. Able to interpret visual communication through design.
4. Understand the application of basic principles and elements of design. Typography Calligraphy Monograms Symbol, Trade Mark, Monograms, Logo Type, Book Cover & Poster.
5. Students examine various definitions of design elements and principals.

UNIT-I (7 Hrs)

1. Elements of Art
2. Principles of Art.

UNIT-II (8 Hrs)

Design :

1. Origin of design
2. Elements of design
3. Principles of design

UNIT-III (7 Hrs)

1. Perspective
2. Techniques of various mediums.
3. Rendering with different mediums.

UNIT-IV (8 Hrs)

Color Theory :

1. Primary Colors
2. Secondary Colors
3. Complementary Colors

Recommended Text Books/Reference Books:

S. No.	Name of Authors	Titles of the Book	Name of the Publisher
1.	BrunoMunari	Design As Art(1966)	Bruno Munari
2.	Alex Fowkes	Drawing Type	Rockport
3.	AlinaWheeler	Designing Brand Identity: An Essential Guide for the Whole Branding Team	John Wiley & Sons
4.	Jens Müller and Julius Wiedemann	Logo Modernism	Taschen
5.	Robert Bringhurst	The Elements of Typographic Style	Hartley & Marks
6.	Sarah Hyndman	Why Fonts Matter	Virgin Books

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7.	Alison Branagan	The Essential Guide to Business for Artists and Designers	Bloomsbury Publishing India Pvt Ltd New Delhi
8.	Pedro J. Lemos	Applied Art: Painting, Design, and Handicraft	Pedro J. Lemos
9.	Bernd Schultz Nuremberg, Germany	Allan Wexler: The Fine Art of Applied Art	Bernd Schultz Nuremberg, Germany
10.	Aryan, Kamla C.	Simplified Applied Art: Reference Book on Human Anatomy and Lettering in English and Hindi for Commercial Artists	Rekha Prakashan
11.	Thames Hudson)	The Poster: A Visual History	Gill Saunders & Margaret Timmers
12.	Colin Salter	100 Posters that Changed the World	Pavilion
13.	Alina Wheeler	Designing Brand Identity: An Essential Guide for the Whole Branding Team	John Wiley & Sons)

Assignment :

1. Submission of two Assignments on given topic.
2. Submission of one Assignment with presentation.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (at least two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

COMMUNICATION SKILLS

Subject Code: BMFAS1 -103

**L S T P C
2 0 0 0 2**

Duration:30 Hrs.

Course Objectives:

1. To enhance the learner's communication skills by giving adequate exposure in listening, speaking, reading and writing skills and the related sub -skills.
2. To build up the learners confidence in oral and interpersonal communication by reinforcing the basics of pronunciation specially focusing on interviews / corporate meetings / international business travels.

Course Outcomes:

1. To sensitize students to the language, forms and types of poetry, fiction & prose.
2. To help them read, critically analyse and appreciate poetry, fiction & prose.
3. To sensitize students to the nuances of spoken and written forms of English
4. To update and expand basic informatics skills and attitudes relevant to the emerging knowledge society.
5. To impart better writing skills by sensitizing the learners to the dynamics of effective writing.

CONTENTS (10 Hrs)

Six chosen lessons from the book, 'Perceptions'

1. Pret in the House
2. My muscles Froze
3. Not just Oranges
4. A different kind of learning
5. The Election
6. A Night with the Bears.

LANGUAGE ACTIVITY. V (10 Hrs)

Grammar

1. Verbs
2. Use of Prepositions Voice
3. Narration

LANGUAGE ACTIVITY. (10 Hrs)

Composition

1. Letter/Application Writing
2. Expansion of ideas/paragraph writing
3. Precise writing (not to be examined)
4. Article writing
5. Poster (not to be examined)

Recommended Text Books/ Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Zimmer. H.	Preceptions Edited by Shanta Rameshwar Rao.	2001	PrincetonUniversity Press
2	A.K. Coomaraswamy.	English Grammar and compositions by Wren & Martin by Tickoo, M.L. Subramanian,	2009	Munshiram Manoharlal New Delhi

INSTRUCTIONS TO QUESTION PAPER SETTER

1. Question paper will have two sections (A&B) Literature and Grammar.
2. Literature section will be of 30 Marks divided into three portions of 10marks each(Poetry,ProseandFiction,10MarksEach)
3. 10 objective type questions carrying 1 mark each, 25 marks questions carrying 5 marks each and one question carrying10marks.
4. Literature section will be of 30 Marks divided into three portions of 10marks each (Poetry, Prose and Fiction,10 Marks Each)
5. Grammar section will be divided into two parts Simple grammar and composition carrying 15 marks each.

DRAWING & PAINTING

Subject Code: BMFAS1 -104

**L S T P C
1 4 - 4 5**

Duration:135 Hrs.

Course Objectives:

1. To able to learn Natural forms related to the living beings and them in still and action.
2. The student shall be able to learn various forms and their 2D and 3D and express their imagination through visual representation

Course Outcomes:

1. Understand human anatomy and proportions.
2. Learn similarities and differences in animals, birds and human forms.
3. Learn basic and complex visual forms of nature
4. Knowledge of basic forms. Understanding the art elements like forms, colors, light, tones, contrast etc.
5. To acquaint students about the form and colors present in the nature. So students can use the same for representational commercial designs later.

UNIT-I (65 Hrs)

1. Quick & rapid sketches from Human figure Animal & Birds Nature
2. Painting from objects and nature to study color, tone and texture.
3. Use of different painting media like water color, poster color, tempera, pastel and wax pastels.
4. Drawing exercises to study nature to observe and acquire skills for its graphic representation.

UNIT-II (70 Hrs)

1. Exercises to explore the expressive quality of line using different media like pencil, charcoal, crayon, pen Brush and ink etc.
2. Drawing from imagination.
3. Study of line through constructions using different media like wire, straw and thread etc.
4. Study of perspective. Difference in handling of nearer and distant objects controlled light and shade. Ability to simplify treating the essential omitting detail.

Recommended Text Books/Reference Books:

S. No.	Name of Authors	Titles of the Book	Name of the Publisher
1.	Tushar Moleshwari	Memory drawing simplified	Jyotsna Prakashan, Mumbai
2.	Pratap Mulick	Sketching	Jyotsna Prakashan, Mumbai
3.	Milind Mulick	Perspective	Jyotsna Prakashan, Mumbai
4.	Milind Mulick	Sketchbook	Jyotsna Prakashan, Mumbai
5.	Milind Mulick	Natural Inspiration	Jyotsna Prakashan, Mumbai
6.	Rahul / Gopal	Pencil Tech -1 Graphite	Jyotsna Prakashan, Mumbai
7.	Rahul / Gopal	Pencil Technique - 2	Jyotsna Prakashan, Mumbai
8.	Tushar Moleshvari	Figure drawing	Jyotsna Prakashan, Mumbai
9.	Rahul Deshpande	Think 3D	Jyotsna Prakashan, Mumbai
10.	Rahul Deshpande	Think 3D Pa by t II	Jyotsna Prakashan, Mumbai
11.	Gopal Nandurkar	Approach to Drawing Animals	Jyotsna Prakashan, Mumbai
12.	Aditya Chari	Figure Study made easy	Jyotsna Prakashan, Mumbai
13.	Victor Perard	Anatomy	Jyotsna Prakashan, Mumbai
14.	M. M. Mehta	Free Drawing	Jyotsna Prakashan, Mumbai

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15.	Milind Mulick	Watercolour	Jyotsna Prakashan, Mumbai
16.	Milind Mulick	Watercolour Landscape	Jyotsna Prakashan, Mumbai
17.	Milind Mulick	Opaque colour	Jyotsna Prakashan, Mumbai
18.	Rahul / Gopal	Colour Pencil	Jyotsna Prakashan, Mumbai
19.	Milind Mulick	Expressions In Watercolour	Jyotsna Prakashan, Mumbai
20.	Milind Mulick	Watercolour paintings with Photo reference	Jyotsna Prakashan, Mumbai
21.	Milind Mulick	Watercolour Demonstrations	Jyotsna Prakashan, Mumbai
22.	Rahul Deshpande	Acrylic Explorations	Jyotsna Prakashan, Mumbai
23.	Bill Creevy	The Pastel Book: Materials and Techniques for Today's Artist	Watson- Guptill
24.	Bill Creevy	Encyclopedia of Pastel Techniques, The: A Unique Visual Directory of Pastel Painting	Bill Creevy
25.	Judy Martin	Techniques, With Guidance On How To Use Them	Search Press UK
26.	Alannah Moore	The collage ideas book	Ilex Press UK

Assignment :

1. Submission of Final 6 Artworks.
2. Submission of Rapid Daily Sketches of A3 Sketchbook (100pages)
3. Submission of 20 Rough Newspapers of large size sketches.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. Section A consists of two questions of 20 marks each. The student has to attempt any one question out of it.
2. Section B consists of three questions if 10 marks each. The student has to attempt any two questions out of it. Total 20 marks.

LETTER WRITING

Subject Code: BMFAS1 -105

**L S T P C
1 4 - 4 5**

Duration: 135Hrs.

Course Objectives:

1. This course provides students the fundamental skill to design effectively
2. This course provides students typography for work produced in Design Communication, Typographic Design, and Portfolio.

Course Outcomes:

1. Acquire advanced knowledge of the creative uses of typography, color, and image.
2. Acquire advanced knowledge of type styles and components of typography, typographic measurement systems, typographic, and layout terminology.
3. Be able to compose visually dynamic design layouts that incorporate visual hierarchy, type, image, color, and graphic elements to effectively communicate and support the content of a design.
4. To establish a strong visual hierarchy and set the product's overall tone.
5. Typography should guide and inform your users, optimize readability and accessibility, and ensure an excellent user experience.

UNIT-I (65 Hrs)

1. Nature study of Lines forms and shapes of old letters.
2. Introduction to Gothic, Punjabi & Hindi type, construction of letters and spacing.

UNIT-II (70 Hrs)

1. Introduction to Roman type, construction of letters and spacing Two Works in a Week Size:- In consultation with teacher
2. Prepare finished slogan/quotation using Gothic and Roman type covering all the alphabets.
3. All exercises should be done Black & White and Colored on Half Imperial Sheet

Recommended Text Books/ Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Robert Bringhurst	The Elements of Typographic Style	2001	Hartley & Marks
2	Sarah Hyndman	Why Fonts Matter	2009	Virgin Books
3	Marie Lynskey	Complete Calligraphy	2005	D & S Books

Portfolio Methodology

1. Individual's daily performance
2. Project Review; Mid Semester
3. Project Submission; End of the Semester

List of Assignments/Tests:

1. Submission of Final 6 Artworks.
2. Submission of Rapid Daily Sketches of A3 Sketchbook (100pages)
3. Submission of Rough 20 Newspapers of large size sketches.

CLAY MODELLING

Subject Code: BMFAD1 -111

**L S T P C
1 2 - 4 4**

Duration: 105 Hrs.

Course Objectives:

1. Art is to see an object in 2D as well as 3D perspective.
2. Clay modeling will help the students to develop a three – dimensional vision.

Course Outcomes:

1. In this module, students will be able to understand the concept of modeling and volume in the given time and space
2. They will be able to make 2D and 3D miniatures of objects available in the nature and their surroundings. They will learn the different types of clays modeling and materials that are used for the same.
3. They will develop skills to use the tools available, the quality of material, their behavior, maintenance and durability.
4. Their hand and eye will be synchronized with the proportion and volume of the object.
5. Students will be able to feel the objects and materials. This exercise is designed to develop a sense of proportion and volume in students.

UNIT-I (50 Hrs)

Creating 3d form with clay

1. Creation of simple 3D objects in clay
2. Upper & Down Relief Slab Works
3. Usage and preparing of clay for modeling
4. Types of clay and usages

UNIT-II (55 Hrs)

Creating 3d form with plaster of Paris

1. Creation of simple 2D and 3D objects using Plaster of Paris
2. Pot Making with using different types of methods.
3. Plaster of Paris and its behavior
4. Maintenance and durability of plaster of Paris (POP)

Portfolio Methodology

- 1 Individual's daily performance
- 2 Project Review; Mid Semester
- 3 Project Submission; End of the Semester

List of Assignments/Tests:

- 1 Submission of Final 6 Artworks.
- 2 Submission of Rapid Daily Sketches of A3 Sketchbook (100pages)
- 3 Submission of Rough 20 Newspapers of large size sketches.

NEW MEDIA

Subject Code: BMFAD1 -112

**L S T P C
1 2 - 4 4**

Duration: 105 Hrs.

Course Objectives:

1. Students are able to get acquainted with the newest forms of creation and communication.
2. New Media students learn to identify what is or isn't "new" about certain technologies.

Course Outcomes:

1. Social Media Networks are examples of New Media which are Digital, interactive, hyper-textual, globally networked, virtual and sometimes based on simulation.
2. These are the six key characteristics which distinguish New Media from old media.
3. Science and the market will always present new tools and platforms for artists and designers.
4. New Media Communications is an innovative, experiential program where students learn to create, interpret, and manage change in media.
5. New Media Communications includes media research, media management, and media production to educate you as an effective manager of change.

UNIT-I (50 Hrs)

1. Understanding Media as Text: Signs and Codes in Media
2. Linear and Non- Linear models of communication
3. Forms of Media: Print, Electronic Media and Digital forms of Media – New media, Digital Media, Social Media

UNIT-II (55 Hrs)

1. Cinema: Digital processes and effects Animation and Gaming: Children as Audience.
2. Social Media Practices and Audience Effects (Social media influencers; trolling; etc.)
3. Digital Media and its computer components.
4. Digital Media Application Software: Word processing, Spreadsheet, Image Editing.

Recommended Text Books/ Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Athique, A.	(2013). Digital media and society:	2001	Athique, A.
2	Buckingham, D.	An introduction.	2009	John Wiley & Sons
3	Dewdney, A.,	Youth, identity, and digital media.	2005	The MIT Press
4.	Dewdney, A.& Ride, P.	The Digital Media Handbook. Routledge. Feldman, T.	2007	John Wiley & Sons
5.	Buckingham, D.	An introduction to digital media. Routledge.	2017	The MIT Press
6.	Lindgren, S.	(Digital media and society. Sage.	2003	Lindgren, S.

Portfolio Methodology

- 1 Individual's daily performance
- 2 Project Review; Mid Semester
- 3 Project Submission; End of the Semester

List of Assignments/Tests:

- 1 Submission of Final 6 Artworks.
- 2 Submission of Rapid Daily Sketches of A3 Sketchbook (100pages)
- 3 Submission of Rough 20 Newspapers of large size sketches.

2-D DESIGN

Subject Code: BMFAD1 -121

L S T P C
1 2 - 4 4

Duration:105 Hrs.

Course Objectives:

1. This subject will introduce students to fundamental topics in three-dimensional design.
2. Students explore the principles of visual perception and the meaning of form, space, function,

Course Outcomes:

1. Know and apply formal systems of two-dimensional composition, using the basic principles and elements of design.
2. Acquire critical thinking skills in the development and resolution of concepts related to visual media.
3. Learn how to identify and analyze the elements, principles and vocabulary of three- dimensional design.
4. Learn to utilize and integrate the elements, principles, materials and processes of three- dimensional design to fulfill a specific intention.
5. To gave structure as they relate to two and three-dimensional design through a clear sequence of assignments and projects.

UNIT-I (50 Hrs)

1. Making 2D Designs based on geometrical shapes
2. Converting natural shapes into geometrical designs

UNIT-II (55 Hrs)

1. Making 2D Design Illustration
2. 2D Expression Illusion

Recommended Text Books/Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Roger Burrows	3DThinkingin Design and Architecture: From Antiquity to the Future	2018	Thames&Hudson,2018
2	Allan Chochinov	Designing Here Now: A Global Selection Of Objects Concepts And Spaces For The Future	2009	Core77
3	Stephen Pentak, David A. Lauer	Design Basics	2005	Wads worth Publishing Company
4.	BrunoMunari	Design As Art	1966	Bruno Munari
5.	Alex Fowkes	Drawing Type	2017	Rockport

Portfolio Methodology

- 1 Individual's daily performance
- 2 Project Review; Mid Semester
- 3 Project Submission; End of the Semester

List of Assignments/Tests:

- 1 Submission of Final 6 Artworks.
- 2 Submission of Rapid Daily Sketches of A3 Sketchbook (100pages)
- 3 Submission of Rough 20 Newspapers of large size sketches.

PRINT MAKING

Subject Code: BMFAD1 -122

L S T P C
1 2 - 4 4

Duration: 105Hrs.

Course Objectives:

1. An understanding of the basic principles of making prints, and the ability to apply these principles with specific aesthetic intent. This includes functional knowledge of the traditions, conceptual modes, and evolutions of the discipline.
2. Knowledge and skills in the use of basic tools, techniques, and processes sufficient to work from concept to finished product using traditional methods and contemporary practices in lino cut, screen print etc

Course Outcomes:

1. Use the printmaking medium as a means of creative and individual expression.
2. Develop facility with the tools, materials, and techniques inherent to basic printmaking processes.
3. Safely and responsibly handle the printmaking presses, equipment, and other materials common to basic printmaking processes.
4. Manage the registration of image to print matrix, and print matrix to paper, with prints composed of both single and multiple passes or layers.
5. Understand and discuss the historical and contemporary role of printmaking media in art, design, and culture.

UNIT-I (50 Hrs)

1. Introduction and brief
2. History of Print Making
3. Basics of Print Making

UNIT-II (55 Hrs)

1. Wood Cut, Lino Cut & Printing
2. Mono and Color print with mounting

Recommended Text Books / Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Frances Stanfield	The Print making Ideas Book	2018	Il express
2	Nick Morley	Linocut for Artists & Designers	2009	The Crossword Press
3	Susan Yeates	Beginner's GuidetoLinocut:10printproj ects with top techniques to get you started	2005	Search Press
4.	Susan Yeates	Learning Linocut: A Comprehensive Guide to the Art of Relief Printing Through Linocut	1966	Search Press
5.	KK Aggarwal	Printing with Stickers, Leaf, Lamination (Hindi Edition)	2017	Manoj Publications

Portfolio Methodology

- 1 Individual's daily performance
- 2 Project Review; Mid Semester
- 3 Project Submission; End of the Semester

List of Assignments/Tests:

- 1 Submission of Final 6 Artworks.
- 2 Submission of Rapid Daily Sketches of A3 Sketchbook (100pages)
- 3 Submission of Rough 20 Newspapers of large size sketches.

SECOND SEMESTER

HISTORY OF MODERN ART (18th cent. To 20th cent.)

Subject Code: BMFAS1 -201

L S T P C
2 - - - 2

Duration: 30 Hrs.

Course Prerequisites: Students should have knowledge of basic art history and culture.

Course Objectives:

1. To identify aesthetic traits found throughout Indian art
2. To learn Modern Indian art and stimulate an interest for the appraisal of efforts done by Indian Great Masters.

Course Outcomes:

1. Understand the Modern aesthetics and knowledge of various modern art techniques.
2. Stimulate interest to know the modern subject matter in detail.
3. Develop observational & systematic analytical skills and have their own opinions on different projects.
4. Knowledge of present Indian modern art to the International Modern art.
Understand the phases of Indian modern art as well as various forms of art.

UNIT-I 18th Cent (10 Hrs.)

1. Background of Indian modern art movement (Company School)
2. Bengal School of art

UNIT-II 19th Cent. (10 Hrs.)

1. Progressive Art group
2. Contemporary Art and Artist

UNIT-III 19th to 20th Cent. (10 Hrs.)

1. Expressionism
2. Impressionism
3. Cubism

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S. No.	Name of Authors	Titles of the Book	Name of the Publisher
1.	Zimmer.H.	Art of Indian Asia	Princeton University Press
2.	A.K. Coomaraswamy.	History of Indian and Indonesian Art	Munshiram Manoharlal New Delhi
3.	B. Rowland	Art & Architecture of Indian	Penguin Books, Melbourne
4.	A.K. Coomaraswamy.	Introduction to Indian Art	Jyo Munshirm Manoharlal Pub Pvt Ltd) tsna Prakashan, Mumbai
5.	Benjamin Rowland	The Pelican history of Art	Penguin Books Ltd
6.	LC Sharma	A Brief History of Indian Painting	Krishna Prakashan Meerut
7.	Edith Tömöry	History of Fine Arts in India & the West	Orient Longman, Bombay)
8.	Stella Kramrisch	Indian Sculpture	Motilal Banarsidas pvt ltd Delhi)
Assignment :			
1.	Submission of two Assignments on given topic.		
2.	Submission of one Assignment with presentation.		

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question is containing 6 questions of 2 marks (12 marks), each requiring short answers are to be set from the entire syllabus.
2. The examiner is required to set another six questions (three from each UNIT), out of which the Students are required to attempt any four questions.

PRINCIPLES OF ART

Subject Code: BMFAS1 -202

L S T P C
2 - - - 2

Duration: 30 Hrs.

Course Prerequisites: Students should have basic knowledge of fundamentals of fine art.

Course Objectives:

1. Learn and enhance their awareness and understanding of the visual world, particularly the natural world and the world of the visual arts, through a thorough study of design principles and observational practices.
2. The main aim of principles of art allow us to place some kind of objective reasoning behind why a great painting is great.

Course Outcomes:

1. Knowledge to identify the elements and evaluate their role in the composition of a work of art will be better able to understand an artist's choices.
2. Understand and equipped to address whether a work of art is successful, and why. The arrangement of elements in a work of art.
3. Understand and demonstrate technical ability and craftsmanship in their artworks.
4. Demonstrate understanding of the elements of art and principals of design through effective compositions.

UNIT-I (10 Hrs.)

1. Elements of Painting - Line, Form, Value, Texture, Color, Light & Shade etc.
2. Principals of Composition – Space-division, Balance, Harmony, Rhythm, Proportion, Contrast etc.

UNIT-II (10 Hrs.)

Creative process (Meaning of composition) - Place and importance of subject, idea, feeling, imagination, expression, suggestion, symbolism, contrast, medium, technique and colors in composition.

UNIT-III (10 Hrs.)

Painting, Graphic, Applied Art, Sculpture equipment's/ materials - Papers, Pencils, Charcoal, Pastels, Brushes, Boards, Clay, Wood, Leno, Board pins, Colors, Printing inks, Sensitive materials, Air Brush, proof reading marks, printing methods, paper and its size, etc.

Recommended Text Books/Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Bruce D. Kurtz	Visual Imagination	2018	Bruce D. Kurtz
2	Mark Gatlein	Living with Art	2009	Mark Gatlein
3	Rudolf Arnheim	Art and Visual perception	2005	Rudolf Arnheim
4.	Susan Yeates	Encyclopedia of Aesthetics	1966	Oxford University Press
5.	J J De Lucio Meyer	Visual Aesthetics	2017	Manoj Publications
6.	Edmund Burke Feldman	Varieties of Visual Experience	2009	Edmund Burke Feldman
7.	Gopal Madhukar Chaturvedy	Bhartiya Chitrakala	2005	Gopal Madhukar Chaturvedy

List of Assignments/Tests:

- 1 Submission of two Assignments on given topic.
- 2 Submission of one Assignment with presentation.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question is containing 6 questions of 2 marks (12 marks), each requiring short answers are to be set from the entire syllabus.
2. The examiner is required to set another six questions (three from each UNIT), out of which the Students are required to attempt any four questions.

COMPUTER GRAPHICS (LEVEL-I)

Subject Code: BMFAS1 -203

L S T P C
2 2 - 2 4

Duration: 90 Hrs.

Course Prerequisites: Students should have basic technical knowledge of computer.

Course Objectives:

1. To learn about Corel Draw interface and work with rendering techniques.
2. To get the concept of creating textures, and thematic designs. To work with color panels to create, manage and edit color and color groups.

Course Outcomes:

1. Knowledge of successful completion of this course, participants will be able to:
2. Experience to Work comfortably with the software's most common tools and panels.
3. Create and edit all sorts of print documents.
4. Knowledge to Insert images, draw shapes, paint, type and apply color.

UNIT-I (45 Hrs.)

Corel Draw

Introduction to Vector Shapes and Bitmaps.
Exploring the Corel Draw Environment.

UNIT-II (45 Hrs.)

Corel Draw

Work with type and text format tools.
Working with Selection Tools import and export images,
Make Geometrical or natural design.

S. No.	Name of Authors	Titles of the Book	Name of the Publisher
1.	Edward R. Tufte	The Visual Display of Quantitative Information, 2 nd edition	Hardcover -May 2001
2.	Edward R. Tufte	Envisioning Information	Hardcover-May1990
1.	Individual's daily performance		
2.	Project Review; Mid Semester		
3.	Project Submission ;End of the Semester		

Assignment :

1. Submission of Final 4 Artworks.
2. Submission of Rapid Daily Sketches of A3 Sketchbook (50pages)
3. Submission of 10 Rough Newspapers of large size sketches.

INSTRUCTIONS TO THE PAPER SETTER

Internal marks shall be awarded through viva- voce.

PRODUCT DESIGN

Subject Code: BMFAS1 -204

L S T P C
2 2 - 2 4

Duration: 90 Hrs.

Course Prerequisites: Students should have the knowledge of fundamentals and principles of design.

Course Objectives:

1. To learn and focus of Product Design and Development is integration of the marketing, design, and manufacturing functions in creating a new product.
2. Develop abilities to create a new product.

Course Outcomes:

1. Understand the Product Design and Development Process, as a means to manage the development of an idea from concept through to production.
2. Understand research and analysis methodologies as it pertains to the product design process, meaning, and user experience.
3. Developed creative process techniques in synthesizing information, problem-solving and critical thinking.
4. Demonstrate and employ hand drawing and drafting principles to convey concepts.
5. Reinforcement of specific knowledge from other courses through practice and reflection in an action-oriented setting.

UNIT-I (45 Hrs.)

1. Drawing (Line and Tonal), Use of various techniques
2. Observation and Understanding the quality of Objects.
3. Designing a new product according to the given specifications.
4. Rendering the product.

UNIT-II (45 Hrs.)

1. Making a prototype of the designed product
2. Making paintings in various medias from objects
3. Designing a product cover in colors

Recommended Text Books/Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Karl Ulrich & Steven Eppinger	Product Design and Development	2018	The McGraw-Hill Companies
2	Koos Eissen, Roselien Steur	Sketching: Drawing Techniques for Product Designers	2009	BIS Publishers
3	Kevin Henry	Drawing for Product Designers	2005	Laurence King Publishing
4.	Rahul Deshpande	Think3D	1966	Jyotsna Prakashan, Mumbai
5.	Rahul Deshpande	Think3DPabytII	2017	Jyotsna Prakashan, Mumbai)
6.	Bruno Munari	Design As Art(1966)	1966	Bruno Munari
7.	Alex Fowkes	Drawing Type	2005	Rockport
8.	Alina Wheeler	Designing Brand Identity: An Essential Guide for the Whole	2018	John Wiley & Sons

Branding Team

9.	Milind Mulick	Sketchbook	2009	Jyotsna Prakashan, Mumbai)
10.	Milind Mulick	Natural Inspiration)	2005	Jyotsna Prakashan, Mumbai)
11.	Milind Mulick	Water colour	1966	Jyotsna Prakashan, Mumbai)
12.	Milind Mulick	Water colour Landscape	2017	Jyotsna Prakashan, Mumbai)
13.	Milind Mulick	Opaque colour	1966	JyotsnaPrakashan, Mumbai)
14.	Rahul/Gopal	Colour Pencil	2005	JyotsnaPrakashan, Mumbai)
15.	Milind Mulick	Expressions In Water colour	2018	JyotsnaPrakashan, Mumbai)
16.	Milind Mulick	Water colour paintings with Photo reference	2009	JyotsnaPrakashan, Mumbai)
17.	Milind Mulick	Water colour Demonstrations	2005	JyotsnaPrakashan, Mumbai)
18.	Rahul Deshpande	Acrylic Explorations	1966	JyotsnaPrakashan, Mumbai)
19.	Milind Mulick	Milind Mulick Journy So Far	2017	Jyotsna Prakashan, Mumbai)
20.	John Fernandes	The Gallery by (Jyotsna Prakashan,Mumbai)	1966	Jyotsna Prakashan, Mumbai)
21.	Karl Ulrich & Steven Eppinger	Product Design and Development by (The McGraw-HillCompanies)	2005	The McGraw- HillCompanies

List of Assignments/Tests:

- 1 Submission of Final 4 Artworks.
- 2 Submission of Rapid Daily Sketches of A3 Sketchbook (50pages)
- 3 Submission of 10 Rough Newspapers of large size sketches.

INSTRUCTIONS TO THE PAPER SETTER

- 1) Two questions are to be set from Unit–I and students are required to attempt any one question (20 marks).
- 2) Three questions are to be set from Unit–II and students are required to attempt any two questions (10 marks each, total 20 marks).
- 3) Evaluation is to be done through viva voce by external examiner appointed by the university at college level. Answer sheets after the university exam shall be retained at college level for the viva-voce.

CALLIGRAPHY

Subject Code: BMFAS1: 205

L S T P C
2 2 - 2 4

Duration: 90 Hrs.

Course Prerequisites: Students should have basic technical knowledge of letter writing and typography.

Course Objectives:

1. This course provides students the fundamental skill to design effectively
2. This course provides students with calligraphy for work produced in Design Communication, Calligraphy Design, and Portfolio.

Course Outcomes:

1. Acquire advanced knowledge of the creative uses of typography, color, and image.
2. Acquire advanced knowledge of type styles and components of calligraphy measurement systems, calligraphy and layout terminology.
3. Be able to compose visually dynamic design layouts that incorporate visual hierarchy, type, image, color etc.
4. Be able to create graphic elements to effectively communicate and support the content of a design.
5. Able to learn the definition and usage of calligraphy.

UNIT-I (45 Hrs.)

1. Introduction to calligraphy style, construction of letters and spacing
2. Introduction to Roman type Calligraphy, construction of letters and spacing Two Works in a Week Size

UNIT-II (45 Hrs.)

1. Advanced Study of calligraphy - English and Hindi & Punjabi
2. Prepare finished slogan/quotation using calligraphy and Roman type covering all the alphabets

Recommended Text Books/Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Sarah Hyndman	Why Fonts Matter	2018	Virgin Books
2	Marie Lynskey	Complete Calligraphy	2009	D & S Books
3	Manoj	English-Hindi Lettering Style	2005	Manoj Publications
4.	Akshar Sanskar	Learn Devnagari Calligraphy Vol (Revised)	1966	Akshar Sanskar Publications
5.	Margaret Shepherd	Learn Calligraphy: The Complete Book of Lettering and Design	2017	Watson-Guptill

Portfolio Methodology

- 1 Individual's daily performance
- 2 Project Review; Mid Semester
- 3 Project Submission; End of the Semester

List of Assignments/Tests:

- 1 Submission of Final 4 Artworks.
- 2 Submission of Rapid Daily Sketches of A3 Sketchbook (50pages)
- 3 Submission of Rough 10 Newspapers of large size sketches.

INSTRUCTIONS TO THE PAPER SETTER

Internal marks shall be awarded through viva- voce.

GEOMETRY & PERSPECTIVE

Subject Code: BMFAD1-211

L S T P C
2 2 - 2 4

Duration: 90 Hrs.

Course Prerequisites: Students should have the knowledge of fundamentals and principles of geometry.

Course Objectives:

1. To learn geometric concepts including the basic elements of geometry, proofs, parallel and perpendicular lines, the coordinate plane, triangles, quadrilaterals, polygons, circles, trigonometry, congruence and similarity, surface area, volume and transformations.
2. To identify and apply the properties of rays and angles

Course Outcomes:

1. Students will be able to recognize the difference between a one-point perspective and two-point perspective drawing.
2. Represent their understanding of linear perspective through a drawing.
3. Arrange a linear perspective drawing with all of its parts.
4. To identify and apply the properties of parallel and perpendicular lines.
To identify and apply the properties of rays and angles.

UNIT-I (45 Hrs.)

1. Draw and use the properties of points and lines.
2. Draw and apply the properties of angles & triangles.
3. Draw and apply the properties of quadrilateral, squares & rectangles.
4. Draw and apply the properties of polygons & circles.

UNIT-II (45 Hrs.)

1. Draw and apply the properties of soiled geometry & scale drawing.
2. Draw and apply the properties of rays perspective drawing.
3. Draw and apply the properties of one point & two point perspective.
4. Draw and apply the properties of aerial & ant view of perspective.

Recommended Text Books/Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Alex Fowkes	Drawing Type	2018	Rockport
2	Alina Wheeler	Designing Brand Identity: An Essential Guide for the Whole Branding Team	2009	John Wiley & Sons
3	Milind Mulick	Sketchbook	2005	Jyotsna Prakashan, Mumbai)
4.	Milind Mulick	Natural Inspiration	1966	Jyotsna Prakashan, Mumbai)
5.	Milind Mulick	Water colour	2017	Jyotsna Prakashan, Mumbai)
6.	Milind Mulick	Water colour Landscape	2018	Jyotsna Prakashan, Mumbai)
7.	Milind Mulick	Opaque colour	2009	Jyotsna Prakashan, Mumbai)
8.	Rahul/Gopal	Colour Pencil	2005	Jyotsna Prakashan, Mumbai)
9.	Milind Mulick	Expressions In Water colour	1966	Jyotsna Prakashan, Mumbai)

List of Assignments/Tests:

- 1 Submission of Final 4 Artworks.
- 2 Submission of Rapid Daily Sketches of A3 Sketchbook (50pages)
- 3 Submission of Rough 10 Newspapers of large size sketches.

INSTRUCTIONS TO THE PAPER SETTER

Internal marks shall be awarded through viva- voce.

PHOTOGRAPHY

Subject Code: BMFAD1-212

L S T P C
2 2 - 2 4

Duration:90 Hrs.

Course Prerequisites: No Prerequisites.

Course Objectives:

1. In this module student shall learn the finer points of photography. It is intended to interweave the camera handling skills; technology and techniques.
2. Student shall learn about various types of cameras, photography equipments and techniques from historical perspective.

Course Outcomes:

1. From this module student will be able to learn shooting from camera using artistic composition and framing methods.
2. They shall be able to process, develop, and print photographs.
3. They shall learn the different types of camera techniques and their usage in visual media and communication.
4. They will be able to understand the light, exposures, and sensitivity of films, bromide papers, and their behavior when they are used for specific results.
5. It will help student understand photography as a medium of artistic expression. After this they shall be able handle camera and photographic accessories professionally to produce expressive photographs.

UNIT-I (45 Hrs.)

1. **Camera as a Tool:** Evolution of camera. Camera technology. Film formats. Camera design. Optical lenses, accessories.
2. **Camera Techniques** - Observation, Selection of subject: Observing light, light temperature. Selection of subject. Exposures, apertures. Choice of lens, filters. Choice of shot.

UNIT-II (45 Hrs.)

1. **Know your digital Camera:** Camera Parts. Body. Sensor/lenses/digital technology/CPU. Automated and Assisted settings:
2. **Shooting modes.** Flash Modes. Image enhancement settings. Video mode. Manual Settings.

Recommended Text Books/Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	M. Langford	Advance Photography	1985	Blaker Applied depth of field
2	H. Angel W	Landscape photography	2009	White Photomacrography
3	Langford	An introduction Visual aids	2005	Wads worth Publishing Company
4.	Spencer's	Photography in education	2000	Applied photography
5.	Arnold	Color photography in practice	2003	Applied photography

Portfolio Methodology

- 1 Individual's daily performance
- 2 Project Review; Mid Semester
- 3 Project Submission; End of the Semester

List of Assignments/Tests:

- 1 Submission of Final 15 Photographs Album with every feature detail report.

INSTRUCTIONS TO THE PAPER SETTER

Internal marks shall be awarded through viva- voce.

3D DESIGN

Subject Code: BMFAD1-221

L S T P C
2 2 - 2 4

Duration:90 Hrs.

Course Prerequisites: Students should have the knowledge of fundamentals and principles of 2D-Design.

Course Objectives:

1. This subject will introduce students to fundamental topics in three-dimensional design.
2. Students explore the principles of visual perception and the meaning of form, space, function, and structure as they relate to two and three-dimensional design through a clear sequence of assignments and projects.

Course Outcomes:

1. Knowledge of two-dimensional composition, using the basic principles and elements of design.
2. Acquire critical thinking skills in the development and resolution of concepts related to visual media.
3. Identify and analyze the elements, principles and vocabulary of three-dimensional design.
4. Utilize and integrate the elements, principles, materials and processes of three-dimensional design to fulfill a specific intention.
5. To create structure as they relate to two and three-dimensional design through a clear sequence of assignments and projects.

UNIT-I (45 Hrs.)

1. Make 2d -3d paper cutting collage and mosaic.
2. Using colors to depict emotions in designs.

UNIT-II (45 Hrs.)

1. Make sculpture with unconventional material.
2. Make group 3D sculpture project.

Recommended Text Books/Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Roger Burrows	3D Thinking in Design and Architecture: From Antiquity to the Future	2018	Thames&Hudson,2018
2	The Future by Allan Chochinov	Designing Here Now: A Global Selection Of Objects Concepts And Spaces	2009	Core77
3	Stephen Pentak, David A. Lauer	Design Basics	2005	Wadsworth Publishing Company
4.	Bruno Munari	Design As Art	1966	Bruno Munari
5.	Alex Fowkes	Drawing Type by	2017	Rockport

Portfolio Methodology

- 1 Individual's daily performance
- 2 Project Review; Mid Semester
- 3 Project Submission; End of the Semester

List of Assignments/Tests:

- 1 Submission of Final 4 Artworks.
- 2 Submission of Rapid Daily Sketches of A3 Sketchbook (50pages)
- 3 Submission of Rough 10 Newspapers of large size sketches.

INSTRUCTIONS TO THE PAPER SETTER

Internal marks shall be awarded through viva- voce.

SCREEN PRINTING

Subject Code: BMFAD1-222

L S T P C
2 2 - 2 4

Duration:90 Hrs.

Course Prerequisites: No Prerequisites.

Course Objectives:

1. Students will learn the fundamentals of screen printing as they create a series of images around a central theme or concept.
2. Students will learn how to design for a screen printed image, how to improve technically, and most importantly, how to articulate their ideas to others.

Course Outcomes:

1. Demonstrate the ability to design, plan and create technically sound and conceptually related screen printed images.
2. Use creative and critical thinking to develop a body of work from a broad, unified concept or theme.
3. Reflect on the role of socially engaged practice within the discipline of printmaking.
4. Identify the various applications of screen printing and the outcomes it produces.
5. Identify materials and operations used in the screen printing process.

UNIT-I (45 Hrs.)

1. Students create rough sketches before creating artworks, then record their processes and subsequent changes in their sketchbooks.
2. Selecting equipment & tools that will allow for creative endeavors.
3. Screen Pretreatment, Screen Tensioning / Stretching: Basic steps in Screen Tensioning, Stretching the Screen Printing Fabric – Manual Stretching and Machine Stretching.

UNIT-II (45 Hrs.)

1. Photocopy generated stencil development
2. Screen preparation -emulsion coating
3. Photo screen exposure and washout technology.
4. Introduction to registration techniques –
5. Basic ink mixing and printing processes –
6. Under-printing and over-printing -transparent ink processing –
7. Multiple color ink procedures

Recommended Text Books/Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Robert Adam	Screen printing : The Complete Water-Based System	2018	Robert Adam
2	Print Liberation	Carol Robertson	2009	Print Liberation
3	Jamie Dillon	The Screen Printing Primer	2005	Jamie Dillon,
4.	Nick Paparone	Luren Jenison	1966	Nick Paparone

Portfolio Methodology

- 1 Individual's daily performance
- 2 Project Review; Mid Semester
- 3 Project Submission; End of the Semester

List of Assignments/Tests:

- 1 Submission of Final 4 Artworks.
- 2 Submission of Rapid Daily Sketches of A3 Sketchbook (50pages)
- 3 Submission of Rough 10 Newspapers of large size sketches.

INSTRUCTIONS TO THE PAPER SETTER

Internal marks shall be awarded through viva- voce

THIRD SEMESTER

ADVERTISING ART AND IDEAS-I

Subject Code: BMFAS1-301

L S T P C
3 0 0 0 3

Duration:45 Hrs.

COURSE PREREQUISITES: No Prerequisites required.

COURSE OBJECTIVES:

1. The students should be able to learn about the strategies for creating advertising art.

COURSE OUTCOMES:

1. To learn about Industrial knowledge and critical thinking skills to analyze, effective advertising solutions that meet professional standards.
2. To develop the concepts as well as analyze and incorporate Aesthetics and layouts.
3. To understand the proficiency with the tools and graphic techniques of the profession of advertising.
4. To learn about the advertising media such as print collateral, audio and video spots, and Web-interactive materials.
5. To understand the interdependence between advertising marketing objectives and visual expression.

CONTENTS

UNIT-I (22Hrs.)

1. **Introduction to Advertising** - History of Advertising, Objectives of advertising, Characteristics of advertising .Advantages and Disadvantages of Advertising as a part of a marketing program. Importance and functions of Advertising
2. **Types of Advertising:** Product – Related advertising, Pioneering, Competitive and Retentive Advertising, Public Service Advertising.
3. **Medias of Advertising:** - print media, outdoor media, broadcast media, internet /social media, and other media.
4. **Print Media-** newspaper, magazine, brochures, flyers .Outdoor Media- billboards, posters/hoardings, retail, guerilla ads.
5. **Broadcast Media-** television, radio. Internet/social media-web banner, contextual, blog mobile/ social. Other Media- cinema, video films, exhibitions, and trade fairs.

UNIT-II (23Hrs.)

1. **Functional Classification :** Based on Demand Influence Level- Primary and Selective Demand Institutional and Product Advertising – Informative, Persuasive and Reminder-Oriented.
2. **Advertising Based on Product Life Cycle** - Consumer and Industrial
3. **Trade Advertising :** Retail and Wholesale Advertising
4. **Advertising based on Area of operation** – National , Local and Regional
5. Advertising according to Medium Utilization.

RECOMMENDED BOOKS:

- Advertising Handbook by D.V. Gandhi.
- A Text Book of Applied Art by Dr Mrs. Sunita Borkar (Himalaya Publishing House, Mumbai)

- Modern Advertising by Hepner.
- Advertising made simple by Frank Jefitine.
- Advertising theory and Practices by Verman Fryburger and Kim Rotzoll.
- The Creative Connection, Advertising Copywriting, and Idea Visualization. By Arthur A. Winters Shirley F. Milton.
- Advertising Art and Ideas. By M.G. Rege
- Hand Book of Applied Art. By Art and Advertising by Joan Gibbons (Bloomsbury Publishing India Pvt Ltd New Delhi)
- Simplified Applied Art: Reference Book on Human Anatomy and Lettering by K.C. Aryan (Rekha Prakashan)

INSTRUCTIONS TO THE PAPER SETTER:

1. One compulsory question containing six questions of 2 marks each (12 marks) requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions of 12 marks each (three from each unit) the students are required to attempt any four questions (selecting two from each unit).

COMPUTER GRAPHICS (LEVEL-2)

Subject Code: BMFAS1-302

L S T P C
1 4 0 4 5

Duration: 135 Hrs.

COURSE PREREQUISITES: No Prerequisites required.

COURSE OBJECTIVES:

1. The students should be able to learn about the Adobe Photoshop interface and its various tools such as working with color palette to create, manage, and edit color and color groups.

COURSE OUTCOMES:

1. To understand the software's most common tools and panels.
2. Knowledge of creating and editing all sorts of print documents.
3. To understand inserting images, drawing shapes, typing and text, applying color, saving print, and creating digital files.

CONTENTS

Adobe Photoshop

UNIT –I (68 Hrs.)

1. Exploring the Photoshop Interface
2. Practice of lines, curves, cones, etc.
3. Working with Selection of Tools and Layers.

UNIT –II (67 Hrs.)

1. Creating a workspace for Painting.
2. Using Color Palette, Paint brush, Editing Blending, Gradation, Patterns, etc.
3. Making RGB & CMYK Illustrative designs

RECOMMENDED BOOKS

- Teach ourselves Adobe 9 in 24 hours by Mordy Golding (David M. Samson)
- Adobe Photoshop CC Classroom in a Book 2022 by Brian Wood (Adobe Press)
- Learning Vector Illustration with Adobe Illustrator: ...through videos, projects, and more by Jodi Staniunas Hopper (Blooms bury Visual Arts)
- Adobe Photoshop for beginners 2021: learn graphic design with Illustrator by Hector Grant
- Paperback - Learn Adobe Photoshop for Graphic Design and Illustration by Ramona Remy
- Adobe Photoshop 10 Classroom in a Book. Adobe Creative Team

Portfolio Methodology

- Individual's daily performance
- Project Review; Mid Semester
- Project Submission; End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

- Evaluation shall be awarded through external viva- voce.

CORPORATE IDENTITY

Subject Code: BMFAS1-303

L S T P C
1 4 0 4 5

Duration: 135 Hrs.

COURSE PREREQUISITES: No Prerequisites required.

COURSE OBJECTIVES:

1. The students should be able to learn about the Brand Identity, Visual Communication, function, and structure of communication.

COURSE OUTCOMES:

1. To understand the demand as a producer in the market and design the Brand identity according to the requirements.
2. To learn the creative potentiality to design the brand material with symbolic and attractive visual language.
3. To understand the design of the structure of communication, strategic, operational thinking, and graphics.

CONTENTS

UNIT –I (68 Hrs.)

1. Creation of symbol & Logo.
2. Uses of Logo & Symbol to create a Letter Head design as a part of Corporate Identity.
3. Creating corporate identity with Visiting Card design.

UNIT –II (67 Hrs.)

1. Creating an Envelope design.
2. Sticker design with a social purpose.
3. Invitation Card Designing.

RECOMMENDED BOOKS

- Design As Art (1966) By Bruno Munari
- Drawing Type by Alex Fow Kes (Rockport)
- Designing Brand Identity: An Essential Guide for the Whole Branding Team by Alina Wheeler (John Wiley & Sons)
- Creating a Brand Identity: A Guide for Designers:(Graphic Design Books, Logo Design, Marketing) by Catharine Slade –Brooking (Laurence King Publishing)
- LOGO Modernism by Jens Müller, R. Roger Remington (Taschen)
- Identity Designed: The Definitive Guide to Visual Branding by David Airey (Rockport Publishers)

Portfolio Methodology

- Individual's daily performance
- Project Review; Mid Semester
- Project Submission; End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

- Evaluation shall be awarded through internal viva- voce.

3D-MODELLING

Subject Code: BMFAS1-304

L S T P C
1 4 0 4 5

Duration: 135 Hrs.

COURSE PREREQUISITES: No Prerequisites required.

COURSE OBJECTIVES:

1. The students should be able to learn about the basics of the three-dimensional design process and principles of visual perception, the meaning of form, space, mass, texture, and basic structure.
2. The students should be able to explore the materials and ability to analyze the relationships between form and space.
3. The students should be able to understand the vocabulary and techniques and develop critical thinking with creative challenges.

COURSE OUTCOMES:

1. To understand the principles of design and the relationship of form, space, and mass.
2. Knowledge of a variety of materials and techniques in Art.
3. To understand the fundamental elements of art and recognize the style and medium of Artists.

CONTENTS

UNIT –I (68 Hrs.)

1. Create a 3D Model of Building Construction.
2. Installation with using waste material.

UNIT –II (67 Hrs.)

1. Create abstract sculptures with wood or wooden pieces.
2. Create a 3D portrait sculpture project with any medium.

Note: There should be a compulsory site visit at Chandigarh rock garden, art museum and galleries.

RECOMMENDED BOOKS

- Design As Art (1966) By Bruno Munari
- Drawing Type by Alex Fow Kes (Rockport)
- Designing Brand Identity: An Essential Guide for the Whole Branding Team by Alina Wheeler (John Wiley & Sons)
- Creating a Brand Identity: A Guide for Designers:(Graphic Design Books, Logo Design, Marketing) by Catharine Slade –Brooking (Laurence King Publishing)
- LOGO Modernism by Jens Müller, R. Roger Remington (Taschen)
- Identity Designed: The Definitive Guide to Visual Branding by David Airey (Rockport Publishers)

Portfolio Methodology

- Individual's daily performance
- Project Review; Mid Semester
- Project Submission; End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

- Evaluation shall be awarded through external viva- voce.

PUNJAB ART AND CULTURE

Subject Code: BMFAD1-311

L S T P C
3 0 0 0 3

Duration: 45 Hrs.

COURSE PREREQUISITES: No Prerequisites required.

COURSE OBJECTIVES:

1. The students should be able to learn the development of Punjab Art and Culture.
2. The students should be able to learn different experiments to create in the field of Art.

COURSE OUTCOMES:

1. Knowledge of various art and culture forms of Punjab folk art, dance, music, drama, etc.
2. knowledge of making better Applied art designs based on culture and tradition
3. To understand the use of specific and measurable statements to improve skills in the field of Art.

CONTENTS

UNIT-I (23 Hrs.)

1. Introduction and history of Folk Art & Craft of Punjab
2. Types of Folk Art and Craft: Folk Music, Folk Dance, Folk lore, Traditional Food and Textile Art.
3. Folk Art and Craft; Wall Painting, Mud Art, Pottery, Paper Mache, Sikku, Pranda, Panjabi Jutti, Ornaments, Panjabi Painting (Miniature)
4. Folk Music: Dhol, Sarangi, Algoja, Chimta, Been, Bagdhu, Vanjhli,

UNIT-II (22 Hrs.)

1. Folk Dance- Giddha, Bhangra, Malwai Giddha, Luddi, Jhummar, Dhol Sammi,
2. Folk Lore- Punjabi Lok Geet, Bolian, Dohe, Sithnnian, Lok Kahanian, and Lok Kisse/, Chithey
3. Traditional Food: Sarson Ka Sag, Makki Di Roti, Chole Bhatore, Kheer Poode, Gulgule Mathian,
4. Textile Art- Phulkari, Dari and khes

RECOMMENDED BOOKS

- Adhunik kavya Sangam (Sutinder Singh Noor)
- Panjabi Katha (Gurdial Singh)
- 10 Pratinidhi Kahaniyan (Nanak Singh)
- Bhai Veer Singh Kaav
- Main Tenu Phir Milangi (AmritaShergill)
- Selected Stories of Gurbhaksh Singh Preetladi
- Saave Patar (Prof.Mohan Sinh)

INSTRUCTIONS TO THE PAPER SETTER

1. One compulsory question containing six questions of 2 marks each (12 marks) requiring short answers, is to be set from the entire syllabus.
2. The examiner is required to set another six questions of 12 marks each (three from each unit) The students are required to attempt any four questions (selecting two from each unit).

ART OF 20TH CENTURY

Subject Code: BMFAD1-312

L S T P C
3 0 0 0 3

Duration: 45 Hrs.

Course Prerequisites: Students should know basic art history and culture.

Course Objectives:

1. The students should be able to identify Aesthetic traits found throughout Indian Western art
2. The students should learn Modern Indian art and stimulate an interest in the appraisal of efforts done by Indian Great Masters.

Course Outcomes:

1. To understand Modern aesthetics with various modern art techniques.
2. To stimulate interest to know about the modern subject matter in detail.
3. To develop observational & systematic analytical skills and apply them in the field of Art.
4. To understand the Indian modern art and International Modern art.

CONTENT

UNIT-I (23 Hrs.)

1. Introduction to Western Art
2. Western Art Movements- Renaissance, Baroque and Rococo
3. Artists of Western Art Movement - Renaissance (Leonardo da Vinci, Michelangelo), Baroque - (Caravaggio) Rococo- (Jean Honore Fragonard)
4. Neoclassicism- Jacques -Louis David, Romanticism- Eugene Delacroix, and Realism- Gustave Courbet

UNIT-II (22 Hrs.)

1. Characteristics and movements of Modern Art
2. Modern Art Movement- Futurism, Dadaism, Surrealism
3. Artists of Modern Art Movement- Futurism (Umberto Boccioni), Dadaism (Marcel Duchamp), Surrealism (Salvador Dali)
4. POP Art- Andy Warhol and OP Art-Bridget Riley, Kinetic Art –Alexander Calder and Neo – Plasticism -Piet Mondrian

RECOMMENDED BOOKS

Recommended Text Books/Reference Books:

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Zimmer. H.	Art of Indian Asia	2001	Princeton University Press
2	A.K. Coomaraswamy.	History of Indian and Indonesian Art	2009	Munshiram Manoharlal New Delhi
3	B. Rowland	Art & Architecture of Indian	1998	Penguin Books, Melbourne
4	A.K. Coomaraswamy.	Introduction to Indian Art	1988	Munshiram Manoharlal New Delhi
5	Moti Chander	Studies in Early Indian Painting	1969	Asia Publishing House
6	W.G. Archer	Indian Paintings in the Punjab Hills	1973	Victoria & Albert Museum, London
7	-	Lalit Kala Academy	1997	New Delhi, Publications of Indian Modern Art
8	-	Cultural History of Indian	2011	Bhartiya Vidya Bhavan Publication.
9	S.K.Sarswati	A Survey of Indian Sculpture	2001	Firma K.L. Mukhopadhyay, Calcutta
10	Percy Brown	Indian Architecture	2009	D.B. Taraporevala, Bombay
11	Benjamin Rowland	The Pelican History of Art	1998	PenguinBooks Ltd)
12	Sharma	A Brief History of Indian Painting	1988	KrishnaPrakashanMeerut
13	EdithTomory	History of Fine Arts in India & the West	1969	OrientLongman, Bombay
14	Stella Kramrisch	Indian sculpture	1973	Motilal Banarsidas pvt ltd Delhi

INSTRUCTIONS TO THE PAPER SETTER

1. One compulsory question containing six questions of 2 marks each (12 marks), each requiring short answers, is to be set from the entire syllabus.
2. The examiner is required to set another six questions of 12 marks each (three from each unit), out of which the students are required to attempt any four questions (selecting two from each unit).

FOURTH SEMESTER

SEMINAR

Subject Code: BMFAS1-401

L	S	T	P	C
4	0	0	0	4

Duration: 60 Hrs.

COURSE PREREQUISITES: No Prerequisites required.

COURSE OBJECTIVES:

1. The students should learn about the importance of the Seminar; as a field-based study, and its objectives provide an accurate description of the specific actions.
2. The students should be able to research Specific, Measurable, Achievable, Realistic, and Time-constrained objectives.

COURSE OUTCOMES:

1. Students will demonstrate the ability to conduct effective research related to their artistic interest and the broader field of fine arts.
2. Students will show improved critical thinking skills by analyzing and discussing various art forms , theories and practices.

CONTENTS

UNIT-I (30 Hrs.)

1. A Student has to select a Topic / Subject on Contemporary Indian Art and Artists.
2. Submission of a field-based study on any topic with data collection and analysis under the guidance of a guide.

UNIT-II (30 Hrs.)

1. Focused on professional enhancement according to the specific talent of the particular student in his field and to become mature under guidance.
2. A student can work under any one faculty by choice and depending upon the specific field expertise.

RECOMMENDED BOOKS

- Simple Ideas on Presentation Design and Delivery by Garr Reynolds
- The Psychology of Persuasion by Robert B. Cialdini
- The Art and Science of Creating Great Presentations by Nancy Duarte
- Present Visual Stories that Transform Audiences by Nancy Duarte
- Public Speaking by Howard Hughes

Portfolio Methodology

- Individual's daily performance
- Project Review; Mid Semester
- Project Submission; End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

- Evaluation shall be awarded through internal viva- voce.

FRESCO MURAL

Subject Code: BMFAS1-402

L S T P C
1 4 0 4 5

Duration: 135 Hrs.

COURSE PREREQUISITES: Students should have basic knowledge of the History of Indian Art , drawing and Painting.

COURSE OBJECTIVES:

1. The students should be able to learn about the historical significance of fresco mural, their evolution, and the traditional techniques.
2. The students should be able to understand and develop the ability to critically analyze fresco murals.

COURSE OUTCOMES:

1. To understand the history, cultural significance, and traditional techniques of fresco mural painting.
2. To exhibit the ability to prepare surfaces for fresco painting.
3. To develop display skills in preparing and applying natural pigments to wet-composed mural design from initial sketches of the wall application.
4. To know how to apply color theory effectively, mixing pigments to achieve the desired hues and shades for the mural.
5. To understand and complete a fresco mural project from concept to execution, showcasing the ability to apply learned techniques and knowledge to a finished work.

CONTENTS

UNIT-I Introduction to Murals (67 Hrs.)

1. History and significance of Fresco Murals
2. Introduction to various material (plaster, pigments, brushes)used for fresco murals/paintings.
3. Natural pigments and their preparation (mixing pigments and basic color theory)
4. Principal of Fresco mural design and composition.
5. Techniques for transferring designs onto walls.

UNIT-II Mural – Fresco Method (68 Hrs.)

1. Introduction to Fresco-Buono, Fresco-secco mural.
2. Building up layers in fresco paintings.
3. First layer of intonaco (Plaster) and begin painting.
4. Glazing and Distemper.
5. Advance painting techniques for fresco.
6. Create a fresco wall painting.
7. Techniques for preserving and restoring Fresco Mural.

RECOMMENDED BOOKS

- Crack Is Wack by Keith Haring
- Balloon Girl by Banksy

- The Sistine Chapel by Michelangelo
- Nelson Mandela by Shepard Fairey
- The Flower Thrower by Banksy
- **Etnias** by Eduardo Kobra
- Reflections by Guido Van Helten
- The Collingwood Housing Estate by Matthew Adnate
- The Giant of Boston by Os Gemeos
- **Portfolio Methodology**
- Individual's daily performance
- Project Review; Mid Semester
- Project Submission; End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

- Evaluation shall be awarded through internal viva- voce.

ART AND INDIAN AESTHETICS - I

Subject Code: BMFAD1-411

L S T P C
4 0 0 0 4

Duration: 60 Hrs.

COURSE PREREQUISITES: No Prerequisites required.

COURSE OBJECTIVES:

1. The students should be able to understand the Indian Aesthetics.
2. The students should be able to analyze various literary arts and their specifications and understand various schools of literary criticism.

COURSE OUTCOMES:

1. To understand Indian Aesthetics in the field of Art.
2. To understand the aesthetic concepts from various Indian philosophers.
3. To analyze the contextual relevance of aesthetic theories and develop a culture of critical and analytical thinking.

CONTENTS

UNIT-I (30 Hrs.)

1. Introduction to the theory of Indian Aesthetics.
2. Theory of Bharat Muni's Natyashastra –The Origen of Drama (Described as the fifth Veda)
3. Relationship between Art and Aesthetics.

UNIT-II (30 Hrs.)

1. Six limbs of Indian Paintings -
Roopbhed, Pramanani, Bhava, Lavanya yojanam, Saadrashyam, Vernika bhangam
2. Theory of Rasa and Bhava-
Shingara, Hasya, Rudra, Karuna, Veera. Bhayanaka, Bhibhatsa, Adbhuta, Shanta

RECOMMENDED BOOKS

- Aesthetics by Prakash Veereshwarand Nupur Sharma (Krishna Prakashan Meerut)
- The Blooms Bury Research Handbook of Indian Aesthetics and the Philosophy of Art by Arindam Chakrabarti (Blooms bury Publishing India Pvt Ltd New Delhi)
- Indian Art and Aesthetics: Endeavours in Interpretation by Murti Nandan Tiwari and Kamalgiri (Aryan Books International)

INSTRUCTIONSTOTHEPAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, is to be set from the entire syllabus.
2. The examiner is required to set another six questions of 12 marks each (three from each unit), out of which the students are required to attempt any four questions (selecting two from each unit).

ART AND WESTERN AESTHETICS - I

Subject Code: BMFAD1-412

L S T P C
4 0 0 0 4

Duration: 60 Hrs.

COURSE PREREQUISITES: No Prerequisites required.

COURSE OBJECTIVES:

1. The Students should be able to understand the knowledge of Western Aesthetics.
2. The students should be able to analyze various literary arts and their specifications and understand various schools of literary criticism.

COURSE OUTCOMES:

1. To understand the Western Aesthetics in the field of Art.
2. To understand the aesthetic concepts from various Western philosophers.
3. To analyze the contextual relevance of Aesthetic theories and develop a culture of critical and analytical thinking.

CONTENTS

UNIT-I (30 Hrs.)

1. Introduction to Western Aesthetics.
2. Philosophical study of Art and Beauty within the Western Tradition.
3. Definition and scope of Aesthetics in philosophy and everyday life.

UNIT-II (30 Hrs.)

1. Introduction to Ancient Greek Aesthetics.
2. Plato's Theory (Plato viewed beauty as an eternal form)
3. Aristotle's Theory (Aristotle viewed beauty as the property of objects themselves)
4. Introduction to Medieval Aesthetics
5. Augustine's Theory (Beauty as a reflection of God's order and divine harmony)
6. Thomas Aquinas 'Theory (Beauty related to Goodness and truth.)

RECOMMENDED BOOKS

- A Hand Book of Method & Material- Ray Smith Chitran Samagri – Dr. R.K. Singh (In Hindi Language)
- The Painter's method and materials – A.P Laurie
- The Artist's Handbook of Materials and Techniques by Ralph Mayer

INSTRUCTIONS TO THE PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, is to be set from the entire syllabus.
2. The examiner is required to set another six questions of 12 marks each (three from each unit), out of which the students are required to attempt any four questions (selecting two from each unit)

STUDY FROM LIFE

Subject Code: BMFAD1-421

L S T P C
1 4 0 4 5

Duration: 135 Hrs.

COURSE PREREQUISITES: Students should have the knowledge of basic study of drawing, painting, and illustrations.

COURSE OBJECTIVES:

1. The students should be able to understand basic anatomical relationships relevant to descriptive drawing of the human form and methods of drawing images of the life model.
2. The students should learn a method of drawing and basic proportional relationships from life model.

COURSE OUTCOMES:

1. To learn about the fundamentals of drawing, principles of gestures, anatomy, and creative interpretation of the human figure.
2. To understand and demonstrate classical and contemporary drawing styles,
3. To explore various drawing materials and processes to produce both accurate and creative representational works.
4. To understand the appropriate vocabulary related to human anatomy for analyzing finished work in a constructive and critical dialogue.
5. To understand the rhythm of the body and Natural forms.

CONTENTS

UNIT –I (67 Hrs.)

1. Practice of Human figures in Black and White. (Charcoal pencil, pen and Ink)
2. Compositions from life -Flora and Fauna.

UNIT –II (68 Hrs.)

1. Illustrations on daily life activities.
2. Create a Landscape on Fantasy and Dreams.

RECOMMENDED BOOKS

- Memory drawing simplified Tushar Moleshwari (Jyotsna Prakashan, Mumbai)
- Sketching by Pratap Mulick(JyotsnaPrakashan,Mumbai)
- Figure drawing by Tushar Moleshvari (Jyotsna Prakashan, Mumbai)
- Figure Study made easy by Aditya Chari (Jyotsna Prakashan, Mumbai)
- Figure Drawing made easy by Shankar Modgekar (Jyotsna Prakashan, Mumbai)
- Anatomy by Victor Perard (Jyotsna Prakashan, Mumbai)
- Free Drawing by M. M. Mehta (Jyotsna Prakashan, Mumbai)

INSTRUCTIONS TO THE PAPER SETTER

- Evaluation shall be awarded through external viva- voce.

ILLUSTRATION

Subject Code: BMFAD1-422

L S T P C
1 4 0 4 5

Duration: 135 Hrs.

COURSE PREREQUISITES: Students should have the knowledge of basic Anatomical drawing and Perspective study

COURSE OBJECTIVES:

1. The students should be able to learn about the various types of Illustration techniques from a historical perspective.
2. The students should be able to learn the focal point concepts of drawing and illustration with illustration techniques, elements, and principles.

COURSE OUTCOMES:

1. To understand the Illustration techniques.
2. Knowledge of the different types of Illustration techniques and their purpose in daily life.
3. To understand the quality of Illustration, inks, papers, and their effects when they are using on different surfaces.
4. Knowledge to create expressive Illustrations and apply different techniques accordingly.

CONTENTS

UNIT-I (67 Hrs.)

1. Personal Series, based on life events, interests, and writings. Portrait illustrations with shading, black Ink. and Cross Hatching.
2. Design of Caricatures on Political Issues and activities.
3. Conceptual thinking/Telling a story

UNIT-II (68Hrs.)

1. Newspaper Illustrations – Choose three relevant, current topics Magazine full page layout spreads.
2. Research the newsstand for interesting, creative possibilities.
3. Package or label Design – Wine labels, beer bottles, soda cans, cereal, detergent, toys, clothing, a fancy boutique, etc.

RECOMMENDED BOOKS

- Acrylic Explorations by Rahul Deshpande (Jyotsna Prakashan, Mumbai)
- Opaque Color by Milind Mulick (Jyotsna Prakashan, Mumbai)
- Call of the Seas by Chandra Mohan Kulkarni (Jyotsna Prakashan, Mumbai)
- Acrylic Explorations by Rahul Deshpande (Jyotsna Prakashan, Mumbai)
- Method and Techniques by Pastel Rahul Deshpande, Gopal Nandurkar (Jyotsna Prakashan, Mumbai)
- My Paintings and Thoughts Behind Them by Vasudeo Kamath (Jyotsna Prakashan, Mumbai)
- My Way of Digital Painting by Chandra Mohan Kulkarni (Jyotsna Prakashan, Mumbai)
- The Art of Basic Oil Painting (Walter Foster)
- Painting with Bob Ross (Walter Foster)

- Painting: Acrylic Basics (WalterFoster)
- The Art of Painting Flowers in Oil & Acrylic (WalterFoster)

Portfolio Methodology

- Individual's daily performance
- Project Review; Mid Semester
- Project Submission; End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

- Evaluation shall be awarded through external viva- voce.

MRSPTEU

MRSPTU BFA –APPLIED ARTS SYLLABUS 2022 BATCH

Total Contact Hours =35

Total Marks = 600

Total Credits =23

5 th SEMESTER		Contact Hrs				Marks			Credits	Duration of Exam Hrs.
Subject Code	Subject Name	L	S	T	P	Int.	Ext.	Total		
BFARS1 -501	Story Board Design	2	2	-	4	60	40	100	5	No Exam (Internal Viva-voce)
BFARS1 -502	Magazine Layout	2	2	-	4	60	40	100	5	No Exam (Internal Viva-voce)
BFARS1 -503	Basics of Animation	1	2	-	4	60	40	100	4	No Exam (Internal Viva-voce)
BFARS1 -504	Campaign Planning-I	2	2	-	4	60	40	100	5	No Exam (Viva-voce by External)
BFARS1 -505	Advertising Art and Communication	2	-	-	-	40	60	100	2	3
BFARS1 -506	Aesthetics-II	2	-	-	-	40	60	100	2	3
Total		11	08	-	16	320	280	600	23	-

* Minimum 4 Expert Lectures to be conducted

**Educational Tour of duration up to 04 days may be undertaken during the semester.

*** Annual Art Exhibition shall be conducted of duration up to 04 days during the semester.

****One week compulsory workshop.

MRSPTU BFA –APPLIED ARTS SYLLABUS 2022 BATCH

Total Contact Hours =35

Total Marks = 700

Total Credits =23

6 th SEMESTER		Contact Hrs				Marks			Credits	Duration of Exam Hrs.
Subject Code	Subject Name	L	S	T	P	Int.	Ext.	Total		
BFARS1 -601	Caricature	1	2	-	2	60	40	100	3	No Exam (Internal Viva-voce)
BFARS1 -602	Campaign Planning-II	2	2	-	4	60	40	100	5	No Exam (External Viva-voce)
BFARS1 -603	Digital Animation	1	2	-	4	60	40	100	4	No Exam (Internal Viva-voce)
BFARS1 -604	Photography	1	2	-	4	60	40	100	4	No Exam (Internal Viva-voce)
BFARS1 -605	Seminar	1	2	-	-	40	60	100	2	3
BFARS1 -606	Aesthetics -III	3	-	-	-	40	60	100	3	3
BFARS1 -607	Literature (Punjabi)	2	-	-	-	40	60	100	2	3
Total		11	10	-	14	360	340	700	23	-

* Mandatory training of six weeks after sixth semester during summer vacations.

* Minimum 4 Expert Lectures to be conducted

**Educational Trip of 04 days may be undertaken during the semester.

MRSPTU BFA –APPLIED ARTS SYLLABUS 2022 BATCH

Total Contact Hours =39

Total Marks = 1900

Total Credits =28

7 th SEMESTER		Contact Hrs				Marks			Credits	Duration of Exam Hrs.
Subject Code	Subject Name	L	S	T	P	Int.	Ext.	Total		
BFARS1 -701	Social Media Design	-	4	-	4	180	120	300	4	No Exam (External Viva-voce)
BFARS1 -702	Exhibition Design and Display	-	4	-	4	180	120	300	4	No Exam (Internal Viva-voce)
BFARS1 -703	Hoarding Design	1	2	-	2	180	120	300	3	No Exam (Internal Viva-voce)
BFARS1 -704	Creative Landscape	-	4	-	4	240	160	400	4	No Exam (Internal Viva-voce)
BFARS1 -705	Graphic Design	-	4	-	4	240	160	400	4	No Exam (External Viva-voce)
BFARS1 -706	Advertising & Market Research-I	2	-	-	-	40	60	100	2	3
BFARS1 -707	Internship	-	-	-	-	100	-	100	3	No Exam (Internal Viva-voce)
Total		3	18	-	18	1160	740	1900	28	-

* Minimum 4 Expert Lectures to be conducted.

**One week compulsory workshop.

***Educational Tour of duration up to 07 days may be undertaken during the semester.

**** Art Festival shall be conducted of duration up to 04 days during the semester.

MRSPTU BFA –APPLIED ARTS SYLLABUS 2022 BATCH

Total Contact Hours =37

Total Marks = 1500

Total Credits =22

8 th SEMESTER		Contact Hrs				Marks			Credits	Duration of Exam Hrs.
Subject Code	Subject Name	L	S	T	P	Int.	Ext.	Total		
BFARS1 -801	Character Design	1	4	-	4	180	120	300	5	No Exam (Internal Viva-voce)
BFARS1 -802	Book Cover Design	1	4	-	4	240	160	400	5	No Exam (External Viva-voce)
BFARS1 -803	Composition Design	1	4	-	4	240	160	400	5	No Exam (External Viva-voce)
BFARS1 -804	Field Based Study	1	2	-	4	180	120	300	4	No Exam (Internal Viva-voce)
BFARS1 -805	Advertising & Market Research-II	3	-	-	-	40	60	100	3	3
Total		7	14	-	16	880	620	1500	22	-

* Minimum 4 Expert Lectures to be conducted.

Overall marks and credits

Semester	Marks	Credits
1 st	800	28
2 nd	800	26
3 rd	800	25
4 th	700	24
5 th	600	23
6 th	700	23
7 th	1900	28
8 th	1500	22
Total	7800	199

FIFTH SEMESTER

STORY BOARD DESIGN

Subject Code: BFARS1-501

L S T P C
2 2 0 4 5

Duration: 120 Hrs.

COURSE PREREQUISITES: Students should have knowledge of basic principles of designing and illustrations.

COURSE OBJECTIVES:

1. Student shall learn about various organizing ideas, break down concepts, and visualize their learning.
2. To make the students enhance their meta cognitive understanding.

COURSE OUTCOMES:

1. To make the students understand the best use of time and resource.
2. To make the understand the great way to organize the video without having to spend hours editing.

UNIT-I (60 Hrs.)

1. Personal Stories based on life events, interests, writings, memories etc.
2. Concept of Illustration and different Illustrative Techniques of Story Board Designing.
3. Creation and Conceptual thinking/ story telling with new style.

UNIT-II (60 Hrs.)

1. Cartooning Illustrations based on drama, reality, series and specific characters.
2. New ways of presenting story board that visually impacts the viewers.
3. Design traditional and ancient stories based on Indian Artists.

RECOMMENDED BOOKS

- 2."Art and Visual Perception – A Psychology of the Creative Eye 50th Anniversary" by Rudolf Arnheim
- Fundamental Of Visual Art" by Mukesh Kumar.
- "Philosophy and the Visual Arts: Seeing and Abstracting (Royal Institute of Philosophy Conferences)" by Andrew Harrison
- Film Directing Shot by Shot: Visualizing from Concept to Screen
- Star Wars Storyboards: The Original Trilogy

Portfolio Methodology

- Individual's daily performance
- Project Review; Mid Semester
- Project Submission; End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

Evaluation shall be awarded through internal viva -voce.

MAGAZINE LAYOUT

Subject Code: BFARS1-502

L S T P C
2 2 0 4 5

Duration: 120 Hrs.

COURSE PREREQUISITES: Students should have knowledge of basic principles of designing and Press layouting.

COURSE OBJECTIVES:

1. Student shall learn accessing the magazine in print or online, they create images and design that are easy for the eyes to follow and that are arranged in a way that's appealing and easy to follow.
2. Students are exposed to a variety of texts that encourage them to read, listen, learn and interact with engaging content.

COURSE OUTCOMES:

1. To make the student understand and develop a distinctive, outcome showcasing students creative magazine layout skills.
2. Understand the design process, critical thinking skills and research methodologies.
3. To make the student to understand creative ideation as a means of problem-solving and enhancing visual communication.

UNIT-I (60 Hrs.)

1. Basic concepts, principles and layouts of magazine design.
2. Various types of Magazine Layout Design such as single page design, double spread layout design, editorial design, custom design.
3. Introduction to Single Spread layout of magazine design and its process; gather and organize content ,choose a layout grid, create a layout plan, design the headline, arrange content, incorporate visual elements, apply typography, design for readability, use color and styles , review and finalize, prepare for print.

UNIT-II (60 Hrs.)

1. Introduction to Double Spread Magazine layout design.
2. Its process ; content gathering and planning, choose a layout grid for double page magazine design , conceptualize the layout, design the headline ,design the cover and leading elements, balance and visual hierarchy, typography and text layout, image and graphic placement, color scheme and style consistency, review and refine, prepare for print.

RECOMMENDED BOOKS

- Magazines: Inside & Out **Authors: Steven Heller and Teresa Fernandes**
- Designing for Newspapers and Magazines **Author: Chris Frost**
- Designing Magazines: Inside Periodical Design, Redesign, and Branding **Editor: Jandos Rothstein**
- How to Design and Improve Magazine Layouts **Author: Raymond Dorn**
- Magazine Design That Works **Author: Stacey King**

Portfolio Methodology

- Individual's daily performance
- Project Review; Mid Semester
- Project Submission; End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

Evaluation shall be awarded through internal viva -voce.

MRSPTU

BASICS OF ANIMATION

Subject Code: BFARS1-503

L S T P C
1 2 0 4 4

Duration: 105 Hrs.

COURSE PREREQUISITES: Students should have knowledge of basic principles of designing and illustration.

COURSE OBJECTIVES:

1. To develop the understanding of animation entails planning, sketching, and generating the appearance of motion from static images.
2. To develop the understanding of messages and complex subjects and help improve learners' retention.

COURSE OUTCOMES:

1. To learn a variety of animation methods to give fictional characters a sense of movement and action.
2. To enhances the comprehension of complex concepts, simplifying the learning process. To develop the ability to translate abstract ideas into images.

UNIT-I (52 Hrs.)

1. Introduction to Animation, definition and its history. Principles of Animation: - straight action and pose to pose Timing, Exaggeration, Drama and Psychological Effect, Fade in and fade out, Squash and Stretch, Anticipation, staging, follow through and overlapping action, slow in and slow out, arcs, timing, solid drawing, and appeal.
2. Types of Animation: -Traditional Animation (2D- Animation), Stop Motion Animation, Computer Animation (3D- Animation), Motion Graphics, Claymation, Cutout Animation, Typography Animation, Pixilation, Rotoscoping, Virtual Reality (VR) Animation.

UNIT-II (53 Hrs.)

1. Terminology of Animation– Keyframe, Tweening, Frame Rate Storyboard, Timeline , Rendering, Character Rigging, Texture Mapping, Onion Skinning , Looping, Masking, Keying , Spline, Rendering Pipeline, Storyboard Artist .
2. Skills for an Animation Artist: -Visual and creative development of an Artist, importance of observation with minute details, efficiency to draw gestures, facial expressions, good listener, hard work and patience, creative and innovative.

RECOMMENDED BOOKS

- Chris Patmore The complete animation course Baron's Educational Series. (New York) Designing for Newspapers and Magazines
- The Animator's Survival Kit / Richard Williams
- Cartoon Animation / Preston Blair
- The Illusion of Life / Frank Thomas and Ollie Johnston

Portfolio Methodology

- Individual's daily performance
- Project Review; Mid Semester
- Project Submission; End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

Evaluation shall be awarded through internal viva -voce.

MRSPTU

CAMPAIGN PLANNING - I

Subject Code: BFARS1-504

L S T P C
2 2 0 4 5

Duration: 120 Hrs.

COURSE PREREQUISITES: Students should have knowledge of basic media of advertising.

COURSE OBJECTIVES:

1. To make the student understand about a particular topic, refine creative concepts for mini campaign, considering target audience, message and medium.

COURSE OUTCOMES:

1. To enhance the technical skills in various design software and tools, enabling students to create visually compelling campaign materials.
2. Developing the ability to present and pitch campaign ideas confidently.
3. Understanding the steps involved in planning, executing, and managing a mini campaign from start to finish.

UNIT-I (60 Hrs.)

1. Introduction to Campaign planning –its parameters.
2. Principles of Campaign planning, co ordinations, policies, objectives of advertising campaign planning.
3. Process of campaign planning - theme, products , assembling different parts, headline, sub-heading, slogans, illustrations, text, identifications closing idea parts of poster-using direct command headline and question headlines.

UNIT-II (60 Hrs.)

1. Campaign for a new product using various types of media such as print media, electronic media, outdoor media, digital media.
2. Colored layout for print media using digital printing method, classification of advertising according to style-pictures and photographs.
3. Ethics in Advertising - Benefits ,utility, importance and manufacturers Ethical objection-Reith report on advertising , legal restrictions-obligations to value systems and life style, Responsibility towards children, Socio-economic values.

RECOMMENDED BOOKS

- Confessions of an Advertising Man by David Ogilvy
- Ogilvy on Advertising by David Ogilvy
- Hey, Whipple, Squeeze This: The Classic Guide to Creating Great Ads by Luke Sullivan
- Targeted: How Technology Is Revolutionizing Advertising and the Way Companies Reach Consumers by Mike Smith
- Introduction to Programmatic Advertising by Dominik Kosorin
- Influence: The Psychology of Persuasion by Robert B. Cialdini
- Predictably Irrational: The Hidden Forces That Shape Our Decisions by Dan Ariely

- Hooked: How to Build Habit-Forming Products by Nir Eyal
- The End of Advertising: Why It Had to Die, and the Creative Resurrection to Come by Andrew Essex
- Disruptive Marketing: What Growth Hackers, Data Punks, and Other Hybrid Thinkers Can Teach Us About Navigating the New Normal by Geoffrey Colon
- The Copywriter’s Handbook: A Step-By-Step Guide To Writing Copy That Sells by Robert W. Bly
- Made to Stick: Why Some Ideas Survive and Others Die by Chip Heath and Dan Heath
- Made to Stick: Why Some Ideas Survive and Others Die by Chip Heath and Dan Heath

Portfolio Methodology

- Individual’s daily performance
- Project Review; Mid Semester
- Project Submission; End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

Evaluation shall be awarded through external viva- voce

ADVERTISING ART AND COMMUNICATION

Subject Code: BFARS1-505

**L S T P C
2 0 0 0 2**

Duration: 30 Hrs.

COURSE PREREQUISITES: Students should have basic knowledge of advertising history and its importance in relevant media of advertising.

COURSE OBJECTIVES:

1. To make the students aware about the major characteristics and role of advertising in market strategy.
2. To develop the understanding of advertising as an element of marketing communications, of how the advertising planning process is managed, and the various factors affecting decision-making in this area.

COURSE OUTCOMES:

1. To increase knowledge of students between information and selling.
2. To make the student recognize the codes and conventions of different categories of advertisements and art.
3. To sharpen the analytical and critical thinking skills in examining visual art.

CONTENTS

UNIT-I (15 Hrs.)

1. **Introduction to Advertising and Communication** –as a paid, non personal ,targeted ,mass communication ,media channels , informative, persuade, remind, measurable results
2. **Process of communication;** Sender, Message, Channel, Receiver, Feedback, Noise and Context.
3. **Types of communication;** Verbal, Nonverbal, Written, Visual, Digital, Direct Marketing, Interpersonal, Sales promotion, Public relations.

UNIT-II (15 Hrs.)

1. **Introduction to Marketing/Media Strategy :** Setting Advertising Objectives-Message about Product, Message about Price, Message About Other Promotions, Message about Distribution
2. **Strategic Planning Process:** Select the Target Audience , Understand target Audience Decision Making, Determine the Best Positioning Develop Communication Strategy Set a Media Strategy
3. **Media Planning** –elements of Media Planning, Developing A Media Plan, Components of Media Plan

RECOMMENDED BOOKS

- Innovation in Marketing- T. Levitt
- Advertising Hand book- Barton-Roger Boviton
- Modern Advertising- Hepnar
- Advertising- John S. Wright, Daniel S. Marner, Wills L. Winter Jr. And S.K. Zeigler
- Confessions of an Advertising Man-David Ogilvy
- Ogilvy on Advertising- David Ogilvy
- The Applied art handbook-Luthra S.K.

- Advertising Art & Ideas- G.M.Rege
- Advertising- What it is and How to do it- R. White

INSTRUCTIONS TO THE PAPER SETTER

1. One compulsory question containing six questions of 2 marks each (12 marks), are to be set from the entire syllabus.
2. The examiner is required to set another six questions of 12 marks each (three from each unit), out of which the students are required to attempt any four questions

MRSPTU

AESTHETICS-II

Subject Code: BFARS1-506

L S T P C
2 0 0 0 2

Duration: 30 Hrs.

COURSE PREREQUISITES: Students should have the basic knowledge of Indian Aesthetics and relevant contextual theories of Aesthetics.

COURSE OBJECTIVES:

1. Understanding of Indian Aesthetics
2. To analyse the difference between art and craft, its specifications.
3. To understand the basic religious system of Buddhism

COURSE OUTCOMES:

1. To get a historical understanding on Indian Aesthetics
2. To understand the theory of Chitrasutra of Vishnu Dharmottara Purana.
3. To develop a culture of critical and analytical thinking
4. To analyse the interconnection between Art and emotion

CONTENTS

UNIT-I (15 Hrs.)

1. **Introduction to Art as a Kala**– according to Bharat Muni , Plato, Croche, Ruskin and Shri Jai Shankar Prasad.
2. **Division of Art** –Professional Art and Liberal Art
3. **Iconography and Mudras**– Types of Mudras; Abhaya , Varada, Jnana, Vyakhyana, Katyavalambita, Namaskara, Gajahasta, Dhyana, Harini , Kartari , Kataka, Vitarka, Tarjani, Suci, Tarpana, Ksepana, Uttarakodhi, Buddhasramana, Bhumisparsha, Bhutadamara, Anjali and Vajrahumkara.

UNIT-II (15 Hrs.)

1. **Basic Religious System** – Buddhism Beliefs and Practices, Dharmachakra or Dharma Wheel
2. **Diversity of Buddhist Symbolism** – Theravada , Mahayana , Vajrayana
3. **Common Buddhist Symbols** – Parasol, Treasure Vase, Lotus Flower, Conch Shell, Golden Fish, Vajra, Tribu , Swastika, Kapala, Lion, Bodhi Tree

RECOMMENDED BOOKS

- Aesthetics by Prakash Veereshwar and Nupur Sharma (Krishna Prakashan Meerut)
- The Blooms bury Research Handbook of Indian Aesthetics and the Philosophy of Art by Arindam Chakrabarti (Blooms bury Publishing India Pvt Ltd New Delhi)
- Indian Art and Aesthetics Endeavours in Interpretation by Murti Nandan Tiwari and Kamalgiri (Aryan Books International)

Portfolio Methodology

- Individual's daily performance
- Project Review; Mid Semester
- Project Submission; End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

1. One compulsory question containing six questions of 2 marks each (12 marks), each requiring short answers.
2. The examiner is required to set another six questions of 12 marks each (three from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

MRSPTU

SIXTH SEMESTER

CARICATURE

Subject Code: BFARS1-601

L S T P C
1 2 0 2 3

Duration: 75 Hrs.

COURSE PREREQUISITES: No Prerequisites is required.

COURSE OBJECTIVES:

To make the students identify the style of caricature, including traditional drawing and mix media.

COURSE OUTCOMES:

1. Developing a personal style or theme in caricatures that showcases unique perspective.
2. Understanding of visual composition and layout.
3. Experimentation with different mediums and techniques to create expressive caricatures.

UNIT-I (37 Hrs.)

1. Introduction and history to the Caricature. Study the work of famous caricaturists (Al Hirschfeld, Ralph Steadman)
2. Exaggerating specific facial features (such as nose, eyes, mouth) in separate sketches.
3. Using various techniques ; Enlargement, Distortion, Simplification, Contrast
4. Study the various facial expressions and emotions (such as happy, sad, angry, surprised).
Accuracy and proportion of facial features.
5. Creativity and originality in composition and design.

UNIT-II (38 Hrs.)

1. Observing Facial Features – Observe a friend’s or family members face, paying attention to the shape, proportion and characteristics of their facial features (eyes, nose, mouth, eyebrows.)
2. Create a detailed sketch of the face, focusing on the accurate representation of each feature.
3. Create a series of caricatures from live faces, focusing on exaggerating specific features to create humor or emphasis.
4. Choose a subject from popular culture (celebrity, politician cartoon character) or a self-portrait.
5. Experiment with different media (such black and colored pencils, markers, inks, brushes pens).

RECOMMENDED BOOKS

- America on Film by Harry M. Benshoff
- The Beginning or the End: How Hollywood—and America—Learned to Stop Worrying and Love the Bomb by Greg Mitchell
- The Big Goodbye: Chinatown and the Last Years of Hollywood by Sam Wasson

Portfolio Methodology

- Individual’s daily performance
- Project Review; Mid Semester
- Project Submission ;End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

Evaluation shall be awarded through internal viva- voce

CAMPAIGN PLANNING-II

Subject Code: BFARS1-602

L S T P C
2 2 0 4 5

Duration: 120 Hrs.

COURSE PREREQUISITES: Students should have knowledge of basic principles of campaign and advertising media.

COURSE OBJECTIVES:

To make the students to inform the target audience about product through creative visualization and presentation.

COURSE OUTCOMES:

1. Understanding of fundamental marketing concepts, and principles in areas of marketing policy; of market and consumer of product, distribution, promotion and pricing decisions. It accelerates and enhances comprehension of complex concepts, simplifying the learning process.
2. Understanding the current market situation of advertising related aspects in visual learning styles.

UNIT-I (60 Hrs.)

1. Advertising Campaign includes the complete digital design-based campaign on a particular theme of consumer advertising as double spread magazine design.
2. Campaign Planning includes the complete digital design-based campaign on a particular theme of non-product advertising as newspaper advertising

UNIT-II (60 Hrs.)

1. Media Planning includes the complete digital design-based campaign on a particular theme of socio cultural communication themes in sync with the poster and hoarding advertising.
2. Execution of final art work of approved material supported with a brief report/data as social media advertising.

RECOMMENDED BOOKS

- Chris Patmore The complete animation course Baron’s Educational Series. (New York) Designing for Newspapers and Magazines
- The Animator’s Survival Kit / Richard Williams
- Cartoon Animation / Preston Blair
- The Illusion of Life / Frank Thomas and Ollie Johnston

Portfolio Methodology

- Individual’s daily performance
- Project Review; Mid Semester
- Project Submission; End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

Evaluation shall be awarded through external viva- voce

DIGITAL ANIMATION

Subject Code: BFARS1-603

L S T P C
1 2 0 4 4

Duration: 105 Hrs.

COURSE PREREQUISITES: Students should have knowledge of basic principles of designing and illustration.

COURSE OBJECTIVES:

1. To make the students understand about animation entails planning, sketching, and generating the appearance of motion from static images that are not interchangeable.
2. Students shall learn the numerous studies support the educational benefits of well-designed animation.

COURSE OUTCOMES:

1. Understanding a variety of animation methods to give fictional characters a sense of movement and action.
2. Understanding the comprehension of complex concepts, simplifying the learning process.
3. Developing the ability to translate abstract ideas into images especially beneficial for students who favour visual learning styles.

UNIT-I (52 Hrs.)

1. Introduction to the Digital Animation; its key frame, its history and tweening.
2. Fundamentals and Principles of storytelling in animation
3. Creating characters for 3d animations and story boarding techniques.
4. Creating vector graphics and pixel art.

UNIT-II (53 Hrs.)

1. Creating 3d Characters and environments.
2. Basic rigging and animation techniques (such as walk cycles, character movements)
3. Adding special effects to animations (explosions, magic)
4. Compositing techniques (layering, blending modes)
5. Creation of short animation (1- 2 minutes) using digital software.

Software Requirements

Adobe Animate, Blender

RECOMMENDED BOOKS

- Chris Patmore The complete animation course Baron’s Educational Series. (New York) Designing for Newspapers and Magazines
- The Animator’s Survival Kit / Richard Williams
- Cartoon Animation / Preston Blair
- The Illusion of Life / Frank Thomas and Ollie Johnston

Portfolio Methodology

- Individual’s daily performance
- Project Review; Mid Semester
- Project Submission; End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

Evaluation shall be awarded through internal viva- voce

MRSPTU

PHOTOGRAPHY

Subject Code: BFARS1-604

**L S T P C
1 2 0 4 4**

Duration: 105 Hrs.

COURSE PREREQUISITES: Students should have the knowledge of basic idea of frame & composition in the area of still images. Knowledge of the Camera & Computer operation is also necessary.

COURSE OBJECTIVES:

The students should be able to visualize Photography & video studios, edit set-up, graphic arts industry and other audio visual sectors.

COURSE OUTCOMES:

1. Understanding the concept of the basics of digital imaging, Raster & Vector Graphics, Resolution, Pixel depth, Aspect Ratio, Dynamic Range, File Formats, File Size, Image Compression etc.
2. Understanding the concept of digital platform and various methods of image capture.
3. Understanding the various methods of post-production and retouching techniques.

UNIT-I (52 Hrs.)

1. Introduction to Photography and its history. Types of Photography: still, motion, and multimedia.
2. Types of photography: film, digital, and hybrid. Camera body and its parts (lens, shutter, aperture, ISO)
3. Lens types; prime, zoom, macro, fisheye. Aperture: f-stop, depth of field, and bokeh.
4. ISO; sensitivity, noise reduction, and grain.

UNIT-II (53 Hrs.)

1. Introduction to image editing software (such as Adobe Light room, Photoshop).
2. Basic editing techniques: cropping, adjusting, brightness, contrast, color balance.
3. Natural Light: types (softbox, sidelight, backlight, its characteristics (warmth, direction)
4. Artificial Light: studio strobes, continuous lights and LEDs.

RECOMMENDED BOOKS

1	M. Langford	Advance Photography	1985	Blaker Applied depth of field
2	H. Angel W	Landscape photography	2009	White Photo macro graphy
3	Langford	An introduction Visual aids	2005	Wadsworth Publishing Company
4.	Spencer's	Photography in education	2000	Applied photography
5.	Arnold	Color photography in practice	2003	Applied photography

Portfolio Methodology

- Individual's daily performance
- Project Review; Mid Semester
- Project Submission; End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

Evaluation shall be awarded through internal viva- voce

SEMINAR

Subject Code: BFARS1-605

**L S T P C
1 2 0 0 2**

Duration: 45 Hrs.

COURSE PREREQUISITES: No Prerequisites required.

COURSE OBJECTIVES:

To enhance students' ability to critically analyze and interpret works of art, art history, and artistic practices. To develop advanced research skills relevant to the field of fine arts, including the ability to locate, evaluate, and synthesize scholarly and artistic sources.

COURSE OUTCOMES:

1. Students will demonstrate the ability to conduct thorough and effective research related to their artistic interests and the broader field of fine arts.
2. Students will show improved critical thinking skills by analyzing and discussing various art forms, theories, and practices.
3. Students will be proficient in presenting their ideas and research findings in a clear, engaging, and professional manner.

CONTENTS

UNIT-I (23 Hrs.)

1. A Student has to select a Topic / Subject on Contemporary Indian Art and Artists.
2. Submission of a field based study on any topic with data collection and analysis under the guidance of a guide.

UNIT-II (22 Hrs.)

1. Focused on professional enhancement according to the specific talent of the particular student in his field and to become mature under the guidance.
2. A student can work under any one faculty by choice and depending upon the specific field expertise

RECOMMENDED BOOKS

- Simple Ideas on Presentation Design and Delivery by Garr Reynolds
- The Psychology of Persuasion by Robert B. Cialdini
- The Art and Science of Creating Great Presentations by Nancy Duarte
- Present Visual Stories that Transform Audiences by Nancy Duarte
- The official TED guide to public speaking by Howard Hugh

Portfolio Methodology

- Individual's daily performance
- Project Review; Mid Semester
- Project Submission ;End of the Semester

INSTRUCTIONS TO THE PAPER SETTER

- Evaluation shall be awarded through internal viva- voce

AESTHETICS-III

Subject Code: BFARS1-606

L S T P C
3 0 0 0 3

Duration: 45 Hrs.

COURSE PREREQUISITES: Students should have knowledge of Indian Aesthetics and relevant contextual theories of Aesthetics.

COURSE OBJECTIVES:

Students shall learn about the iconography of various Asanas and Aesthetics of Philosophers.

COURSE OUTCOMES:

1. Understanding the concept of Indian Aesthetics
2. Understanding the theory of various Philosophers.

CONTENTS

UNIT-I (23 Hrs.)

1. Nature of Beauty as discussed by Plato, Aristotle, Immanuel Kant, Georg Hegel, Tolstoy.
2. Nature of Beauty as discussed by Friedrich Nietzsche, Martin Heidegger, Jean-Paul Sartre, John Dewey.
3. Theory of Asana and its types: Padmasana , Virasana , Siddhasana, Bharadvajasana , Dhanurrasana, Utkatasana, ArdhaMatsyendrasana, Haumanasana, Marichyasana, Usttrasana .

UNIT-II (22 Hrs.)

1. Introduction to Jainism in Aesthetic and its concepts ; Ahimsa (Non –Violence), Aparigraha (Non – Possession), Anekantavada (Non- Absolutism), Karmaphala (Cause and effect)
2. Artistic Elements in Jain Aesthetic: Naturalism, Minimalism, Symbolism, Linear Perspective.
3. Jain Art and Architecture: Sanchi Stupa, Ellora Caves, Khujuraho group of Monuments.

RECOMMENDED BOOKS

- Aesthetics by Prakash Veere shwarand Nupur Sharma (Krishna Prakashan Meerut)
- The Blooms bury Research Handbook of Indian Aesthetics and the Philosophy of Art by Arindam Chakrabarti (Blooms bury Publishing India Pvt Ltd New Delhi)
- Indian Art and Aesthetics Endeavours in Interpretation by Murti Nandan Tiwari and Kamalgiri (Aryan Books International)

INSTRUCTIONS TO THE PAPER SETTER

1. One compulsory question containing six questions of 2 marks each (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions of 12 marks each (three from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

LITERATURE (PUNJABI)

Subject Code: BFARS1-607

L S T P C
2 0 0 0 2

Duration: 30 Hrs.

COURSE PREREQUISITES: Students should have the basic knowledge of Punjabi Grammar and Punjabi Literature.

COURSE OBJECTIVES:

To develop analytical skills by studying various genres such as poetry, prose, drama, and folk literature. To examine literary techniques, themes, and stylistic elements used by Punjabi writers.

COURSE OUTCOMES:

1. Students will be able to identify and describe significant Punjabi literary works and authors.
2. Students will have a comprehensive understanding of the evolution of Punjabi literature and its major periods and styles.
3. Students will demonstrate the ability to analyze and interpret literary texts, including their themes, characters, and narrative techniques.
4. Students will gain insight into the cultural and historical background that shapes Punjabi literature.

CONTENTS

UNIT-I (15 Hrs.)

Punjabi Prominent Poets (Life and Literary work style with any two poems)

1. Bhai Veer Singh,
2. Puran Singh,
3. Dhaniram Chatrik
4. Varis Shah

Punjabi Story writers / Novelists (Life and Literary work style with any one story)

1. Sant Singh Sekhon
2. Santokh Singh Dheer
3. Nanak Singh
4. Gurbaksh Singh Preetladi

UNIT-II (15 Hrs.)

Modern Punjabi Poets (Life and Literary work style with any two poems)

- a. Professor.Mohan Singh
- b. Surjit Patar
- c. Shiv Kumar Batalvi
- d. Amrita Pritam

Modern Punjabi Story writers / Novelists (Life and Literary work style with any one story)

- a. Navtej Singh
- b. Daleep Kaur Tiwana
- c. Gurdial Singh

RECOMMENDED BOOKS

- Adhunik Kaav Sangam (Sutinder Singh Noor)
- Punjabi Katha (Gurdial Singh)
- 10 Pratinidhi Kahaniyan (Nanak Singh)
- Bhai Veer Singh Kaav
- Main Tenu Phir Milangi (Amrita Pritam)
- Selected Stories of Gurbhaksh Singh Preetladi
- Saave Patar (Prof.Mohan Singh)
- Birhada (Shiv Kumar)
- Hva Vich Likhe Harf (Surjit Patar)
- Gurdial Singh Rachanavali
- Eho Hmara Jiwana (Dalip Kaur Tiwana)

INSTRUCTIONS TO THE PAPER SETTER

1. One compulsory question containing six questions of 2 marks each (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions of 12 marks each (three from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

Maharaja Ranjit Singh Punjab Technical University

Bathinda-151001



FACULTY OF ARCHITECTURE AND PLANNING

SYLLABUS

FOR

BACHELOR OF DESIGN (INTERIOR DESIGN)

(4 YEARS PROGRAMME)

2022 BATCH ONWARDS

Note: (i) Copy rights are reserved.

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Defaulters will be prosecuted.

(ii) Subject to change in the syllabi at any time.

Please visit the University website time to time.

1st Semester

Total Contact Hours = 26

Total Marks = 800

Total Credits = 21

SEMESTER 1 st		Contact Hrs.				Marks			Credits	Duration of Exam Hrs
Subject Code	Subject Name	L	T	S	P	Int.	Ext.	Total		
BMNCC0-053	Introduction to Interior Design	2	0	0	0	100	0	100	0	No Exam
BDIDS1-101	Interior Design Studio – I	2	0	4	0	40	60	100	6	3
BDIDS1-102	Materials and Construction - I	2	0	3	0	40	60	100	5	3
BDIDS1-103	Manual Graphics – I	2	0	3	0	40	60	100	5	3
BDIDS1-104	History of Interior Design - I	2	0	0	0	40	60	100	2	3
BDIDS1-105	Elements of Interior Space	1	0	1	0	40	60	100	2	3
BDIDS1-106	Model Making	0	0	0	2	60	40	100	1	No Exam (External Viva - Voce)
BMNCC0-041	"Drug Abuse: Problem, Management & Prevention"	2	0	0	0	100	0	100	0	No Exam
BMNCC0-010	Universal Human Values - I	22 Hrs (to be completed during SIP)*				Satisfactory/ Unsatisfactory				No Exam
Total		13	1	10	2	460	340	800	21	

- There will be Induction Programme of 3 weeks before start of classes.
- Drug Abuse: Problem, Management & Prevention & Introduction to Concerned Branch of Engineering are non-credit Courses; however, it is necessary to secure at least E grade in each of them.
- Educational Tour of duration up to 4 days during the semester may be undertaken

Total Contact Hours = 26

Total Marks = 600

Total Credits = 24

SEMESTER 2 nd		Contact Hrs.				Marks			Credits	Duration of Exam Hrs
Subject Code	Subject Name	L	T	S	P	Int.	Ext.	Total		
BDIDS1-201	Interior Design Studio – II	2	0	4	0	40	60	100	6	6
BDIDS1-202	Materials and Construction - II	2	0	3	0	40	60	100	5	3
BDIDS1-203	Manual Graphics – II	2	0	3	0	40	60	100	5	3
BDIDS1-204	Theory of Interior Design	2	0	0	0	40	60	100	2	3
BDIDS1-205	Digital Graphics – I	1	0	0	4	40	60	100	3	No Exam (External Viva -Voce)
BHSMC0-026	Universal Human Values - II	2	1	0	0	100	0	100	3	No Exam
Total		11	1	10	4	300	300	600	24	

- Exit Certificate of Interior Design can be opted after completion of 1 year in this course.
- Educational Tour of duration up to 4 days during the semester may be undertaken.

3rd Semester

Total Contact Hours = 22

Total Marks = 600

Total Credits = 20

SEMESTER 3 rd		Contact Hrs.				Marks			Credits	Duration of Exam Hrs
Subject Code	Subject Name	L	T	S	P	Int.	Ext.	Total		
BDIDS1-301	Interior Design Studio – III	2	0	4	0	40	60	100	6	12 (External by External viva voce)
BDIDS1-302	Materials & Construction- III	2	0	3	0	40	60	100	5	3
BDIDS1-303	Digital Graphics – II	1	0	0	4	40	60	100	3	No Exam (External Viva - Voce)
BDIDS1-304	History of Interior Design - II	2	0	0	0	40	60	100	2	3
BDIDS1-305	Interior Services- I	2	0	0	0	40	60	100	2	3
BDIDS1-306	Interior landscape	2	0	0	0	40	60	100	2	3
Total		11	0	7	4	240	360	600	20	

Educational Tour of duration up to 6 days during the semester may be undertaken.

4th Semester

Total Contact Hours = 21

Total Marks = 700

Total Credits = 18

SEMESTER 4 th		Contact Hrs.				Marks			Credits	Duration of Exam Hrs
Subject Code	Subject Name	L	T	S	P	Int.	Ext.	Total		
BDIDS1-401	Interior Design Studio – IV	2	0	3	2	40	60	100	6	12 (External viva voce)
BDIDS1-402	Furniture Design	2	0	0	2	40	60	100	3	3
BDIDS1-403	English Composition & Communication	1	0	0	2	40	60	100	2	3
BDIDS1-404	Interior Services- II	2	0	0	0	40	60	100	2	3
BDIDS1-405	Interior Lighting	2	0	0	0	40	60	100	2	3
BDIDS1-406	Physical Modelling and Visualization	1	0	0	2	60	40	100	2	No Exam (External Viva - Voce)
BDIDS1-407	Educational Tour-I	0	0	0	0	100	0	100	1	No Exam (Internal Viva - Voce)
Total		10	0	3	8	360	340	700	18	

- Educational Tour-I (BDIDS1-407) of up to 07 days during the semester shall be undertaken and evaluated.
- Field Visits/Workshops / Expert Sessions / Visits to Exhibition venues located within the Northern Region (India) shall be planned.

1ST SEMESTER

INTRODUCTION TO INTERIOR DESIGN

Subject Code: BMNCC0-053

L T S P C
2 0 0 0 0

Duration: 30 Hrs.

COURSE PREREQUISITES

Nil

COURSE OBJECTIVES

To appraise students with the knowledge, skills, and abilities necessary for a successful career in the field.

COURSE OUTCOME

1. To Understanding the different methods of design presentation and its deliver.
2. To understand the basics of Interior design and its implementation.
3. To understand the larger scope of Interior design associated fields.
4. Understanding the impact of Interior Project Management on the built environment.
5. To understand the role of Portfolio, Internship & its contribution towards professional practice.

UNIT-I (10 Hrs.)

Fundamentals of Design and Applications

Introduction to basic design principles and elements.

Design process: problem definition, research, concept generation, sketching, development, presentation, spatial relationships and proportions.

Architectural Drafting and Drawing, Computer-Aided Design (CAD), Interior Materials and Finishes, Manual Graphics

UNIT-II (10 Hrs.)

Interior Design and Allied Fields

Interior Materials and Finishes, Interior Lighting, Furniture Design

Color Theory and Application, Environmental Psychology

Project Management

UNIT-III (10 Hrs.)

Portfolio, Internship and Professional Practices

Presentation skills for design projects, practicum to provide real-world experience

Ethics and responsibilities, Client communication and Project presentation

RECOMMENDED BOOKS

1. Architecture - Form, Space and Order by Francis D.K. Ching
2. The Interior design Handbook: Furnish, Decorate and style your space by Frida Ramstedt.
3. The Interior design Reference & Specification Book by Chris Grimley.
4. Building drawing, 3rd edition – M G Shah, C M Kale, Tata Mcgraw – Hill publishing, New Delhi.
5. S. C. Rangwala - Engineering materials - Charotar Publishing, Anand
6. Architectural Graphics by Francis D.K. Ching
7. Interior Design Illustrated by Francis D.K. Ching

INTERIOR DESIGN STUDIO – I

Subject Code: BDIDS1-101

L T S P C
2 0 4 0 6

Duration: 90 Hrs.

COURSE PREREQUISITES

Nil

COURSE OBJECTIVES

To make students familiar with various factors affecting the aesthetic and functional aspects of design through training them in two-dimensional and three dimensional design compositions.

COURSE OUTCOME

1. Understanding various design principles such as emphasis, balance, contrast, Harmony, Unity etc., and applying them in two-dimensional and three-dimensional compositions.
2. Understanding and applying design elements such as Point, Line, shape, color, texture, area, mass, volume etc.
3. Critical analysis of design of existing manmade objects, aiding self-criticism of design and inspiration from nature as a source for design.
4. Understanding the process involved in design including analysis, synthesis and evaluation.
5. To understand the evolution of design from basic concepts to design outputs.
6. To collaborate both technical knowledge along with creativity, theme and rendering output.

UNIT-I (30 Hrs)

Designs involving various elements such as point, line, shape, colour and texture – applied to compositions such as mural design, fabric design, mosaics, stained glass, engraving, block printing, collage etc. – involving all the principles of composition.

UNIT-II (30 Hrs)

3D sculptures involving platonic solids, wooden sculptures applying different types of carpentry joints, design and execution of POP made objects such as: cornices, moldings, brackets, etc., Metal and terracotta sculptures.

Study and critical analysis of man-made objects – their purpose, functional suitability, formal appeal, etc. – evolving suggestions for improvement of the same.

UNIT-III (30 Hrs)

Study and analysis of forms, patterns and color schemes in nature. Abstraction of natural forms and design of three-dimensional objects and two-dimensional patterns inspired by them.

RECOMMENDED BOOKS

1. Paul Laseau, Graphic Thinking for Architects and Designers, John Wiley & Sons.
2. TrewinCoplestone, Arts in Society, Prentice Hall Inc.
3. H. Gardner, Art through Ages.
4. David Fair, Design Graphics, Hodder and Stoughton.
5. Architectural arts and Sculpture, Guild Source Books.
6. Virginia Cobb Watson, Discovering the Inner Eye, Guptill Publication.
7. JohannesItten, The Art of Colour.
8. H.H. Arnason, History of Modern Art

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question is to be set from the entire syllabus.
2. The topic of the project is to be displayed on College / Institute Notice Board ten days in advance.

MATERIALS AND CONSTRUCTION- I

Subject Code: BDIDS1-102

L T S P C
2 0 3 0 5

Duration: 75 Hrs.

COURSE PREREQUISITES

Nil

COURSE OBJECTIVES

To familiarize the students of Interior Design on material and construction methodology

COURSE OUTCOME

1. Understanding the process of building construction from the very first step.
2. To understanding the basic components of the buildings envelope for small buildings like Foundations, Walls, Openings, Roofs, Understanding simple roof & floor finishes.
3. Understanding masonry construction details
4. Developing the knowledge of components of the brick masonry
5. Understanding the Types, Uses & Market rates of building materials.
6. Understanding the various building materials used in construction of a building with study of their Constituents, Properties.

UNIT-I (25 Hrs)

INTRODUCTION TO MATERIALS

- Wood - Soft and hardwood, plywood, laminated wood and particle boards – properties, manufacture & uses.
- Synthetic Materials – Different types of Glass, their properties, manufacturing processes and uses. Plastics – injection moulding & other manufacturing methods, etc.
- Fabrics – textile, Jute, leather etc. different types and their uses

UNIT-II (25 Hrs)

WALLS - TYPES OF MASONRY

Different types - Stone walls – random rubble, coursed rubble, square rubble, polygonal rubble & Ashlar etc. Brick masonry -Types of bonds - single & double Flemish bond, header bond, stretcher bond, rat trap bond, ornamental bonding.

UNIT-III (25 Hrs)

TILED ROOFS

Drawings indicating various types of sloped & hipped roof Types of sloping roof –lean to & couple roof with Mangalore tiles, country tiles & pan tiles.

STRUCTURAL SYSTEMS

Structures – Components of a load bearing wall &RCC slab roof system - RCC beams, columns and framed structure

BASIC SERVICES

Components of a toilet & bathroom – sanitary ware - W.C., wash basin, bathtub, jacuzzi etc. Sanitary fittings – taps, mixers, shower units

RECOMMENDED BOOKS

1. S. C. Rangwala - Engineering materials - Charotar Publishing, Anand
2. Francis D. K. Ching - Building Construction Illustrated, VNR, 1975
3. W.B.Mckay –Building construction Vol1 –Longmans, UK 1981
4. W.B.Mckay –Building construction Vol 3 –Longmans, UK 1981

INSTRUCTIONS TO QUESTION PAPER SETTER

1. The examiner is required to set a total of six questions with two questions from each UNIT.
2. The student is required to attempt any one question from each UNIT making a total of three questions.

MANUAL GRAPHICS – I

Subject Code: BDIDS1-103

L T S P C
2 0 3 0 5

Duration: 75 Hrs.

COURSE PREREQUISITES

Nil

COURSE OBJECTIVE

To make students improve their sketching skills & drawing abilities.

COURSE OUTCOME

1. To learn rendering of textures of different building materials in pencil.
2. To learn the fundamentals of drawing equipments and method of presentation
3. To understand variety of forms as a medium for indoor and outdoor sketching
4. To learn various colour schemes, tints and shades.
5. To make them understand the use of colors& their effects in drawing.
6. Isometric views of simple and complex forms.

UNIT-I (25 Hrs)

INTRODUCTION TO FREE HAND DRAWING

- Basic exercises, Still life, Basic forms, effect of lines to represent textures - Understanding of different types of perspective views using vanishing points, shading exercises etc.

SKETCHING

- Outdoor sketching including Lawns, bushes, Water Bodies, Plants & trees in different media. Indoor sketching – furniture, lights, corridor, lobby, class room etc.

UNIT-II (25 Hrs)

MEASURED DRAWING

- Lettering - types, Scale, measured drawing of furniture, wall panelling, flooring pattern, ceiling pattern, doors and windows.

GEOMETRICAL DRAWING

- Orthographic projections - Projection of lines, planes and solids, section of primary solids such as pyramids, cones, cylinder, prism, sphere, cuboids, etc.

UNIT-III (25 Hrs)

ISOMETRIC DRAWING

- Isometric projection of all platonic solids such as cube, cuboids, hexagonal prism, pyramids, cone and sphere etc. – isometric projection of singly and doubly curve surfaces.

RECOMMENDED BOOKS

1. Drawing – A creative Process, Francis D.K. Ching, John Wiley Sons, New York
2. Geometrical drawing for art students, 2nd revised edition - I.H.Morris, Orient Longman, Calcutta, 1995.
3. Architectural drafting and design, 4th edition – Ernest R. Weidhaas, Allyn and Bacon, Boston, 1981.
4. Building drawing, 3rd edition – M G Shah, C M Kale, Tata Mcgraw – Hill publishing, New Delhi.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. The examiner is required to set a total of six questions with two questions from each UNIT.
2. The student is required to attempt any one question from each UNIT making a total of three questions.

HISTORY OF INTERIOR DESIGN - I

Subject Code: BDIDS1-104

L T S P C
2 0 0 0 2

Duration: 30 Hrs.

COURSE PREREQUISITES

Nil

COURSE OBJECTIVES

To provide the student of Interior Design knowledge on various developments in Interior design through ages.

COURSE OUTCOME

1. To help the student understand the designs from Prehistoric Period to the Middle Ages.
2. To know more on the Modern Movements in Interior design from the beginnings of 20th century.
3. To understand the different traditional contemporary art form with different tools and techniques
4. To explore the different ornaments and accessories in historic interiors
5. To appreciate various styles learnt through individual designs across diverse range of sources
6. To understand the role of decorative styles in history of architecture and interior design.

UNIT – I (10 Hrs)

EARLY CLASSICAL PERIOD

- Prehistoric Cave paintings – Primitive Designs- Interiors during Egyptian, Greek, Roman, Gothic, Early Christian & Renaissance Periods.

MIDDLEAGES

- Interiors in Romanesque, Gothic, and renaissance periods

UNIT – II (10 Hrs)

COLONIAL TO THE BEGINNING OF THE 20TH CENTURY

- Colonial, Victorian designs, Arts & Crafts movement, Art Nouveau, Eclectism, Frank Lloyd Wright.

UNIT – III (10 Hrs)

BAUHAUS TO POST WAR MODERNISM

- Walter Gropius/ Bauhaus, De Stijl, Mies Van Der Rohe, Le Corbusier, Art Deco, Postwar Modernism.

RECOMMENDED BOOKS

1. Interior Design Course, Mary GilliatCoyran, Octopus Ltd., London
2. Interior Design & Decoration, SherrilWhiton, Prentice Hall
3. Interior Design, Francis D.K. Ching, John Wiley & Sons, New York
4. History of Architecture, Sir Banister Fletcher, CBS Publishers & distributors, New Delhi
5. Time Saver Standards for Interior Design, Joseph De Chiara, McGraw Hill, New York.

INSTRUCTIONS TO THE PAPER SETTER

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

ELEMENTS OF INTERIOR SPACE

Subject Code: BDIDS1-105

L T S P C

Duration: 30 Hrs.

1 0 1 0 2

COURSE PREREQUISITES

Nil

COURSE OBJECTIVES

To develop an understanding of point, line & planar elements in defining an interior space.

COURSE OUTCOME

1. To develop an understanding of various degrees of enclosure, various types of relationship between spaces.
2. Understanding of the various effects that could be created by manipulating the enclosing elements such as walls, roof etc.
3. Understanding the types of the door and their implementations.
4. Knowing about the detailing doors and windows
5. Understanding on site construction work.
6. Knowing about the detailing types of walls, roofs and floors.

UNIT- I (10 Hrs)

WALL PLANES

Use of wall planes to create architectural effects - Natural patterns and textures obtained in masonry walls – articulation of openings in wall planes – effect of tilting the vertical axis of wall planes - niches and alcoves - cornices and mouldings etc.

ROOF PLANES

Different types and their visual impact – articulation of skylights and roof apertures – false ceiling – materials, finishes & patterns - types of false ceiling – various types of lighting.

FLOOR PLANES

Various types of flooring – mosaic, tile, stone etc. – aesthetic effects created by flooring material and pattern - graphic patterns and their visual effects – construction details – skirting, moulding, embossing etc. Floor finishes and floor coverings.

UNIT – II (10 Hrs)

DOORS, WINDOWS AND VENTILATORS, ETC.

Doors – types – flush doors, panelled doors, braced doors, carved wooden doors, metal embossed doors, glazed doors and their relevance – various materials and articulation.

Windows – various types (casement, horizontal sliding, vertical sliding, hopper, pivoted) – various shapes (arched, circular, triangular etc.) various materials (wood, aluminum, steel, PVC) and their suitability to that space – ventilators – louvered, paneled etc.

UNIT – III (10 Hrs)

CASE STUDIES

Case studies for manipulation of wall, floor and roof planes to create various architectural effects – case studies of various doors, windows and ventilators – case studies of columns, beams etc. for interior effects.

RECOMMENDED BOOKS

1. The making of interiors – An introduction- Allen Tate- Harper & Row Publishers, New York, 1987.
2. Interior Design & Decoration, Fourth Edition, Sherrill Whiton- Prentice Hall, 1974.
3. Interior lighting for Designers, Third edition – Gary Gordon & Jamco L. Nuckolls – John Wiley & Sons, New York, 1995.

4. The Encyclopaedia of Decorative Styles – William Hardy & Steve Adams – New Burlington books, London, 1988.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
 2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).
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MRSPTU

MODEL MAKING

Subject Code: BDIDS1-106

L T S P C

Duration: 30 Hrs.

0 0 0 2 1

COURSE PREREQUISITES

Nil

COURSE OBJECTIVES

To introduce the students basics of Model making with various materials.

COURSE OUTCOME

1. Understand basic carpentry techniques.
2. Knowledge of Joinery techniques and various model making techniques.
3. Understand methods using different materials.
4. Tools used in carpentry.
5. Model making techniques using different materials.
6. Methods of Preparations of Model

UNIT- I (10 Hrs)

INTRODUCTION TO MODEL MAKING

Introduction to concepts of model making and various materials used for model making

BLOCK MODELLING

- Preparation of base for models using wood or boards
- Introduction to block models of buildings (or 3D Compositions) involving the usage of various materials like Thermocol, Soap/Wax, Boards, Clay etc.

DETAILED MODELLING

- Making detailed models which include the representation of various building elements like Walls, Columns, Steps, Windows/glazing, Sunshades, Handrails using materials like Mount board, Snow-white board, acrylic sheets.
- Representing various surface finishes like brick/stone representation, stucco finish etc.
- Various site elements – Contour representation, Roads/Pavements, Trees/Shrubs, Lawn, Water bodies, Street furniture, Fencing etc.

UNIT – II (10 Hrs)

INTERIOR MODELS OF INTERIOR SPACES

Making scaled models of the various interior spaces with furniture such as

- 1) Residences 2) Offices 3) Retail Spaces 4) Recreational Spaces

UNIT – III (10 Hrs)

CARPENTRY

Introducing techniques of planning, chiselling & joints in timber to learn the use of hand tools.

Exercise involving the design of simple furniture and making a model of the same.

RECOMMENDED BOOKS

1. BENN, The book of the House, Ernest Benn Limited, London
2. Janssen, Constructional Drawings & Architectural models, Karl Kramer Verlag Stuttgart, 1973.
3. Harry W.Smith, The art of making furniture in miniature, E.P.Duttor Inc., New York, 1982.
4. H.S. Bawa, 'Carpentry- A Complete Guide',
5. Miller, 'Carpentry and Construction'

NOTE: Evaluation is to be done through viva voce by external examiner appointed by the University at collage level. Answer sheets after the University exam shall be retained at collage level for the viva-voce.

DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION

Subject Code: BMNCC0-041

L T P C
2 0 0 0

Duration: 30Hrs.

UNIT-I (6 Hours)

Meaning of Drug Abuse: Meaning: Drug abuse, Drug dependence and Drug addiction. Nature and extent of drug abuse in India and Punjab.

UNIT-II (8 Hours)

Consequences of Drug Abuse: Individual: Education, Employment, Income. Family: Violence. Society: Crime. Nation: Law and Order problem.

UNIT-III (8 Hours)

Prevention of Drug Abuse: Role of Family: Parent-child relationship, Family support, supervision, shipping values, active scrutiny. School: Counselling, Teacher as role-model, Parent-teacher-health professional coordination, Random testing on students.

UNIT-IV (8 Hours)

Treatment and Control of Drug Abuse: Medical Management: Medication for treatment and to reduce withdrawal effects. Psychological Management: Counselling, Behavioural and Cognitive therapy. Social Management: Family, Group therapy and Environmental intervention. Treatment: Medical, Psychological and Social Management. Control: Role of Media and Legislation.

Recommended Books:

1. Ram Ahuja, 'Social Problems in India', Rawat Publications, Jaipur, 2003.
2. 'Extent, Pattern and Trend of Drug Use in India', Ministry of Social Justice and Empowerment, Govt. of India, 2004.
3. J.A. Inciardi, 'The Drug Crime Connection', Sage Publications, Beverly Hills, 1981.
4. T. Kapoor, 'Drug Epidemic among Indian Youth', Mittal Publications, New Delhi, 1985.
5. Kessel, Neil and Henry Walton, 'Alcoholism, Harmond Worth', Penguin Books, 1982.
6. Ishwar Modi and Shalini Modi, 'Addiction and Prevention', Rawat Publications, Jaipur, 1997.
7. 'National Household Survey of Alcohol and Drug Abuse', Clinical Epidemiological Unit, All India Institute of Medical Sciences, New Delhi, 2003 & 2004.
8. Ross Coomber and Others, 'Key Concept in Drugs and Society', Sage Publications, New Delhi, 2013.
9. BhimSain, 'Drug Addiction Alcoholism, Smoking Obscenity', Mittal Publications, New Delhi, 1991.
10. Ranvinder Singh Sandhu, 'Drug Addiction in Punjab: A Sociological Study', Guru Nanak Dev University, Amritsar, 2009.
11. Chandra Paul Singh, 'Alcohol and Dependence among Industrial Workers', Shipra, Delhi, 2000.
12. S. Sussman and S.L. Ames, 'Drug Abuse: Concepts, Prevention and Cessation', Cambridge University Press, 2008.
13. P.S. Verma, 'Punjab's Drug Problem: Contours and Characteristics', Vol. LII, No. 3, P.P. 40-43, Economic and Political Weekly, 2017. 1
14. 'World Drug Report', United Nations Office of Drug and Crime, 2016.
15. 'World Drug Report', United Nations Office of Drug and Crime, 2017.

2ND
SEMESTER

INTERIOR DESIGN STUDIO – II

Subject Code: BDIDS1-201

L T S P C
2 0 4 0 6

Duration: 90 Hrs.

COURSE PREREQUISITES

Nil

COURSE OBJECTIVES

To introduce the basics of designing for Residential interiors and to develop skills required for the same.

COURSE OUTCOME

1. To develop understanding of the scale, function and options existing when designing small-scale spaces in residences such as toilets, kitchens, living, bedrooms etc.
2. Development of ideas with regard to false ceiling, wall paneling, flooring, floor coverings, curtains, windows, doors and other elements of residential interiors.
3. To understand and create spaces of comfort and spatial quality
4. To understand and do a technical drawing of kitchen & toilet related elements and storages.
5. To be able to choose the desired finishes and materials for the design based on their technical attributes.
6. To understand and do a technical drawing of Residential related interiors & furniture.

UNIT-I (30 Hrs)

KITCHENS

- Work triangle, planning for activity – anthropometrics – types of kitchen- Modular kitchens. Materials used in counters, shelves, worktops, washing areas & their comparative study. Lighting & color scheme – Natural & Artificial light.

- **TOILETS**

Anthropometry – various types of sanitary ware and their use – types of layouts – concepts in modern day toilet interiors – materials & finishes – colour, texture & pattern.

UNIT-II (30 Hrs)

BEDROOMS & LIVING ROOMS

- Concepts in bedroom & living room interiors – various layouts of these spaces – the use of furniture and accessories to create a certain type of ambience – materials & finishes – lighting, colour & texture.

UNIT-III (30 Hrs)

RESIDENCE

- Holistic concepts in residential interiors – ability to integrate various individual spaces into one theme – treatment of patios, courtyards, verandahs & other semi sheltered spaces – integration of built form and open spaces.

RECOMMENDED BOOKS

1. Designs for 20th century Interiors – Fiona Leolie, VH Publications, London, 2000.
2. Interior Design; The New Freedom, BarbaralecDiamonstein, Rizzoli International Publications, New York, 1982.
3. Interior Colour by Design, Jonathan Poore, Rockport Publishers, 1994.
4. Worldwide Interiors – International Federation of Interior Architects & Designers, Rikuyo-Sha, Japan, 1987.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question is to be set from the entire syllabus.
2. The topic of the project is to be displayed on College / Institute Notice Board ten days in advance.

NOTE:

1. Evaluation is to be done through viva voce by external examiner appointed by the university at college level. Answer sheets after the university exam shall be retained at college level for the viva-voce.
2. The topic of the project is to be displayed on collage/Institute notice board ten days in advance.

MRSPTU

MATERIALS AND CONSTRUCTION- II

Subject Code: BDIDS1-202

L T S P C
2 0 3 0 5

Duration: 75 Hrs.

COURSE PREREQUISITES

Nil

COURSE OBJECTIVES

To familiarize the students of Interior Design on material and construction methodology

COURSE OUTCOME

1. To understand the construction of basic elements of an interior space such as walls & partitions, floors & roofs.
2. To understand in detail about the types and use of partitions and false ceilings in interior construction industry.
3. Understanding the process of building construction from the very first step.
4. Knowing about the detailing types of roofs and floors.
5. Understanding various color schemes, lighting, textures, etc. in Interior design
6. Understanding the materials and techniques used in Interior design

UNIT-I (25 Hrs)

BUILDING COMPONENTS

Drawings of the components of a building indicating

- Foundation – brick footing, stone footing & RCC column footing
- concrete flooring, plinth beam & floor finish
- superstructure- brickwork with sill, lintel, windows & sunshade
- Flat RCC roof with weathering course, parapet & coping.

FLOORS

Floor coverings- - softwood, hardwood- resilient flooring - linoleum, asphalt tile, vinyl, rubber, cork tiles - terrazzo, marble & granite – properties, uses & lying.

Floor tiles- ceramic glazed, mosaic and cement tiles- properties, uses and laying, details for physically handicapped.

UNIT-II (25 Hrs)

FALSE CEILING

Construction of various kinds of false ceiling such as thermocol, plaster of Paris, gypsum board, metal sheets, glass and wood Construction of domes, vaults, & other special ceilings

WALL PANELING

Panelling – Using wooden planks, laminated plywood, cork sheets, fibre glass wool & fabric for sound insulation and wall panelling for thermal insulation.

UNIT-III (25 Hrs)

FINISHES

Paints- enamels, distempers, plastic emulsions, cement based paints- properties, uses and applications- painting on different surfaces – defects in painting, clear coatings & strains- varnishes, lacquer, shellac, wax polish & strains- properties, uses and applications. Special purpose paints- bituminous, luminous, fire retardant and resisting paints- properties, uses and applications.

RECOMMENDED BOOKS

1. S.C Rangwala – engineering materials – Charotar publishing, Anand 1982
2. W.B Mckay, building construction, VOL 1-4, Longmans, U.K 1981
3. Laxmi publications Pvt. Ltd., New Delhi, 1993.
4. Dr. B.C Purnima, building construction, Laxmi publications Pvt. Ltd., New Delhi, 1993.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. The examiner is required to set a total of six questions with two questions from each UNIT.
2. The student is required to attempt any one question from each UNIT making a total of three questions.

MRSPTU

MANUAL GRAPHICS – II

Subject Code: BDIDS1-203

L T S P C
2 0 3 0 5

Duration: 75 Hrs.

COURSE PREREQUISITES

Nil

COURSE OBJECTIVE

Students should acquire knowledge of the various drawings, which effectively communicate their designs.

COURSE OUTCOME

1. To understand the spatial and stylistic qualities associated with design and creativity.
2. To understand the purpose of shadows in buildings and in interiors
3. To enable a student to understand the theory of perspective in design
4. Visualize and convert his/her thoughts and ideas of design into 3-D forms.
5. Sciography in plans and elevations.
6. Construction of Interior perspectives.

UNIT-I (25 Hrs)

MEASURED DRAWING

Measured Drawing of Simple objects like Cupboards etc. and building components like Columns, Cornices, Doors, Windows etc.

ISOMETRIC

Isometric View: like Tables, Chairs, Cylindrical & Spherical elements etc.

Axonometric View: like Interior views for living room, Toilet, Dining Room etc.

UNIT-II (25 Hrs)

PERSPECTIVE

Perspective View: Principles and Visual Effect of three dimensional objects, Study of Picture plane, Station Point, Vanishing Point, Eye level etc. One-point perspective for interiors Two-point perspective for interiors.

UNIT-III (25 Hrs)

SCIOGRAPHY

Sciography: Principles of Shade and Shadow- Shade and Shadows of Architectural Elements in Interiors. Shadows of Circular/Cylindrical/Spherical elements.

RECOMMENDED BOOKS

1. Perspective & Sciography BY Shankar Mulik, Allied Publishers
2. Perspective Principles, M.G. Shah & K.M. Kale, Asia Publications, Mumbai
3. Geometrical drawing for Art students, I.H. Morris, Orient Longman, Chennai
4. N.D. Bhatt, 'Engineering Drawing'
5. Ching Franc D.K., 'Architectural Graphics'.
6. Robert W. Gill, 'Rendering with Pen and Ink', Thames & Hudson London, 2008.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. The examiner is required to set a total of six questions with two questions from each UNIT.
 2. The student is required to attempt any one question from each UNIT making a total of three questions.
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THEORY OF INTERIOR DESIGN

Subject Code: BDIDS1-204

L T S P C
2 0 0 0 2

Duration: 30 Hrs.

COURSE PREREQUISITES

Nil

COURSE OBJECTIVES

The object of this course is to make students understand the various aspects such as spatial quality, design vocabulary, design principles, and design process related to the design of interiors.

COURSE OUTCOME

1. Understanding various aspects such as form, scale, light, dimension, height, transitional elements etc. affecting interior space.
2. Understanding and applying design vocabulary such as Point, Line, shape, color, texture, area, mass, volume etc.
3. Understanding and applying design principles such as ratio, proportion, scale, balance, harmony, unity, variety, rhythm, emphasis.
4. Understanding the process involved in design including analysis, synthesis and evaluation.
5. To analyze and identify the anthropometrics and ergonomics in daily life
6. To understand and analyze the stress factors on human body in various tasks

UNIT – I (10 Hrs)

INTERIOR SPACE

Space – definition; Interior space – spatial qualities: form, scale, outlook; structuring space with interior design elements; spatial form; spatial dimension – square, rectangle, curvilinear spaces; height of space; spatial transitions – openings within wall planes, doorways, windows, stairways.

UNIT – II (10 Hrs)

DESIGN VOCABULARY

Form – point, line, volume, shape, texture & colour – in relation to light, pattern etc. and application of the same in designing interiors.

DESIGN PRINCIPLES

Ratio; proportions – golden section; relationships; scale; Balance – symmetrical, radial, occult; harmony; unity; variety; rhythm; emphasis.

UNIT – III (10 Hrs)

ANTHROPOMETRICS

Definition, theory of standard dimension based on human figures for activities, functions, circulation, furniture design, spatial requirements etc.

Study of Ergonomics

Design of Furniture for Living, Dining, Kitchen, Office etc.

DESIGN CONTROL

Design process – Analysis, synthesis, design evaluation; Design criteria – function and purpose, utility and economy, form and style; human factors - human dimensions, distance zones, activity relationships; fitting the space – plan arrangements, function, aesthetics.

RECOMMENDED BOOKS

1. Francis. D. K. Ching, Interior design Illustrated, Van Nostrand Reinhold
2. John. F. Pile, Interior Design, Harry Abrams Inc.
3. Sam. F. Miller, Design process – a primer for Architectural and Interior Design, Van Nostrand Reinhold.
4. Gary Gordon, Interior lighting for designers, John Wiley & Sons Inc.
5. Harold Linton, Colour in Architecture, McGraw Hill

6. Jonathan Poore, Interior Colour by Design, Rock Port Publishers.
7. Sherrill Winton, Interior Design and Decoration, Prentice Hall.
8. JohannesItten, the Art of Colour, John Wiley and Son

INSTRUCTIONS TO THE PAPER SETTER

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
 2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).
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DIGITAL GRAPHICS - I

Subject Code: BDIDS1-205

L T S P C
1 0 0 4 3

Duration: 75 Hrs.

COURSE PREREQUISITES

The students should have cleared Soft Skill Development course.

COURSE OBJECTIVES

The students should be made aware of the role and importance of Computers in the field of Interiors.

COURSE OUTCOME

1. Student shall be able to understand the use of Computer as an aid to drafting and presentation of Interior design projects.
2. To understand the basic components of operating on menu and setup wizard
3. To work on drafting a plan with dimensioning and layers
4. To understand the various tools on Photoshop
5. Advanced commands like layers, viewports, layer-Iso and other 2D commands.
6. To understanding 3-D Modeling on Auto cad

UNIT- I (25 Hrs)

2-D AUTOCADD:

1. Advanced Introduction to Auto Cad, and Introduction to Auto Cad Revit
2. Advanced commands like layers, viewports, layer-iso and other 2D commands.
3. Drafting the complex and multi storied Plans, Sections, and Elevations.
4. Text writing and dimensioning of the Plans, Elevation and Sections

UNIT- II (25 Hrs)

3-D AUTOCADD:

1. Advanced rendering in the Auto Cad
2. 3-D Modeling on Auto cad of Single Storey and Multi Storey Buildings,
3. 3-D Modeling of Multiple Building in a Single Site, Camera View of the Buildings.

UNIT- III (25 Hrs)

BASICS OF ADOBE PHOTOSHOP

Tool box (Moving , marquee tool), Magic wand selection, Crop tool, Paint Brush, Opacity, Text Styles, Blue tool, Sharpening Tool, Color correction, Layers, moving Tool, Masking Tool.

INSTRUCTIONS TO QUESTION PAPER SETTER

The evaluation of student shall be based on the written questions to be set from the course and the practical conducted based on a specific problem given to assess and evaluate the knowledge of students related to course defined above.

UNIVERSAL HUMAN VALUES -II

Subject Code: BHSMC0-026

L T S P C
2 1 0 0 3

Duration: 45 Hrs.

COURSE PREREQUISITES

Nil

COURSE OBJECTIVES

This course is intended to provide a much needed orientation input in value education to the young enquiring minds.

COURSE OUTCOME

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

UNIT I (Hrs.)

Introduction to Value Education Lecture: Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity – the Basic Human Aspirations, Right Understanding, Relationship and Physical Facility, Happiness and Prosperity – Current Scenario, Method to Fulfil the Basic Human Aspirations

UNIT II (Hrs.)

Harmony in the Human Being: Understanding Human being as the Co-existence of the Self and the Body Lecture 8: Distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health

UNIT III (Hrs.)

Harmony in the Family and Society : Harmony in the Family – the Basic Unit of Human Interaction, Values in Human-to-Human Relationship, 'Trust' – the Foundational Value in Relationship, 'Respect' – as the Right Evaluation, Exploring the Feeling of Respect, Understanding Harmony in the Society, Vision for the Universal Human Order

UNIT IV (Hrs.)

Harmony in the Nature/Existence: Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature, Realizing Existence as Co-existence at All Levels, The Holistic Perception of Harmony in Existence

Implications of the Holistic Understanding – A Look at Professional Ethics: Natural Acceptance of Human Values, Definitiveness of (Ethical) Human Conduct, A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics, Holistic Technologies, Production Systems and Management Models Typical Case Studies, Strategies for Transition towards Value-based Life and Profession

SUGGESTED READINGS:

Text Book and Teachers Manual

1. The Textbook A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978- 93-87034-47-1
2. The Teacher's Manual Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978- 93-87034-53-2 3.2

RECOMMENDED BOOKS

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff(Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J CKumarappa
8. Bharat Mein Angreji Raj - PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

MRSPTU
3rd SEMESTER

INTERIOR DESIGN STUDIO – III

(BDIDS1 - 315)

Uni. Exam. Marks : 60

Sessional Marks : 40

Duration: 90 Hours

(L-2, T-0, S-4, P-0, C=6)

1. COURSE PREREQUISITES

The students should know the relationship of forms, space, function and order.

2. COURSE OBJECTIVES

To help students understand the interior design process of small-scale building projects with a particular emphasis on on-site analysis and site planning.

3. COURSE OUTCOME

- Students should be able to understand and appreciate the site's constraints in the evolution of design for small building projects.
- Knowledge of handling the flow of masses in buildings like primary schools, dispensaries, convenience shopping, etc.
- Distinguish and appreciate the constraints of the project in the evolution of interior design for small buildings.
- Interior design of spaces that are partly under the preview of urban regulatory controls
- Understand the role of interior design development stages in the outcome.

Unit-I (70 Hours)

Project-I

Institution for Physically Challenged, Old age People, Orphans, Deaf & Dumb

- Scope, objectives and ways to overcome through designing
- Different research institutions & their functions
- Ergonomic Factors & Anthropometries Data, Circulation, Work Surfaces for Different Functions, Arrangement & Clearances, Door Width, Furniture Suggested for them & their Details
 - a) For Reading & Studying
 - b) Dining
 - c) Storing- books & other daily needs.
 - d) Recreational activity
 - e) Toilet facilities
 - f) Ramp, slope
 - g) Parking areas
 - h) Circulation areas
 - i) Lifts
- Space planning and interior designing

Unit-II (20 Hours)

Project-II

- Interior Design of Guest house, Architect/ Interior Design Studio, Doctor Clinic, Road side restaurant/ Dhaba without urban regulatory controls.

Note:

- The faculty may select an existing campus or building as an interior design project. The primary focus will be on interior design aspects. Minor architectural changes can be considered to demonstrate an understanding of architectural principles.
- All students should handle a minimum of two projects individually.
- An expert lecture related to the subject content is to be arranged by an industry expert.

TEACHING METHODOLOGY

For all assignments, the following methodology should be followed, and all stages should be attempted individually.

1. Library and Proto-type Studies
2. Site analysis and site planning
3. Space planning
4. Design development and volumetric studies (model)
5. Preliminary design and volumetric study
6. Final design with detailed volumetric study (Detailed Model) and visual communications (3D Visualisations)

RECOMMENDED BOOKS

1. Ministry of Urban Development and Ministry of Urban Development GOI, Harmonised Guidelines and Spaces Standards for Barrier Free Built Environment for persons with disability and elderly persons. 2016.
2. GoI Ministry of Urban Development, Model Building Bye-Laws- 2016. Ministry of Urban Development, Government of India.
3. Bureau of Indian standards, National Building Code of India 2016
4. Ching, Francis DK., Architecture: Form Space and Order, Van Nostrand Reinhold Co.
5. Ching, Francis D.K., Interior Design Illustrated, John Wiley & Sons, Inc.
6. Chiara, Joseph De and Crosbie, Michael J. Time saver standards for building types, McGraw Hill Education (India) Private Limited
7. Lynch, Kevin and Hack, Gary, Site Planning, The MIT Press Books
8. Carstens, Diane Y. Site planning and design for the elderly, VNR; New Delhi
9. Meuser, Philipp. Accessible architecture: construction and design manual, A Dom Publishers

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question should be set from the syllabus and cover the entire content.
2. The total exam duration will be 12 hours, divided into four sessions, with lunch breaks following the first and third three-hour sessions.
3. Evaluation is to be done through viva voce by an external jury consisting of two examiners appointed by the University at college, and answer sheets should be retained at the college level.
4. The topic of the project is to be displayed on the College / Institute Notice Board ten days in advance.

NOTE: Evaluation is to be done through viva voce by an external examiner appointed by the university at the college level. After the university exam, answer sheets shall be retained at the college level for the viva voce.

MATERIALS AND CONSTRUCTION- III
(BDIDS1 – 316)

Uni. Exam. Marks : 60
Sessional Marks : 40

Duration: 75 Hours
(L-2, T-0, S-3, P-0, C=5)

1. COURSE PREREQUISITES

Nil

2. COURSE OBJECTIVES

To familiarise the students of Interior Design with material and construction methodology

3. COURSE OUTCOME

- To understand working drawings
- To explain the Co-relations and cross-referencing in drawings
- To understand elevations, Sections in drawings
- To evaluate technical projections and isometric detailing
- To understand the detailing of material and representation in drawings
- To understand basic anthropometry and layouts of toilets and kitchens.

Unit-I (20 Hours)

FINISHING MATERIALS (PLYWOOD, LAMINATES & VENEERS)

Introduction to Materials: Properties and characteristics of plywood, laminates, and veneers. Applications in interior design and construction.

Layout Techniques and Machining Plans: Measurement and layout techniques for plywood, laminates, and veneers. Tools and machinery used for cutting and shaping.

Fabrication Techniques: Stapling and glueing methods. Safety practices during fabrication.

Furniture Joinery: Types of joints: screw joinery, nail joinery, mortise & tenon joints, dovetail joints, dowel joints, edge joints. Techniques for creating solid and durable joints. Practical exercises and demonstrations.

Unit-II (35 Hours)

KITCHEN DESIGN AND CASE STUDY

Modular Kitchens: Design principles for modular kitchens.

Interior Detailing and working drawings of kitchens: Plumbing diagrams, Electrical layouts, Reflected ceiling plans, Flooring plans, Selection of materials and finishes.

Case Study of Commercial Kitchen: Analysis of a commercial kitchen layout. Evaluation of workflow, materials, and safety considerations. Report and presentation on findings.

JOINERY AND FURNITURE CONSTRUCTION

Joinery: Working drawings of different types of doors and windows. Detailed construction methods and techniques.

Furniture Construction:

Working drawings of various furniture pieces: Drawers. Credenzas. Dining chairs. Sofas and settees.

Cost estimation and material specifications.

Preparation for finishing: Sanding and smoothing. Applying timber finishes.

Detailed construction drawings and explanation of construction and material finishes.

Unit-III (20 Hours)

TOILETS AND PLUMBING

Toilet Design: Working drawings for toilets with plumbing diagrams. Electrical layouts for toilets. Reflected ceiling plans and flooring patterns. Selection of sanitary fixtures and finishes.

Note:

- Field Visits/Workshops / Expert Sessions / Visits to Exhibition venues located within the Northern Region (India) shall be planned.

RECOMMENDED BOOKS

1. Sweet Fay, Kitchens: A Practical Guide to Design and Decor for Your Home, Mere Hurst
2. Do It Yourself, Kitchen Idea, Bland Fore Press
3. National Kitchen Bathroom Association, Universal kitchen and bathroom planning, McGraw Hill
4. Deolalikar, S.G. Plumbing: Design and Practice, Tata McGraw Hill
5. Stitt, Fred A. Working drawing manual, McGraw Hill; New York, John Wiley & Sons. Inc
6. Liebing Ralph W. Architectural working drawings
7. Ching, Francis D.K., Interior Design Illustrated, John Wiley & Sons. Inc
8. Chiara, Joseph De and Crosbie, Michael J. Time saver standards for building types, McGraw Hill Education(India) Private Limited
9. Lynch, Kevin and Hack, Gary, Site Planning, The MIT Press Books
10. Carstens, Diane Y. Site planning and design for the elderly, VNR; New Delhi
11. Meuser, Philipp. Accessible Architecture: construction and design manual, A Dom Publishers

INSTRUCTIONS TO QUESTION PAPER SETTER

The examiner is required to set a total of six questions, with two questions from each UNIT. The student is required to attempt any one question from each UNIT, making a total of three questions.

MRSPTU

DIGITAL GRAPHICS - II
(BDIDS1 - 317)

Uni. Exam. Marks : 60
Sessional Marks : 40

Duration: 45 Hours
(L-1, T-0, S-0, P-4 C=3)

1. COURSE PREREQUISITES

Nil

2. COURSE OBJECTIVES

The students should be able to visualise, draft and render their small design projects into 3-D forms.

3. COURSE OUTCOME

- To have proficiency in 2D and 3D Modelling Software
- To learn about advanced Rendering Techniques
- To understand the effective Use of Presentation Software
- To understand the integration of Software for Comprehensive Design Solutions
- To explore the critical Evaluation and Communication of Design Concepts

Unit- I (15 Hours)

2D AND 3D MODELLING SOFTWARE

SketchUp:

SketchUp Interface, Basic Tools and Commands, Creating Simple 3D Models, Groups and Components, Modifying Models, Using Layers and Tags, Applying Materials and Textures, Creating Custom Materials, Adding and Adjusting Lights, Shadow Settings, Rendering.

Unit- II (15 Hours)

Revit:

Revit User Interface, Basic Drawing and Modify Tools, Setting Up Levels and Grids, Modelling Walls, Doors and Windows, Curtain Wall, working with Views, Adding Components, Modelling Floors, Modelling Ceilings, Modelling Roofs, Vertical Circulation, Creating Construction Documents.

Basic introduction to Rhinoceros 3D and Grasshopper

Unit- III (15 Hours)

RENDERING SOFTWARE

Lumion / 3ds Max / V-Ray / Other Similar Software

Introduction to 3D Rendering and Software Overview, Modelling Basics, Materials and Textures, Lighting and Environment, Cameras and Rendering Settings, Rendering Techniques, Post-production and Visualisation

Explore using Artificial Intelligence to generate 3-dimensional digital models and render views.

RECOMMENDED BOOKS

1. Cardoso, C. (2015). Lumion 3D Best Practices. PACKT.
2. Chavez, C., & Faulkner, A. (2022). Adobe Photoshop Classroom in a Book.
3. Cline, L. S. Sketch Up for Interior Design. Wiley.
4. Hansen, A. R. (2012). Interior Design Using Autodesk Revit Architecture 2024. 688.

NOTE: A workshop to be arranged by an external expert for delivering the updates related to the listed software/ related software to the course.

INSTRUCTIONS TO QUESTION PAPER SETTER

Students will be evaluated through written examinations based on course content and practical assessments centered around specific problem/s. These assessments aim to gauge and evaluate students' knowledge and understanding of the subject.

HISTORY OF INTERIOR DESIGN - II

(BDIDS1 - 318)

Uni. Exam. Marks : 60

Sessional Marks : 40

Duration: 30 Hours

(L-2, T-0, S-0, P-0, C=2)

1. COURSE PREREQUISITES

Nil

2. COURSE OBJECTIVES

To understand the need for and applications of water supply and sanitation in buildings, as well as exposure to various fixtures and fittings, water supply, and sanitary installations at work sites.

3. COURSE OUTCOME

- To understand the importance of culture and tradition in the interior.
- To understand the shapes and patterns that emphasize the elements in interiors
- To learn the different types of materials that could bring changes in the country
- To understand imperialism and colonialism in the Indian context
- To learn about the different contemporary styles in interiors

Unit- I (10 Hours)

BUDDHIST, JAIN AND HINDU

Buddhist, Jain and Hindu faith - Harmony between architecture and interior in religious spaces – the play of light and shadow – art, sculpture, mouldings, wall treatments, roof treatments, floor treatments – interiors as a reflection of the faith – examples and case studies across faiths

Unit – II (10 Hours)

CHRISTIAN AND ISLAMIC

Christian and Islamic faith - Harmony between architecture and interior in religious spaces – the play of light and shadow – art, sculpture, mouldings, wall treatments, roof treatments, floor treatments – interiors as a reflection of the faith - – examples and case studies across faiths

Unit – III (10 Hours)

REGIONAL VERNACULAR INTERIORS

Elements of style, materials and concepts of interiors in vernacular secular architecture across North and South India -Jammu and Kashmir – Punjab – Gujarat – Goa - Kerala – Tamil Nadu – examples and case studies

IMPERIALISM AND COLONIALISM IN INDIA

Elements of Style - Ornamentation and decoration – quality of space – Colonial, Regency, Indo-Saracenic - examples and case studies

RECOMMENDED BOOKS

1. Cooper, Ilay and Dawson, Barry. Traditional buildings of India: Ilay Cooper, Barry Dawson, Thames & Hudson
2. Pandya, Yatin. Concepts of space in traditional Indian architecture, Mapin Publishing Pvt.Ltd
3. G. Satish, Buddhist and Hindu Architecture in India, CBS Publishers & Distributors Pvt.Ltd
4. Mitchell, George. Hindu art and architecture, Thames & Hudson
5. Shai, Surendra, Indian architecture Hindu, Buddhist and Jain, Prakash Books Pvt Ltd
6. Brown, Percy. Indian Architecture: Buddhist and Hindu periods, D. B. Taraporevala Publications
7. Murray, Peter and Murray, Linda. The oxford dictionary of Christian art and architecture, Oxford University Press; United Kingdom

8. Michell, George Architecture of the Islamic world, Thames & Hudson
9. Sharma, Praduman K. Indo-Islamic architecture (Delhi and Agra), Winsome books
10. Grover, Satish. Islamic architecture in India, CBS Publishers & Distributors Pvt. Ltd.
11. Desai, Madhavi. Traditional architecture: house form of the Islamic community of Bohras in Gujarat, Council of Architecture
12. Tipnis, Aishwarya Vernacular Traditions Contemporary Architecture, TERI The Energy and Resources Institute
13. Collins, Larry and Brown Percy. Traditional woodwork, Collins Business
14. Prakash, Vikramaditya. Chandigarh's Le Corbusier: The Struggle for Modernity in Postcolonial India, University of Washington Press
15. Indian canvas re-rendered documentation of INDO-SARACENIC architecture, (NIDC) NASA Information & Documentation Centre.
16. Fletcher Sir Banister. A history of architecture, CBS Publishers & Distributors Pvt. Ltd.
17. Morelli, Marcello. World's greatest royal palaces, Timeless Books
18. Raulet, Sylvie. Maharajas Palaces
19. Chavez, C., & Faulkner, A. (2022). Adobe Photoshop Classroom in a Book.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, will be set from the entire syllabus.
2. The examiner must set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

MRSPTU

INTERIOR SERVICES - I (BDIDS1 - 319)

Uni. Exam. Marks : 60
Sessional Marks : 40

Duration: 30 Hours
(L-2, T-0, S-0, P-0, C=2)

1. COURSE PREREQUISITES

To expose the students to the basic principles of water supply and sanitation.

2. COURSE OBJECTIVES

To provide students with essential knowledge of plumbing systems, including water supply, drainage, and sustainable practices, for effective integration into interior design and building services.

3. COURSE OUTCOME

- Understand the roles of various plumbing systems in different building types.
- Design and select appropriate piping materials for efficient water distribution.
- Develop skills in designing sanitary and drainage systems per building codes.
- Select and place plumbing fixtures and fittings to meet code and user requirements.
- Integrate sustainable plumbing solutions into building designs.

Unit- I (10 Hours)

Introduction to Plumbing Systems

- Overview of plumbing systems in residential, commercial, and industrial buildings
- Types of plumbing systems: Water supply, drainage, and gas systems
- Role of plumbing in interior design and building services
- Plumbing codes and regulations

Water Supply Systems

- Sources of water supply and water distribution systems
- Cold and hot water supply systems
- Piping materials and selection criteria (PVC, CPVC, PEX, copper, galvanized steel, etc.)
- Water pressure, flow rate, and sizing of pipes
- Water conservation techniques and sustainable plumbing practices

Unit- II (10 Hours)

Sanitary and Drainage Systems

- Wastewater collection and disposal systems
- Design of drainage and venting systems
- Sizing and layout of drains, soil pipes, and waste stacks
- Traps, cleanouts, and vent systems

Plumbing Fixtures and Fittings

- Selection and placement of plumbing fixtures (sinks, toilets, showers, bathtubs)
- Fixture requirements based on building codes and user needs
- Fittings and accessories: Faucets, valves, and controls

Unit- III (10 Hours)

Hot Water Systems

- Types of water heaters: Storage, tank less, solar
- Design and installation of hot water distribution systems
- Insulation of hot water pipes

Fire Protection and Plumbing

- Sprinkler systems and their integration with plumbing systems
- Standpipes and fire hydrants

Sustainable Plumbing Solutions

- Water-saving devices and systems (e.g., low-flow fixtures, greywater recycling)
- Rainwater harvesting and its integration into building design

RECOMMENDED BOOKS

1. Charanjit S Shah, Water supply and sanitary engineering, Galgotia Publishers
2. G.S. Birdie and J.S. Birdie, Water Supply and Sanitary Engineering, Dhanpat Rai Publishing Company (p) Ltd
3. Deolalikar, Plumbing Design and Practice, McGraw Hill Education
4. A Kamala & D L Kanth Rao, Environmental Engineering, Tata McGraw–Hill publishing Company Limited
5. National Building Code of India (NBC) 2016, Bureau of Indian Standards (BIS)

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, is to be set from the entire syllabus.
 2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).
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MRSPTU

INTERIOR LANDSCAPE (BDIDS1 - 320)

Uni. Exam. Marks : 60
Sessional Marks : 40

Duration: 30 Hours
(L-2, T-0, S-0, P-0, C=2)

1. COURSE PREREQUISITES

Nil

2. COURSE OBJECTIVES

To acquaint students with the uses and Importance of landscape design in architecture.

3. COURSE OUTCOME

- To help students understand the elements of landscape design and its application in architectural design solutions.
- To learn the basic palette of design outside the premise of the built envelope
- Identifying plant characteristics of various types of Trees, Shrubs, Cacti Bushes and Creepers
- Understanding Historical development, Design Principles, salient features & elements of various garden styles
- To understand the role of hardscape elements and assess their role individually
- To get an in-depth knowledge of plant life and the science behind their life

Unit- I (10 Hours)

LANDSCAPE AND BUILT ENVIRONMENT

Introduction and role of landscape design in the interiors. Natural elements include stones, rocks, pebbles, water forms, plants and vegetation. Introduction to the study of plants concerning landscape design and interiors. Types of indoor plants, visual characteristics: i.e., colour, texture, foliage.

VISUAL PERCEPTION

Flowers- their colours, texture, and visual perception in various indoor spaces. They are also part of the science of flower arrangement in indoor plants in an Indian context. Plant biology, soil, moisture, light nutrients, atmospheric conditions, growing medium, pests & diseases. Botanical terminology, anatomy and physiology of plant growth. Market survey and costs.

Unit – II (10 Hours)

SOFTSCAPE

Design with plants – Basic principles of designs. The physical attributes of plants and their relation to design. Appearance, functional and visual effects of plants in landscape design and built environment. Selection and management of plant material concerning the built environment.

HARDSCAPE

Design concepts related to using sculpture, lighting, garden furniture, and architectural features and grouping them into meaningful compositions for visual and functional effects.

Unit – III (10 Hours)

LANDSCAPE DESIGN PARAMETERS

Landscaping design parameters for various built forms- indoor and outdoor linkage to spaces. Landscaping of courtyards- residential and commercial forms. Indoor plants and their visual characteristics-. Science of maintaining and growing greenery. Automatic irrigation costing and installation of micro irrigation systems.

RECOMMENDED BOOKS

1. The water garden: Styles, designs, and visions, Thames & Hudson Ltd Publication
2. The small garden handbook, Abbeydale Press
3. Johnson,S.D.Alliene, Garden rooms, Pradeep publishers

4. Meredith Book, Better homes and gardens: basement planners: Inspiration Design, Meredith Book
5. Harris, Charles W and Dines, Nicholes T., Time saver standards for landscape architecture, Tata McGraw Hill Education Limited
6. Booth, Norman K., Residential landscape architecture, Prentice-Hall of India Private Limited
7. Blanc, Alan, Landscape construction and detailing, B.T. Batsford Ltd; London
8. Ortega, Daniel H and Anderson, Jonathon R., Innovations in Landscape Architecture, Routledge Taylor & Francis Group
9. Uje Lee, House on the landscape, Prakash Books Pvt Ltd
10. Ryan Tom, Detailing for landscape architects, John Wiley & Sons. Inc
11. E.C. Martin, A photographic guide landscape in plant, Van Nostrand Reinhold Co
12. Morrow, BH, A dictionary of landscape architecture, University of New Mexico Press; Mexico

INSTRUCTIONS TO QUESTION PAPER SETTER

- One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, will be set from the entire syllabus.
- The examiner must set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

MRSPTU

MRSPTU
4TH SEMESTER

INTERIOR DESIGN STUDIO – IV

(BDIDS1 - 421)

Uni. Exam. Marks : 60

Sessional Marks : 40

Duration: 90 Hours

(L-2, T-0, S-3, P-2, C=6)

1. COURSE PREREQUISITES

The student should know Design fundamentals and spatial organisation

2. COURSE OBJECTIVES

- To equip students with the skills to design functional, aesthetically pleasing, and sustainable interiors for small to medium-scale buildings.

● COURSE OUTCOME

- To apply space planning principles to create functional and user-friendly layouts for diverse small to medium-scale buildings.
- To develop and communicate design concepts integrating aesthetics, ergonomics, and user needs for various interior environments.
- Select appropriate materials, finishes, furniture, and lighting to achieve desired functionality and aesthetics in specific building types.
- Use practical visual communication tools (drawings, renderings, presentations) to present interior design proposals.
- To demonstrate an understanding of basic project management principles applicable to the interior design process for small to medium-scale projects.

CONTENTS

Project-I: Resort/ Farmhouse/ Luxury Villa/ Public Library

(45 Hours)

Project Brief:

Design the interior of a luxury eco-resort nestled amidst a natural landscape. The resort should cater to guests seeking a relaxing and rejuvenating experience in harmony with nature.

Design Considerations:

- Site analysis: Consider the surrounding natural environment and integrate it visually.
- Theme and Ambiance: Develop a design theme that reflects the resort's eco-friendly concept and creates a sense of tranquillity.
- Room types: Design various room layouts catering to guests' needs (individual travellers, couples, families).
- Public areas: Design inviting spaces like a lobby, lounge, restaurant, spa, and recreational areas.
- Sustainability: Emphasise sustainable design principles throughout the project, using eco-friendly materials, maximising natural light, and incorporating energy-efficient fixtures.

Deliverables:

- Detailed space planning layouts for all designated areas (lobby, public areas, different room types).
- Mood boards depicting the design aesthetic for each space.
- Furniture layout plans with specifications and elevations for custom-designed furniture.
- Material and finish samples for flooring, walls, ceilings, and furniture.
- Lighting design plan with fixture specifications.
- 3D renderings or detailed hand-drawn perspectives showcasing critical areas of the resort.
- Presentation boards or digital presentations effectively communicate the design proposal.

Project II: Community Centre/ Banquet Hall / Theme Restaurant/ Jewellery Showroom

Project Brief:

(45 Hours)

Design the interior of a new community centre in a developing area. The centre should cater to a diverse age group's needs, offering various activities and programs.

Design Considerations:

- Target audience: Consider the age range, demographics, and interests of the community members who will use the centre.
- Multi-functionality: Design flexible spaces that can accommodate a variety of activities like fitness classes, after-school programs, senior citizen meetings, and community events.
- Accessibility: Ensure the design is accessible to people with disabilities, following relevant building codes and guidelines.
- Sustainability: Consider incorporating sustainable materials, finishes, and lighting strategies.

Deliverables:

- Space planning layout with a clear designation of functional areas.
- Mood board depicting the overall design aesthetic.
- Furniture layout plan with specifications for key furniture pieces.
- Material and finish samples for flooring, walls, and ceilings.
- Basic lighting plan (optional).

Evaluation Criteria:

Both projects will be evaluated based on the following criteria:

- Understanding of the project brief and target audience.
- Creativity and functionality of the design concept.
- Effective space planning and circulation flow.
- Appropriate selection of materials, finishes, and furniture.
- Integration of sustainable design principles (major project).
- Quality of visual communication (drawings, renderings, presentations).

TEACHING METHODOLOGY

For all assignments, the following methodology should be followed, and all stages should be attempted individually.

1. Library and Proto-type Studies
2. Site analysis and site planning
3. Space planning
4. Design development and volumetric studies (model)
5. Preliminary design and volumetric study
6. Designs & details Electrical and Lighting Layout Plumbing Drawing HVAC co-ordination
7. Final design with detailed volumetric study (Detailed Model) and visual communications (3D Visualisations)

Note:

- As an interior design project, the faculty may select an existing campus or building. The primary focus will be on interior design aspects. Minor architectural changes can be considered to demonstrate an understanding of architectural principles.
- An industry expert will deliver a guest lecture on the subject matter.
- Field Visits/Workshops / Expert Sessions / Visits to Exhibition venues located within the Northern Region (India) shall be planned.

RECOMMENDED TEXT AND REFERENCE BOOKS

1. Dechiara,J. Time-saver standards for interior design and space planning, Tata McGraw Hill Education Limited
2. Chiara,Joseph De and Crosbie,Michael J. Time saver standards for building types, McGraw Hill Education(India) Private Limited
3. Barron,Michael, Auditorium acoustics and architectural design, Chapman & Hall
4. Yu,Wang. Hotel architecture, Artpower; Hong Kong
5. Alan,Phillips, The best in lobby design hotels & offices, Rotovision; New York
6. Daab, Airport design, Daab; London

7. Horonjeff, Robert and Mckelvey, Francis X. Planning and design of airports, Tata McGraw Hill Education Limited
8. Ham Roderick, Theatres planning guidance for design, Butterworth-Heinemann Ltd
9. Paul Lang V. Principles of Air Conditioning, CBS Publishers & Distributors Pvt. Ltd
10. John E Flynn; Jack A. Kremers and Arthur W. Segil, Architectural interior systems: Lighting, Acoustics, Air Conditioning, Van Nostrand Reinhold Co.
11. Khurmi, R.S and Gupta, J.K., A Textbook of Refrigeration and Air Conditioning, Eurasia Publication House Pvt Ltd.
12. Davies, Thomas R. Accessible Design for Hospitality, Tata McGraw Hill Education Limited

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question is to be set from the syllabus and cover the entire content.
 2. The total exam duration will be 12 hours, divided into four sessions, with lunch breaks following the first and third three-hour sessions.
 3. Evaluation is to be done through viva voce by an external jury consisting of two examiners appointed by the University at college, and answer sheets should be retained at the college level.
 4. The topic of the project is to be displayed on the College / Institute Notice Board ten days in advance.
-

MRSPTU

FURNITURE DESIGN
(BDIDS1 - 422)

Uni. Exam. Marks : 60
Sessional Marks : 40

Duration: 45 Hours
(L-2, T-0, S-0, P-2, C=3)

1. COURSE PREREQUISITES

Nil

2. COURSE OBJECTIVES

- To develop advanced furniture design skills through historical and contemporary exploration, material expertise, and human-centred design principles, culminating in innovative and functional furniture solutions.

3. COURSE OUTCOME

- To demonstrate a comprehensive understanding of furniture design history, theory, and contemporary trends.
- Mastering ergonomic principles, anthropometry, and materials science to furniture design.
- To develop proficiency in furniture design software, digital prototyping, and physical model-making techniques.
- To create innovative and functional furniture solutions that address specific user needs and contexts.
- To cultivate critical thinking and problem-solving skills for designing, producing, and marketing furniture products.

Unit- I (15 Hours)

Introduction to Furniture Design: Overview of furniture design, Historical evolution of furniture styles, Key designers and their contributions

Materials and Technologies: Types of materials used in furniture design (wood, metal, plastic, etc.), Properties and applications of different materials, Sustainable materials and practices, Introduction to furniture manufacturing technologies

Ergonomics and Human Factors: Principles of ergonomics, Designing for comfort and functionality, Anthropometric data and its application in furniture design

Unit- II (15 Hours)

Styles and Aesthetics: Exploration of various furniture styles (traditional, modern, contemporary, etc.), Influences of cultural and regional aesthetics, Combining form and function in design

Masterpiece by Architects: Pierre Jeanneret; Le Corbusier- LC4 Chaise Longue, LC2 Petit Confort Armchair; Frank Lloyd Wright- Barrel Chair, Robie House Dining Table and Chairs; Mies van der Rohe- Barcelona Chair, Brno Chair; Eero Saarinen- Womb Chair, Tulip Chair; Alvar Aalto- Paimio Chair, Stool 60

Masterpiece by Interior Designers: Florence Knoll- Knoll Sofa Collection, Knoll Lounge Chair; Philippe Starck- Louis Ghost Chair, Masters Chair; Charles and Ray Eames- Eames Lounge Chair and Ottoman, Eames Molded Plastic Chair; Arne Jacobsen- Egg Chair, Swan Chair; Marcel Breuer- Wassily Chair, Cesca Chair

Unit- III (15 Hours)

Design Methodology and Process: Design thinking in furniture design, Concept development and sketching, Prototyping and model-making, Design documentation and specification

Contemporary Trends and Innovations: Smart furniture and integrated technology, Modular and multifunctional furniture, Sustainable and eco-friendly design practices.

Note: Visits to museum/ exhibition venues located within the Northern Region (India) shall be planned.

RECOMMENDED BOOKS

1. Urban landscape furniture, Hi-Design International Publishing Co.Ltd.
2. Linley,David, Extraordinary furniture, Mitchell Beazley GratBtaiain
3. Children furniture, Atrium; New Delhi
4. Office Furniture, Atrium; New Delhi
5. Dormitories Bedrooms, Atrium; New Delhi
6. Dining Room, Atrium; New Delhi
7. Suresh,Dalela, Work study and ergonomics, Standard Publishing Distributors
8. Pellam,John L 100 Designers Favourite Rooms, Barons Whos Who; North America

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, is to be set from the entire syllabus.
 2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).
-

MRSPTU

ENGLISH COMPOSITION AND COMMUNICATION

(BDIDS1 - 423)

Uni. Exam. Marks : 60

Sessional Marks : 40

Duration: 30 Hours

(L-1, T-0, S-0, P-2, C=2)

1. COURSE PREREQUISITES

Basic knowledge of English as a language up to 12th standard

2. COURSE OBJECTIVES

The objective is to help the students to become independent users of the English language. Students should be able to understand spoken and written English language of varied complexity, including some abstract topics, particularly for preparing reports. They must show awareness in the field and be able to explain their views rationally.

3. COURSE OUTCOME

- The students shall be able to converse fluently, without strain, with international speakers of English in an accent and lexis widely understood globally. They will be able to prepare reports and texts on their own and shall be able to communicate professionally.
- **Reading:** Reading texts of varied complexity; speed reading for global and detailed meaning; processing factual and implied meanings.
- **Vocabulary:** Building up and expansion of vocabulary; active use of vocabulary
- **Grammar:** Revising and practising a prescribed set of grammar items; using grammar actively while processing or producing language
- **Writing:** The qualities of good writing include learning the prescribed written expressions of conventional use, writing business letters and emails, architectural reports, summaries, and various forms of descriptive and argumentative essays related to buildings, as well as poetry and prose.

Unit- I (Reading) (10 Hours)

The students will go through the reading texts themselves with the help of a dictionary or word power as given at the end of the books. As they progress from one reading to another, they should learn to read fast and better understand concrete and abstract topics. While taking up the textbook lessons in the classroom, the teacher shall ensure that students can do the following:

- Identify the significant points and conclusions as given in the text.
- Handle significant texts (outside the prescribed book) with overall comprehension of the links between arguments and the finer distinction between stated and implied meanings.
- Generally, read the stance or the point of view of the writer and present it as a summary.
- Use the vocabulary learnt in the lessons (especially in “word power”) productively in various writing tasks as suggested at the end of each lesson.
- Profitably use the grammatical items discussed at the end of each lesson while producing language for communication.
- Besides the textbook, the teacher must insist that students extend their reading by taking up additional texts of their choice.

Unit – II (Writing) (10 Hours)

The students must learn the language that expresses various cognitive functions frequently used in writing. With the help of the teacher who will give them adequate practice, the students should be able to:

- Convey information on concrete or abstract topics with clarity and precision.
- Write about objects or events in descriptive and narrative form with appropriate detail.
- Explain ideas and build up arguments with adequate support in a convincing manner.
- Use language with some degree of flexibility in consideration of the reader.

- Produce effective forms of professional writing such as business letters, emails, notes, memos, reports, summaries, etc.
- While teaching, the teacher must inculcate in students the habit of revising their writing. The teacher can also use and recommend the relevant sections of the following books to develop students' writing skills.

Unit – III (Report Writing) (10 Hours)

The students must visit places of importance, such as buildings, gardens, monuments, etc., and prepare visit reports. The parameters to be considered for report writing shall be location, history, concept and key elements of design

- Basic understanding and vocabulary of Interior terms and features.
- Presentation of various site reports, case studies and methods of holding meetings.
- Preparation of press notes for interior reports and events.

RECOMMENDED BOOKS

1. Vandana R. Singh, 'The Written Word', Oxford University Press, New Delhi.
2. K.K. Ramchandran, et al., 'Business Communication', Macmillan, New Delhi.
3. Swati Samantaray, 'Business Communication and Communicative English', Sultan Chand, New Delhi.
4. S.P. Dhanavel, 'English and Communication Skills for Students of Science & Engineering.

INSTRUCTIONS TO THE PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, is to be set from the entire syllabus
 2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).
-

INTERIOR SERVICES - II
(BDIDS1 - 424)

Uni. Exam. Marks : 60
Sessional Marks : 40

Duration: 30 Hours
(L-2, T-0, S-0, P-0, C=2)

1. COURSE PREREQUISITES

Nil

2. COURSE OBJECTIVES

To develop an understanding of advanced building services such as fire safety, HVAC, lifts, escalators, and building automation systems and their application in the Interior Design proposals of multi-storied buildings.

3. COURSE OUTCOME

- To understand the heating, ventilation and air conditioning systems
- To learn about the various firefighting systems and provision of fire systems in NBC
- To learn about the vertical transportation systems in multi-storied buildings
- To understand the various safety and security systems.
- To have a brief understanding of the various building management systems

Unit- I (10 Hours)

HVAC (Heating, Ventilation, and Air Conditioning)

- Basic principles of HVAC systems
- Types of HVAC systems (central, split, VRF, etc.)
- Load calculations and system sizing
- Ductwork and air distribution
- Indoor air quality and ventilation
- Integration of HVAC systems with interior design (diffuser placement, noise control, etc.).

VERTICAL TRANSPORT

- Types of elevators and escalators
- Elevator and escalator components and operation
- Safety features and regulations
- Elevator and escalator design considerations
- Integration of vertical transportation with interior design (lobby design, passenger flow).

Unit – II (10 Hours)

FIRE SAFETY

- Fire safety codes (NBC, etc.) and regulations
- Fire prevention and protection measures
- Fire detection and alarm systems
- Fire suppression systems (sprinklers, fire extinguishers)
- Emergency evacuation planning
- Interior design considerations for fire safety (materials, finishes, escape routes)

SAFETY AND SECURITY

- Security systems (CCTV, access control, alarms)
- Safety measures (emergency lighting, signage, first aid)
- Security and safety regulations
- Interior design for security and safety (surveillance, control rooms, safe zones)

Unit – III (10 Hours)

BUILDING AUTOMATION AND ENERGY MANAGEMENT

- Building automation system (BAS) components and functions
- Energy-efficient building design

- Energy-efficient building codes
- Lighting control systems
- HVAC control systems
- Energy monitoring and management
- Integration of BAS with interior design for energy optimisation

RECOMMENDED BOOKS

1. National Building Code of India (NBC) 2016, Bureau of Indian Standards (BIS)
2. Energy Conservation Building Code 2017, Bureau of Energy Efficiency, New Delhi.
3. Arora, S. C and Domkundwar, S. A Course in Refrigeration and Air Conditioning, Dhanpat Rai & Co.(Pvt.) Ltd.; New Delhi
4. Paul Lang V. Principles of Air Conditioning, CBS Publishers & Distributors Pvt.Ltd; New Delhi
5. Aulakh, G. S. Refrigeration and Air Conditioning, Eagles Prakashan Regd; Jalandhar
6. Khurmi, R. S and Gupta, J. K. A textbook of refrigeration and air conditioning, Eurasia Publication House Pvt. Ld.
7. Sinopoli, J. Smart Building Systems for Architects, Owners, and Builders. Elsevier Inc.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, is to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

MRSPTU

INTERIOR LIGHTING (BDIDS1 - 425)

Uni. Exam. Marks : 60
Sessional Marks : 40

Duration: 30 Hours
(L-2, T-0, S-0, P-0, C=2)

1. COURSE PREREQUISITES

Nil

2. COURSE OBJECTIVES

This course explores the principles, techniques, and applications of lighting design in interior spaces. Students will learn about the impact of lighting on aesthetics, functionality, and occupant well-being.

3. COURSE OUTCOME

- Understand the fundamentals of light and human vision.
- Explore the different types of lighting and their applications in interior design.
- Develop skills in lighting calculations and the use of lighting software.
- Learn about energy-efficient and sustainable lighting solutions.
- Create lighting designs that enhance the functionality and aesthetics of interior spaces.

Unit-I (10 Hours)

BASICS OF INTERIOR LIGHTING:

Introduction to Interior Lighting- Importance of lighting in interior design, Basics of light and vision: Light properties, Human visual system

Light Sources and Fixtures- Types of light sources: natural and artificial, Characteristics of light sources: Incandescent, fluorescent, LED, etc. Types of lighting fixtures and their applications

Lighting Terminology and Metrics- Key terms: Lumen, Lux, Candela, Efficacy, etc. Understanding lighting metrics, Introduction to lighting calculations

Principles of Lighting Design- Layered lighting approach: ambient, task, accent, and decorative lighting, Principles of effective lighting design, Lighting for different room types and functions

Unit-II (10 Hours)

NATURAL AND ARTIFICIAL LIGHTING:

Natural Lighting- Importance of natural lighting in interiors, Techniques for maximising natural light, Daylighting strategies and their benefits, Solar geometry and shading devices

Artificial Lighting Design- Designing with artificial lighting, Choosing the right fixtures and placement, Lighting control systems and automation, Introduction to lighting design software

Energy Efficiency and Sustainability in Lighting- Energy-efficient lighting solutions, Sustainable lighting practices, Standards and certifications (e.g., BEE, LEED)

Elements of Lighting

Colour and Light- Understanding colour temperature and colour rendering, Impact of light on colour perception, Techniques for integrating colour and light in design

Unit-III (10 Hours)

LIGHTING APPLICATIONS:

Lighting for Special Environments- Lighting for commercial spaces, Lighting for healthcare and educational facilities, Residential lighting design considerations, Lighting for outdoor and landscape areas

Advanced Lighting Technologies- Smart lighting systems, Innovations in LED technology, Interactive and adaptive lighting, Future trends in lighting design

Lighting Design Project - Project briefing and objectives, Site analysis and client requirements, Lighting calculations and simulations, Selection of fixtures and materials

RECOMMENDED BOOKS

1. Schawen, Deidi von Taschen, Angelika and Sethi, Sunil. Indian Interiors, Taschen Publications
2. Taschen, Angelika. Indian interior, Taschen Publications
3. Steffy, Gary, Architectural lighting design, John Wiley & Sons, Inc
4. Lighting commercial cooling and repair handling, Platts Colorado E source Colorado
5. Cullen, John The lighting handbook
6. Pile J. Color in interior design, McGraw Hill; New York
7. K Ono; K Kato and S Kabayama, Introduction to colour and composition, Westland; New Delhi
8. Martha, Stewart, Decorating with colours: the best of Martha Stewart, Martha Stewart; London
9. Rochon, Richard and Linton, Harold, Colour in Architectural Illustration, Van Nostrand Reinhold Co
10. Karlen, M. (n.d.). Lighting Design Basics. JOHN WILEY & SONS, INC.

INSTRUCTIONS TO QUESTION PAPER SETTER

1. One compulsory question containing six questions of 2 marks (12 marks), each requiring short answers, is to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

MRSPTU

PHYSICAL MODELLING AND VISUALISATION

(BDIDS1 - 426)

Uni. Exam. Marks : 60

Sessional Marks : 40

Duration: 30 Hours

(L-1, T-0, S-0, P-2, C=2)

1. COURSE PREREQUISITES

Nil

2. COURSE OBJECTIVES

Teaching this subject shall help the students learn different materials and techniques used to present the work of interiors on a higher level.

3. COURSE OUTCOME

- To demonstrate Proficiency in Medium of Material
- To be able to create Scaled Models
- To apply photography Techniques
- To understand the integration of Visualization Tools
- To critically analyze and Present Designs

Unit- I (10 Hours)

MATERIAL REPRESENTATION

Understanding Material Selection: Exploring various materials used in interior visualisation, including their properties and visual impacts.

Techniques in Material Representation: Methods for effectively representing materials such as wood, glass, fabric, and metals through digital rendering and visualisation tools.

Unit- II (10 Hours)

SCALED MODELS

Importance of Scaled Models: Utilising scaled-down models to visualise spatial arrangements and design concepts before full-scale implementation.

Techniques for Creating Scaled Models: Hands-on approaches to constructing and presenting scaled models, incorporating principles of proportion, detail, and accuracy.

PHOTOGRAPHY

Photographic Principles and Techniques: Applying photography techniques to capture and enhance interior visualisations.

Lighting and Composition: Strategies for using lighting and composition to convey atmosphere, scale, and materiality in interior spaces.

Unit- III (10 Hours)

PORTFOLIO

Compilation of Visual Works: Curating and organising a collection of interior visualisations, emphasising diverse material mediums, scaled models, and photography techniques.

Presentation Techniques: Developing skills in presenting portfolios through digital platforms and physical formats, focusing on clarity, coherence, and visual impact.

RECOMMENDED BOOKS

1. Hilton,Jonathan and Watts, Barrie, A first guide photography, Pradeep publishers
2. Mills,Criss. Designing with Models: A Studio Guide to Architectural Process Models, John Wiley & Sons. Inc.; New Jersey
3. Werner,Megan., Model Making, Princeton Architectural Press

INSTRUCTIONS TO QUESTION PAPER SETTER

1. Assess the student's portfolio using two external methods: craftsmanship, creativity, technical proficiency, and the ability to articulate design concepts effectively.

EDUCATIONAL TOUR -I
(BDIDS1 - 427)

Uni. Exam. Marks : No Exam
Sessional Marks : 100

Duration: 15 Hours
(L-0, T-0, S-0, P-0, C=1)

1. COURSE PREREQUISITES

Nil

2. COURSE OBJECTIVES

The main aim is to explore study, analyse and understand the contemporary/ traditional/ historical architectural characteristics and details of areas and places relevant to the syllabi. The duration of the tour shall be up to 07 days.

3. COURSE OUTCOME

- To develop observational and documentation skills
- To enhance understanding of construction principles and interior design elements
- To foster critical thinking and problem-solving abilities
- To promote effective communication and teamwork
- To assess students' knowledge and comprehension of building materials, construction techniques, and interior design

GENERAL GUIDELINES FOR TEACHER

Study of building materials and details through sketches and photographs to be made as an individual student activity and is to be submitted in a report form. Study of concepts/ construction techniques and Interior characters for different sites/ buildings visited to be submitted in groups of students. As part of the internal assessment, the viva voce of individual students for both submissions will be conducted by the teacher in charge, who accompanied the tour.

NOTE: The evaluation shall be done on the work done by the students in the form of handmade sketches and a tour report.

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF ENGINEERING AND TECHNOLOGY

SYLLABUS

M. Tech. (Textile Engineering)

2022 BATCH ONWARDS

(For Full-Time and Part-Time Modes)

Note: (i) Copy rights are reserved.

Nobody is allowed to print it in any form.

Defaulters will be prosecuted.

(ii) Subject to change in the syllabi at any time.

Please visit the University website time to time.

Mission and Vision of the Department

Vision

To strive to become a premier department in the field of Textile Engineering by providing quality technical education to the students to serve the needs of society.

Mission

The department is committed to nurture the students with best quality technical education in textile engineering and develop research aptitude.

To improve skill and knowledge through effective and participative teaching – learning process using latest educational techniques.

To boost up industry-institute interaction/ collaboration through MoUs, Internships and participative curriculum developments.

To enhance students exposure in multidisciplinary & interdisciplinary domain and professional ethics through collaborative case study/ project and related activities.

Programme Outcomes

Critical Thinking: Ability to analyse complex engineering problems and apply acquired knowledge in an innovative manner to provide societal acceptable solutions.

Research Skills: Creating a research temperament for achieving meaningful and long-lasting solutions in-line with the changing needs of the society.

Use of Modern Tools: Ability to develop appropriate models/simulated solutions by using available state-of-the-art tools and techniques.

Collaborate Multidisciplinary Work: Ability to achieve the laid objectives by maximizing the potential of co-team members and collaborating with other stakeholders.

Project Management and Finance: Ability to formulate economically viable solutions using acquired technical and allied knowledge base.

Research Ethics and Life Long Learning: Ability to exercise research ethics and enforce professional conduct in research, publications and life-long learning.

Effective Communication: Ability to acquire effective listening, oral and writing skills for executive presentations making complete use of available ICT platforms.

Environment and Sustainability: Analyse the impact of engineering solutions in societal and environmental contexts to address the needs for sustainable development.

Programme Specific Outcomes (PSOs)

Ability to evaluate the complex textile engineering problems and design optimal solutions and implement the same using cutting edge technologies.

Ability to develop research skill to explore new facts and dimensions which can help develop solutions which are sustainable and beneficial to the society.

Programme Educational Objectives (PEO) for M. Tech. (Textile Engineering)

Post graduates will be recognized by contribution in the workplace that involves creative and critical thinking in engineering challenges.

Teaming skill and effective communication in a professional environment.

Continuous learning through developmental opportunities by adapting to changing social, economic and technological environments.

**MRSPTU M.TECH. TEXTILE ENGINEERING SYLLABUS
2022 BATCH ONWARDS**

Study Scheme for M. Tech Regular Programme

1 st SEMESTER		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Internal	External	Total	
MTEXS1-101	Advances in Yarn Production Technologies	4	0	0	40	60	100	4
MTEXS1-102	Advances in Fabric Production Technologies	4	0	0	40	60	100	4
MTEXS1-103	Apparel Technology	4	0	0	40	60	100	4
	DE- 1	4	0	0	40	60	100	4
MTEXD1-111	Process Control in Spinning and Weaving							
MTEXD1-112	Production Management in Textiles							
MTEXD1-113	Total Quality Management							
	DE- 2	4	0	0	40	60	100	4
MTEXD1-121	Textile Product Design							
MTEXD1-122	Physical Properties of Fibres							
MTEXD1-123	Coloration and finishing Technology							
MTEXS1-104	Advanced Mechanical Processing Laboratories	0	0	4	60	40	100	2
Total:		20	0	4	260	340	600	22

2 nd SEMESTER		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Internal	External	Total	
MTEXS1-201	Advances in Fibre Production Technologies	4	0	0	40	60	100	4
MTEXS1-202	Structural Mechanics of Yarns	4	0	0	40	60	100	4
MTEXS1-203	Structural Mechanics of fabrics	4	0	0	40	60	100	4
	DE- 3	4	0	0	40	60	100	4
MTEXD1-211	Knitting and Non-Woven Technology							
MTEXD1-212	Post Spinning Operation							
MTEXD1-213	Environmental Practices in Textiles							
	DE- 4	4	0	0	40	60	100	4
MTEXD1-221	High Performance Fibres and Composites							
MTEXD1-222	Advanced Garments Manufacturing Technology							
MTEXD1-223	Technical Textiles							
MTEXS1-204	Advanced Textile Testing Lab	0	0	4	60	40	100	2
Total:		20	0	4	260	340	600	22

**MRSPTU M.TECH. TEXTILE ENGINEERING SYLLABUS
2022 BATCH ONWARDS**

3 rd SEMESTER		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Internal	External	Total	
XXXX	Open Elective- 1	3	0	0	40	60	100	3
MREMI0-101	RM & IPR	4	0	0	40	60	100	4
MTEXS1-302	Project	0	0	-	60	40	100	6
MTEXS1-303	Seminar	0	0	2	100	--	100	1
Total:		7	0	2	240	160	400	14

4 th SEMESTER		Contact Hours			Marks		
Subject Code	Subject Name	L	T	P	Internal	External	Total
MTEXS1-401	Dissertation	--	--	--	Satisfactory / Not Satisfactory as per CBCS-2016		
Total:		--	--	--	--		

**MRSPTU M.TECH. TEXTILE ENGINEERING SYLLABUS
2022 BATCH ONWARDS**

Study Scheme for M. Tech Part-Time Programme

SEMESTER-1		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Internal	External	Total	
MTEXS1-101	Advances in Yarn Production Technologies	4	0	0	40	60	100	4
MTEXS1-102	Advances in Fabric Production Technologies	4	0	0	40	60	100	4
Department Elective- 1		4	0	0	40	60	100	4
MTEXD1-111	Process Control in Spinning and Weaving							
MTEXD1-112	Production Management in Textile							
MTEXD1-113	Total Quality Management							
Total:		12	0	0	120	180	300	12

SEMESTER-2		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Internal	External	Total	
MTEXS1-103	Apparel Technology	4	0	0	40	60	100	4
Department Elective- 2		4	0	0	40	60	100	4
MTEXD1-121	Textile Product Design							
MTEXD1-122	Physical Properties of Fibres							
MTEXD1-123	Coloration and finishing Technology							
MTEXS1-104	Advanced Mechanical Processing Laboratories	0	0	4	60	40	100	2
Total:		8	0	4	140	160	300	10

SEMESTER-3		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Internal	External	Total	
MTEXS1-201	Advances in Fibre Production Technologies	4	0	0	40	60	100	4
MTEXS1-202	Structural Mechanics of Yarn	4	0	0	40	60	100	4
Department Elective- 3		4	0	0	40	60	100	4
MTEXD1-211	Knitting and Non-Woven Technology							
MTEXD1-212	Post Spinning Operations							
MTEXD1-213	Environmental Practices in Textiles							
Total:		12	0	0	120	180	300	12

**MRSPTU M.TECH. TEXTILE ENGINEERING SYLLABUS
2022 BATCH ONWARDS**

SEMESTER-4		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Internal	External	Total	
MTEXS1-203	Structural Mechanics of fabrics	4	0	0	40	60	100	4
Department Elective- 4		4	0	0	40	60	100	4
MTEXD1-221	High Performance Fibres and Composites							
MTEXD1-222	Advanced Garments Manufacturing Technology							
MTEXD1-223	Technical Textiles							
MTEXS1-204	Advanced Textile Testing Lab	0	0	4	60	40	100	2
Total:		8	0	4	140	160	300	10

SEMESTER-5		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Internal	External	Total	
XXXXX	Open Elective- 1	3	0	0	40	60	100	3
MREMI0-101	Research Methodology and IPR	4	0	0	40	60	100	4
MTEXS1-302	Project	0	0	-	60	40	100	6
MTEXS1-303	Seminar	0	0	2	100	--	100	1
Total:		7	0	2	240	160	400	14

SEMESTER-6		Contact Hours			Marks		
Subject Code	Subject Name	L	T	P	Internal	External	Total
MTEXS1-401	Dissertation	-	-	-	Satisfactory / Not Satisfactory as per CBCS-2016		
Total:		-	-	-	--		

ADVANCES IN YARN PRODUCTION TECHNOLOGIES

Subject Code: MTEXS1-101

**LTPC
4 0 0 4**

Duration-60hrs

Course Objectives:

- CO1: To develop an ability to understand various yarn manufacturing parameters.
- CO2: To equip students with knowledge about the machines used in various spinning technologies.
- CO3: To make students understand about the structure and properties of yarn.
- CO4: To impart knowledge of the quality requirement in various spinning systems.

Course Outcomes

- CO1: To analyse the basics of fiber Quality Requirements, and Various spinning systems.
- CO2: To understand and analyse the theory of textile machines and modern developments.
- CO3: To understand the various new spinning methods.
- CO4: Evaluate the structure, properties of spun yarn and various quality parameters.

UNIT – I (15 Hrs)

Fiber Quality Requirements for Different Spinning Technologies, Systems of Yarn Manufacture in Cotton, Worsted, Woollen and Semi Worsted System, Comparative Study of New Spinning Technologies, Concept of Opening and Cleaning

UNIT-II (15 Hrs)

Aerodynamics and its Role in Blow room, Theories of Cardin, Drafting Theories, Developments in Comber, Quality Aspects of Roving, Balloon Theory in Spinning, Significance of Modern Developments in Spinning Process, Modern High Speed Draft Spinning Systems

UNIT-III (15Hrs)

Machine and Process Variables Affecting the Structure and Properties of Spun Yarns, Introduction to Core Spinning, Cover Spinning, Siro-Spinning and Compact Spinning.

UNIT-IV (15 Hrs)

Processing of Wool and Man Made Fibres in New Spinning Systems, Non-Conventional Methods of Yarn Manufacture, Air-Vortex Yarn, Quality Standards of Different Yarns with Emphasis on USTER Standard

Recommended Books

1. P. Grosberg and C. Iype, "Yarn Production-Theoretical Aspects", 1st edition, The Textile Institute, UK, 1999.
2. R. Chattopadhyay, "Advances in Technology of Yarn Production", 1st Edn., NCUTE, New Delhi, 2002.
3. M.V.S. and A.B. Talele, "A Guide to Crimping / Texturing Technology", 1st Edn., Nasnal Printers and its Associates, Surat, 1992.
4. Klein W, "Manual of Textile Technology-New Spinning Systems", Vol.5, 1st Edn., The Textile Institute, UK, 1993.

**MRSPTU M.TECH. TEXTILE ENGINEERING SYLLABUS
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ADVANCES IN FABRIC PRODUCTION TECHNOLOGIES

Subject Code: MTEXS1- 102

**LTPC
4 0 0 4**

Duration -60hrs

Course Objectives:

CO1: To Understand science based manufacturing of Weaving.

CO2: Able to Learn mathematic Modelling of weaving process.

CO3: To understand and analyse the theory of textile Knitting machines.

CO4: Learn modelling of Non-woven manufacturing process and identifying the parameters in nonwoven production.

Course Outcomes

CO1: Understand mathematical logics behind weaving and winding process.

CO2: Understand the different aspects of unorthodox weaving.

CO3: understand the concepts of warp and weft knitting.

CO4: Understand different aspects of nonwoven technology and predictive measures of different properties of nonwoven fabric.

UNIT-I (15 Hrs)

Development Trends in Winding, Warping and Sizing Machines for Improving Quality of Preparation and Cost Reduction, Loom Development Trends and Objectives, Kinematics of Sley and Heald Motion with Reference to Shuttle Loom, Mechanics of Shuttle Checking, Analysis of Warp Tension during Weaving, Cloth Fell Position, Beat Up Force and Pick Spacing

UNIT-II (15Hrs)

Theoretical Analysis of Weft Insertion in Shuttleless Loom, Electronic Control of Different Motions of Loom, Techno-Economics of Different Methods of Fabric Production

UNIT-III (15 Hrs)

Weft Knitted Fabric Manufacturing by Circular Knitting and Flat Bed Knitting Machine, Warp Knitting Manufacturing

UNIT-IV (15 Hrs)

Classification and Areas of Application of Nonwoven Fabrics, Different Methods of Production of Nonwoven Fabrics, Effect of Machines, Fibre and Process Variables on Properties of Nonwoven Fabrics, Failure Mechanism of Nonwoven Fabrics. Prediction Of Needle Punched Nonwoven Fabric Behavior. Designing of Nonwoven For Engineering Applications. Developments In Nonwoven Machineries.

Recommended Books

1. R. Marks and A.T.C. Robinson, "Principles of Weaving", Textile Institute, UK, 1986.
2. Ormerod, "Modern Preparation and Weaving Machinery", Buttersworth & Co., UK, 1983.
3. O. Talavasek and V. Svaty, "Shuttleless Weaving Machine", Elsevier Scientific Publishing Co. Amsterdam, 1981.
4. J. Lunenschloss and W. Albrecht, "Nonwoven Bonded Fabrics", Ellis and Harwood Ltd. UK, 1985.
5. W. Albrecht, H. Fuchs and Kittelmann, "Nonwoven Fabrics", Wiley – VCH Weinheim, 2003.
6. V. Mrstina and F. Fejgal, "Needle Punching Textile Technology", Elsevier Scientific Publishing Co. Amsterdam, 1990.
7. M.L. Gulrajani, "Book of Papers of International Conference on Nonwoven", The Textile Institute, UK, 1992.
8. D.J. Spencer, "Knitting Technology", 2nd Edn., Pergamon Press, 1989.

APPAREL TECHNOLOGY

Subject Code: MTEXS1-103

**LTPC
4 0 0 4**

Duration-60hrs

Course Objectives:

- CO1: To enable students to understand different manufacturing processes of apparel such as pattern making, lay plan, spreading, cutting, bundling and ticketing.
- CO2: To make students understand the detail of sewing room processes.
- CO3: To learn different types of finishing in garment construction.
- CO4: To create awareness about clothing culture.

Course Outcomes

- CO1: Understanding different manufacturing processes of apparel such as pattern making, lay plan, spreading, cuttings bundling and ticketing
- CO2: Understanding of detail of sewing room processes Understanding of finishing processes of apparel.
- CO3: Knowledge of production, planning and control in apparel production.
- CO4: Understanding of the property of the fabric with comfort to the clothing wearer

UNIT-I (10 Hrs)

Introduction:- Introduction to garment manufacturing and Indian apparel industry.
Latest developments in apparel manufacturing and machinery.
Pattern Formation and Cutting - Pattern making – Draft construction – marker planning – fabric spreading - laying methods - fabric cutting. Advanced Pattern making, Spreading & cutting – Factors affecting spreading – Automatic systems - Marker planning - 3D body scanner for measurements.
Computerized cutting machines – easy match system - automatic ticketing and bundling
Automatic pattern notcher.

UNIT-II (20 Hrs)

Sewing Machine Mechanisms & Accessories – Introduction to sewing m/c and its parts and working details, types of sewing m/c, Attachment of sewing m/c, Automation in industrial sewing machines, automatic placket feeder, Automatic pocket maker, auto button sewer, Electronic Sewing machines Application of robotics in sewing, LAN in Sewing machines, high speed stitching. Preparation of seamless garments and its applications, sewing room planning.
Sewing Needles and Threads - Needle – functions, special needles, Needle size, Needle points, sewing thread – construction, material, thread size and packages.
Seams & Stitches – Seams, Different types, Superimposed, lapped, bound, flat, decorative, edge neatening, addition to Garment edges, single piece addition, Stitches – lock stitch, chain stitch, hand stitch type, multi-thread chain stitch, over edge chain stitch and covering chain stitches.
Stitch formation Mechanics: - Mechanism of lock stitch formation, Factors affecting yarn tension and stitch length of a seam during stitching, Mathematical model of lock stitch,
Development of yarn tension during lock stitching, Modeling of take-up arm displacement

UNIT-III (10 Hrs)

Components and Trims - Labels – linings, interlinings, wadding, lace, braid, elastic, hock and loop fastening shoulder pads, eyelets and laces, Zip fasteners and buttons.
Garment finishing & Packing machines - CNC pressing machines, Quality control in apparel production.

UNIT-IV (20 Hrs)

Apparel Production parameters – control parameters, Product Development, Time management. Breakdown of operation sequence, Development of Flow process, Grid chart for operation sequence.

Manufacturing systems & Planning – Lay out planning, Bundling and ticketing, Evaluation of production systems Capacity planning & line balancing, Capacity calculation for cutting, sewing & finishing, Machine requirements – Line Balancing techniques. Work study method, motion & time study - computer Integrated production planning & management systems.

Recommended Books:

1. Jackb Solinger, “Apparel Manufacturing Handbook”, Van Nostrand Reinhold company” 1980
2. Cooklin. G. “Introduction to clothing manufactures” Blackwell science . 1995.
3. Harold Carr & B. Latham, “The Technology of clothing manufacture - Blackwell sciences 1998
4. Churter. A.J, “Introduction to clothing production management”, Osney Mead.1995.
5. Mehta P V and Bhardwaj S K “ Managing Quality in Apparel Industry”, New Age International (P) Ltd., Delhi-2002
6. “Garment Technology NCUTE Series”, Ed. Bhattacharya A, NCUTE- IIT, Delhi,2003.
7. Aldrich W, “ Metric pattern cutting”, Om Book Service, Delhi-1998.

PROCESS CONTROL IN SPINNING & WEAVING

Subject Code: MTEXD1-111

**LTPC
4 0 0 4**

Duration -60 hrs

Course Objectives

- CO1: To familiarize students with Process control in spinning
- CO2: To equip students with knowledge about Plant Engineering in a textile Industry
- CO3: To impart knowledge of Process control in weaving
- CO4: To equip students with knowledge about Process control of Textile processes in special conditions

Course Outcomes

- CO1: Optimisation of quality and cost of fibres through mixing/blending.
- CO2: Able to apply process and quality control tools in yarn production.
- CO3: Apply modern process and quality control parameters of yarns and fabrics in production.
- CO4: Able to evaluate various process and quality parameters for fabric production.

UNIT - I (15 Hrs)

Process Control in Spinning: Optimum Fibre-Mix for Various End Use Requirements, Yarn Realization, Waste Control in Blow room and Card for All Types of Fibres Spun on Cotton System, Minimizing Lea Count Variation, Controlling Yarn Irregularity, Imperfections and Faults, Yarn Tenacity and Elongation, Hairiness. Production of High Quality Export Yarns

UNIT - II (15 Hrs)

Machinery Audit, Work Load, Life of Accessories, Work Load, Indices of Productivity, Temperature and Humidity Control & Its Effect on Performance.

UNIT - III (15 Hrs)

Process Control in Weaving: Principles for Control of Productivity in Different Sections, Contribution of Control in Yarn Winding, Warping, Sizing & Weaving to The Cost of Production in Fabric Manufacture, Splicing, Machine Allocation and Load Distribution, Control of Migration in Sizing, Size Droppings, Sizing Materials, Loom Allocation, Evaluation & Grading of Fabric Defects, Control of Loom Accessories, Control of Loss of Efficiency by Snap Study.

UNIT - IV (15 Hrs)

Process Control in Special Conditions: Controls in the Process of High Twist Yarns, Blended Yarns, Filament Yarns in Warp and Weft, Controls in The Winding for Processing Yarns for Dyeing & Knitting, Controlling Sloughing Off During Winding, Warping & Weaving, On- Line Data System and Its Use In Controls.

Recommended Books

1. ATIRA, "Process Control in Spinning".
2. ATIRA, "Process Control in Weaving".
3. R. Chattopadhyay, "Process Control in Spinning", IIT, NCUTE, Delhi.
4. SITRA, "Quality Control
5. 1 in Spinning".

**MRSPTU M.TECH. TEXTILE ENGINEERING SYLLABUS
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PRODUCTION MANAGEMENT IN TEXTILE

Subject Code - MTEXD1-112

**L T P C
4 0 0 4**

Duration – 60 Hrs

Course Objectives

- CO1: To create awareness about Operation management of different manufacturing and service systems
- CO2: To familiarize students with decisions about Plant Location and Lay out
- CO3: To make students understand about material Management
- CO4: To develop understanding about Job Evaluation and waste management

Course Outcomes

- CO1: Know and examine the concepts of operation management and operations planning control.
- CO2: Analyse the various aspects of plant location and layout.
- CO3: Evaluate critically the concepts of Material Management, objectives, planning, MRP calculation and material handling.
- CO4: Judge the role and solutions of issues like Job Evaluation and Waste Management and different types of pollution.

UNIT – I (15Hrs)

Operation Management: Operations Management in Corporate Profitability and Competitiveness, Types and Characteristics of Manufacturing and Service Systems, Operations Planning Control: Planning Production in Aggregate Terms, Quality Assurance

UNIT – II (15Hrs)

Plant Location and Layout: Plant Layout: Features, Basic Principles, Types of Layout, Merits And Demerits, Optimization Of A Product/Line Layout And Process Layout. Location of Facilities: Nature of Location Decision, Situations That Influence Location Decision, Backward Areas And Industrial Policy, Behavioral Aspects In Location Planning

UNIT – III (15 Hrs)

Material Management: Purchasing, Objectives, Value Engineering, Vendor Relations, Selection of Vendors, Material Requirement Planning, MRP Calculations, Material Handling

UNIT - IV (15Hrs)

Job Evaluation and Waste Management: Job Evaluation, Incentive Schemes, Job Redesign, Work Measurement Techniques, Different Types of Pollution: Water, Air, Solid Waste, Soil, Noise, Odours etc. Pollution Caused by Textile Industries, Waste Definition, Characteristics and Perspectives, Different Types of Waste

Recommended Books

- M.R. Raymond, "Production and operations management", Mcgraw-Hill international Edition, New York, 1993.
- S.E. Buffa and R. Sarin, "Modern Production/Operations Management", John Willey and Sons, Delhi, 1995.
- R. Collard, "Total quality", Jaico Publishing House, Mumbai, 1988.
- S.K., Sharma, Sand Sharma T, "Industrial Engineering and Operations Management", S.K. Kataria and Sons, Delhi, 1996.
- S. Asolekar, "Environmental Problems in Chemical Processing of Textiles" 1stEdn., NCUTE, Department of Textile Technology, IIT-Delhi, 2000.

TOTAL QUALITY MANAGEMENT

Subject Code: MTEXD1-113

**LTPC
4 0 0 4**

Duration -60hrs

Course Objectives

- CO1: To familiarize students with various dimensions and concepts related to TQM
- CO2: To develop understanding about various quality processes in an organization
- CO3: To equip students with knowledge about tools and Techniques of Quality Improvement.
- CO4: To familiarize students with Quality Management system under ISO.

Course Outcomes

- CO1: Recognise importance and framework of TQM
- CO2: Appreciate and analyze TQM principles
- CO3: Comprehend and appraise Tools and Techniques of TQM
- CO4: Demonstrate the understanding about implementation of Quality Management System

UNIT -I(15hrs)

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention.

UNIT II(15hrs)

Leadership - Quality Statements, Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.

UNIT III(15hrs)

The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types. Quality Circles - Cost of Quality - Quality Function Deployment (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

UNIT IV(15hrs)

Introduction—Benefits of ISO Registration—ISO 9000 Series of Standards—Sector-Specific Standards—AS 9100, TS16949 and TL 9000-- ISO 9001 Requirements—Implementation—Documentation—Internal Audits—Registration--ENVIRONMENTAL MANAGEMENT SYSTEM: Introduction—ISO 14000 Series Standards—Concepts of ISO 14001—Requirements of ISO 14001— Benefits of EMS.

Books recommended:

1. Dale H.Besterfield, Carol B.Michna,Glen H. Besterfield,Mary B.Sacre,Hemant Urdhwareshe and Rashmi Urdhwareshe, "Total Quality Management", Pearson Education Asia, Revised Third Edition, Indian Reprint, Sixth Impression, 2013.
2. Ross E, "Total Quality Management", Kogan Page USA, 1989.
3. Raju S S M, "Total Quality Management",Tata Mcgraw Hill Publishing Co., 1985.
4. Fiegenbaum V A, "Total Quality Management", Mcgraw Hill International, 1990.
5. Tenner R A and Detoro JI,"Total Quality Management", Addison–Wesley Publishing Co., 1986.

TEXTILE PRODUCT DESIGN

Subject Code: MTEXD1-121

**L T P C
4 0 0 4**

Duration - 60 Hrs

Course Objectives

- CO1: To familiarize students with various dimensions and concepts related to TQM
- CO2: To develop understanding about various quality processes in an organization
- CO3: To equip students with knowledge about tools and Techniques of Quality Improvement.
- CO4: To familiarize students with Quality Management system under ISO.

Course Outcomes

- CO1: Conceptualise process of Product development & Design
- CO2: Evaluate the role of Research in Product development and Its business aspects
- CO3: Organise the ideas related to Design Conceptualization and Design analysis
- CO4: Execute Design optimization

UNIT-I (15 Hrs)

Concepts of Engineering, Product Development and Design, Characteristics of Successful Product Design, Product Development Process Tools, Product Architecture. Evolution of Engineering, Engineering Attributes and Concepts

UNIT-II (15Hrs)

Basic Concepts and Critical Factors for Product Development, Simplified View of Product Development, The Product Development Cycle, Business and Marketing Aspects Related To Product Development Product-Focus Versus User-Focus Product, Development Role Of Research in Product Development, The Core Task in Product Development

UNIT-III (15 Hrs)

The Product Design Cycle, Design Conceptualization Design Analysis, Basic Differences between Design Conceptualization and Design Analysis, General Guidelines for Design Conceptualization Basic Tools of Design Conceptualization

UNIT-IV (15 Hrs)

Purpose of Design Analysis, Optimization Analysis: Linear programming, Product Design Economics.

Recommended Books

1. Kevin Otto, & Kristin Wood, "Product Design Techniques in Reverse Engineering and New Product Development", Pearson Education Publication, 1st Edn., 2006.
2. K.T. Ulrich, "Product Design and Development", Tata McGraw Hill, 3rd Edn., 2004.

PHYSICAL PROPERTIES OF FIBRES

Subject Code: MTEXD1-122

**L T P C
4 0 0 4**

Duration – 60 Hrs

Course Objectives

- CO1: To impart knowledge about various aspects of moisture absorption by Textile material.
- CO2: To develop understanding about mechanical response of textile materials
- CO3: To equip students with knowledge about textile behaviour towards various agencies like friction, heat etc.
- CO4: To familiarize students with fibre structure and their electrical properties.

Course Outcomes

- CO1: Analyze the mechanism of moisture absorption and its influence on fibre properties
- CO2: Appreciate the fibre mechanical properties under different test conditions, their analysis and applications.
- CO3: Apply the knowledge about the properties like thermal, electrical, frictional properties of Fibre.
- CO4: Distinguish the structural features of fibres and application of structure analysis

UNIT – I (15 Hrs)

Moisture Absorption and Desorption of Fibres, Sorption Isotherms, Heat of Sorption and Theory of Sorption, Swelling of Fibres.

UNIT - II (15 Hrs)

Mechanism of Deformation of Fibres, Principles of Elasticity and Visco-Elasticity, Stress- Strain Behaviour of Textile Fibres, Creep and Stress Relaxation. Dynamic Mechanical Properties of Fiber, Model Theory, Time Temperature Superposition Principle, Thermodynamic Analysis of Deformation.

UNIT - III (15 Hrs)

Fiber Friction, Its Nature, Theory, Application and Measurement, Unibirefringence and Its Measurement, Thermal Transition and Its Importance

UNIT – IV (15 Hrs)

Dielectric Properties of Fiber, Static Electricity and Measurement of Static Charge in Fibres, Fiber Micro Structure, X-Ray Analysis, IR Spectroscopy and SEM

Recommended Books

1. R. Meredith, 'The Mechanical Properties of Textile Fibres', North Holland Publishing Co; Amsterdam, 1959.
2. W.E. Morton and J.W.S. Hearle, "Physical Properties of Textile Fibres", 1st reprint, The Textile Institute, Manchester, 1986.
3. V.B. Gupta and V.K. Kothari, "Manufactured Fibre Technology" 1st Edn., Chapman and Hall, London, 1997.
4. J.W.S. Hearle, Polymers and their Properties, Vol. I, John Wiley and Sons, NY, 1982.

COLORATION AND FINISHING TECHNOLOGY

Subject Code: MTEXD1-123

**L T P C
4 0 0 4**

Duration: 60 hrs

Course Objectives

- CO1: To impart knowledge about preparatory chemical process for synthetic textile materials.
- CO2: To develop understanding about dyeing and printing of textile materials and their blends
- CO3: To familiarize students with various finishing treatments and quality control practices in Textile chemical processing.
- CO4: To equip students with knowledge about effective management of energy, water and other resources in chemical processing of Textiles.

Course Outcomes

- CO1: Understand technology behind preparatory processes for manmade textiles and their blends
- CO2: Learn modern approaches for dyeing and printing of manmade fibres and blends
- CO3: Grasp the latest techniques of finishing processes and garment processing
- CO4: Appreciate energy management and effluent treatment techniques in textile industries

UNIT- I (15hrs)

Preparatory processes for synthetic textiles and their blends. Heat setting - Mechanism and effect on properties of textiles.

UNIT II(15hrs)

Developments in dyeing of synthetic textiles and their blends. Dyeing of micro-fibres. Mass coloration of synthetic textiles. Printing of synthetic/blended textiles in direct, resist and discharge styles. Transfer printing of polyester, cotton, wool and their blends.

UNIT -III(15hrs)

Anti-crease finishes and latest development in it. Controlled application techniques. Anti-stat, soil release and flame- retardant finishes. Garment processing. Quality control in chemical processing.

UNIT- IV (15hrs)

Energy conservation, minimization of wastage of energy during chemical processing of textiles, low temperature processing of textiles. Waste water load in various areas of chemical processing and ways to reduce it.

Recommended Books:

1. Peters R H, "Textile chemistry", Vol. – II and III, Elsevier Publishing Company, London, 1967.
2. Nunn D M, "The dyeing of synthetic polymer and acetate fibres", Dyers Company Publication Trust, London, 1979.
3. Miles L W C, "Textile printing", Dyers Company Publication Trust, Bradford, England, 1981.
4. Hall A J, "Textile finishing", Haywood Books, London, 1996.
5. Bird C L and Boston W S, "The theory of coloration of textiles", Dyers Company Publication Trust, Bradford, England, 1975.
6. Smethwurst G, "Basic water treatment", IBT Publications, Delhi, 1989.

ADVANCED MECHANICAL PROCESSING LABORATORIES

Subject Code: MTEXS1-104

**L T P C
0 0 4 2**

Duration: 60 Hrs

Course Objectives

CO1: To gain knowledge about the various types of yarn manufacturing machines.

CO2: To impart skills to develop new products.

CO3: To develop presentation skills.

CO4: To understand about the various machine faults

Course Outcomes

CO1: To study and analyse the various machines.

CO2: Able to develop new products through process optimization.

CO3: Acquire the presentation skill

CO4: Develop an idea to analyse and correct the machine faults.

List of Experiments

Exploration of product development possibilities in Spinning laboratories.

Exploration of product development possibilities in weaving laboratories

Measurement of properties of the Ring spun yarns.

Measurement of properties of the Rotor, spun yarns.

Measurement of properties of the Friction spun yarns.

Measurement of properties of the Airjet yarns.

Preparation of Fabric Samples in knitting machines and measurement of Fabric properties.

Preparation of Fabric Samples in Weaving machines and measurement of Fabric properties.

Note: A minimum 6 Experiments should be performed by the student from the above given list of experiments or experiments relevant to syllabus.

ADVANCES IN FIBER PRODUCTION TECHNOLOGIES

Subject Code: MTEXS1-201

**L T P C
4 0 0 4**

Duration - 60 Hrs

Course Objectives

CO1: To gain knowledge about the various types of yarn manufacturing machines.

CO2: To impart skills to develop new products.

CO3: To develop presentation skills.

CO4: To understand about the various machine faults.

Course Outcomes

CO1: Create the concept of man-made fibre production, principles and factors affecting.

CO2: Understand the raw materials, monomers, equipment, mechanism used in manmade fibre spinning.

CO3: Apply the basic principles in important manmade fibres production methods, polymerization and new developments.

CO4: Analyze the effect of variables on melt spinning and study high speed spinning, micro-fibre production, solution spinning and heat setting.

UNIT – I (15 Hrs)

General Definition of Man Made or Manufactured Fibres, Introduction to General Principles of Spinning and Spinning Processes, Basic Principles of Fluid Flow during Fiber Spinning, Factors Affecting Shear Viscosity. Elongational Flow, Spinnability and Flow Instabilities

UNIT - II (15 Hrs)

Extruder Design, Spin Head, Spinneret, Quench Chamber, Spin Finish Application, Wind Up Mechanism, Manufacture and Specifications of Raw Materials and Monomers.

UNIT - III (15Hrs)

Types, Methods of Manufacture, Mechanism of Polymerisation and Production Techniques of Viscose, Nylon 6 And 66, PET, PAN And PP, Introduction to New Developments, other Fibres including PU, PVA, PE, PVC and Polyvinylidene Chloride.

UNIT-IV (15 Hrs)

Primary and Secondary Variables and Their Effect on Melt Spinning, High Speed Spinning, Spinning of Microfibre, Solution Spinning Process: Dry and Wet Spinning, Heat-Setting of Fibres

Recommended Books

1. A.A. Vaidya, "Production of Synthetic Fibres", 1st Edn., Prentice Hall of India, NewDelhi, 1988.
2. V.B. Gupta and V.K. Kothari, "Manufactured Fibre Technology", 1st Edn., Chapman and Hall, London, 1997.
3. H.F. Mark, S.M. Atlas and E. Cernia, "Man Made Fibre Science and Technology", Vol. 1,2, 3, 1st Edn., Willey Inter Science Publishers, New York, 1967.
4. J.E. Macintyre, "Synthetic Fibres", Woodhead Fibre Science Series, UK, 2003.
5. F. Fourne, "Synthetic Fibres: Machines and Equipment, Manufacture, Properties", Hanser Publisher, Munich, 1999.

STRUCTURAL MECHANICS OF YARN

Subject Code: MTEXS1-202

LTPC
4 0 0 4

Duration-60hrs

Course Objectives

- CO1: Learn about yarn geometry and packing density
- CO2: Understand migration of fibres in yarn and mechanics of blended yarn
- CO3: Analysis of breaking mechanics of yarn and yarn strength and irregularity
- CO4: Structure and properties relationship of yarn

Course Outcomes

- CO1: To understand and analyse the yarn structure and measurements of various parameters pertaining to yarn structure.
- CO2: Able to apply applications of theoretical aspects in problem solving.
- CO3: Analysis of yarn structure and relation with properties.
- CO4: Able to acquire presentation skill.

UNIT-I (15 Hrs)

Elements of Yarn Geometry, Geometry of Helix and Its Application to Yarn Structure, Geometry of Folded Yarn, Yarn Diameter and Density

UNIT-II (15 Hrs)

Theoretical Analysis of Effect of Fiber Properties and Their Geometrical Configuration on the Tensile and Bending Properties of Yarn, Theories and Analysis of Yarn Strength and Irregularity

UNIT-III (15 Hrs)

Fiber Migration Characteristics of Continuous Filament and Spun Yarns, Breakage of Continuous Filament and Spun Yarns, Effect of Properties of Constituent Fibres and Blend Composition on Behavior of Composite Yarn.

UNIT-IV (15 Hrs)

Effect of Yarn Structure on Different Properties of Yarns, Structure and Property Relationship of Ring, Rotor, Air-Jet and Friction Spun Yarns

Recommended Books

1. J.W.S. Hearle, P. Grosberg and S. Backer, "Structural Mechanics of Fibres Yarns and Fabrics",
2. Wiley Interscience, New York, 1969.
3. B.C. Goswami, J.G. Martindale and F. Scardino, "structure and applications", Wiley Interscience Publisher, New York, 1995.
4. J.W.S. Hearle, J.J. Thwaites and J. Amirbayat, "Mechanics of Flexible Fibre Assemblies", Sijthff and Noordhoff International Publishers BV, Alphen aan den Rijn, Netherlands, 1980.

STRUCTURAL MECHANICS OF FABRICS

Subject Code: MTEXS1-203

**LTPC
4 0 0 4**

Duration-60 hrs

Course Objectives:

CO1: Develop the concept of Mechanics applicable to textile

CO2: Understand the anatomy of woven structure.

CO3: Analyse relation with property and structure of woven and knitted fabric.

CO4: Understand the mechanics of non-woven and woven fabric.

Course Outcomes

CO1: The concepts of fabric geometry and its application.

CO2: The concepts of fabric geometry with respect to yarn shapes.

CO3: The geometry of knitted structures,

CO4: The concepts of mechanical behaviors of woven structures.

UNIT-1 (15Hrs)

Fabric Cover Factor and Its Significance, Engineering Approach for Fabric Formation, Pierce's Cloth Geometry, Practical Aspect of Cloth Geometry, Graphical Relationship in Cloth Geometry for Plain, Twill and Sateen Weaves

UNIT-II (15 Hrs)

Concept of Jammed Structure, Analysis of Racetrack Section of Yarn in Cloth Geometry, Theoretical Investigation of Weavability Limit of Yarns, Elastic Thread Model for Fabric

UNIT-III (15 Hrs)

Concept of Fabric Relaxation for Knitted Fabrics, Geometry and Properties of Weft Knitted Fabrics – Importance of Doyle's and Munden's Research, K-Values and Pierce's Geometry of Knitted Fabrics

UNIT-IV (15 Hrs)

Tensile and tearing Behaviour of Fabric, Bending Deformation of Fabric, Bending Hysteresis of Woven Fabric, Buckling, Shear And Drape Behaviour of Woven Fabric, Mechanical Properties of Nonwoven Needle Punch and Stitch Bonded Fabric, Brief Study of Formability, Tailorability and Hand of Apparel Fabric.

Recommended Books

1. J.W.S. Hearle, P. Grosberg and S. Backer, "Structural Mechanics of Fibres Yarns and Fabrics", Wiley Interscience, New York, 1969.
2. F.T. Peirce and J.R. Womersley, "Cloth Geometry", The Textile Institute, Manchester, 3. 1978.
4. J.W.S. Hearle, J.J. Thwaites and J. Amirbayat, "Mechanics of Flexible Fibre Assemblies", Sijthff and Noordhoff International Publishers BV, Alphen aan den Rijn, Netherlands, 1980.
5. J. Hu, "Structural Mechanics of Fabrics", Woodhead Publishing Co., Cambridge, UK, 2006.

KNITTING AND NONWOVEN TECHNOLOGY

Subject Code: MTEXD1-211

**LTPC
4 0 0 4**

Duration 60 hrs

Course Objectives:

CO1: Understand the dynamics of knitting process and mechanics of loop formation.

CO2: Understand the design and performance of high speed knitting cam.

CO3: Analyse the geometry and properties of knitted fabrics.

CO4: Understand effect of machine, fibre and process variables on properties of non-woven fabrics .

Course Outcomes

CO1: Understand mechanism behind knitting process

CO2: Understand different aspects of knitting cams.

CO3: Understand geometry of knitted structures and their applications.

CO4: Understand the effects of different parameters of nonwoven manufacturing process and latest developments in nonwoven manufacturing technologies.

UNIT-I (15hrs)

Concepts of loop formation in weft and warp knitting. Different forces acting on the needle butt and mechanics of loop formation. Study of dynamics of knitting process. Study of different machines, process and yarn parameters affecting the yarn tension in knitting zone and loop length.

UNIT-II(15hrs)

Concept of Robbing Back of yarn in loop. Study of design and performance of high speed knitting cam and increase in machine production. Yarn feeding devices on circular knitting machines.

UNIT-III(15hrs)

Geometry and properties of weft knitted fabrics –k-values and Pierce’s geometry. Outlines of process control in knitting. Use of electronics and computers and other developments in knitting. Features of warp knitted fabrics and their used friction spun yarns, Strength-length relation in yarn

UNIT IV(15hrs)

Different advanced methods of production of nonwoven fabrics. Effect of machines, fibre and process variables on properties of nonwoven fabrics. Designing of nonwoven for engineering applications. Development in nonwoven machineries. Developments in various nonwoven manufacturing techniques.

Recommended Books:

1. Spencer D J, “Knitting Technology” , 2nd Ed., Pergamon Press, 1989.
2. Russell, S J, “Handbook of Nonwovens”, Woodhead Publishing Limited, Cambridge, UK, 2007
3. Lunenschloss J and Albrecht W, “Non-Woven Bonded Fabric”, Ellis and Horwood Ltd., UK, 1985
4. Albrecht W, Fuchs H and Kittelmann, “Nonwoven Fabrics”, Wiley-VCH Weinheim, 2003.
5. Journals: Textile Research Journal, Princeton, USA and Journal of Textile Institute, Manchester, UK.

POST SPINNING OPERATIONS

Subject Code: MTEXD1-212

**L T P C
4 0 0 4**

Duration – 60Hrs

Course Objectives

- CO1: To understand the concept of drawing process and its influence on filament structure and properties.
- CO2: To inculcate ability to evaluate the texturing process; material and process variables and their influence.
- CO3: To develop the ability to analyze the heat setting process, parameters, equipment and degree of set.
- CO4: To gain knowledge in depth about the sewing threads and post spinning operation used on multifilament sewing threads

Course Outcomes

- CO1: Create the concept of drawing process and its influence on structure and properties of filament.
- CO2: Evaluate the texturing process for fibres; material and process variables and their influence.
- CO3: Analyze the heat setting process, parameters, equipment and degree of set.
- CO4: Understand about the sewing threads, properties and post spinning operations

UNIT-I (15 Hrs)

Drawing: Drawing Process, Neck Drawing, Initiation and Propagation of Neck, Neck Stabilization. Natural Draw Ratio, Effect of Temperature and Strain Rate on Neck Drawing, Prediction of Neck Formation, Influence of Drawing on Structure and Properties of Filament, Spin - Draw process.

UNIT-II (15 Hrs)

Texturing: Texturing and Warping Process, Material and Process Variables in Texturing and Their Influence on Yarn Quality, Recent Advances in Texturing, Testing and Evaluation of Textured Yarn Properties of Fabrics Made from Textured Yarn.

UNIT-III (15Hrs)

Heat Setting: Heat Setting Process, Parameters for Heat Setting, Equipment for Heat Setting and Evaluation of Degree of Set.

UNIT-IV (15 Hrs)

Multifilament Sewing Threads: Post Spinning Operation on Multifilament Sewing Threads

Recommended Books

1. V.B. Gupta and V.K. Kothari, "Manufactured Fibre Technology", 1st Edn., Chapman and Hall, London, 1997.
2. H.F. Mark, S.M. Atlas, E. Cernia, "Man Made fibre Science and Technology", 1stEdn., Vol. I, II, III, Wiley Interscience Publishers, New York, 1967.
3. Macintyre J E, "Synthetic Fibres", Woodhead Fibre Science Series, UK, 2003
4. F. Fourne, "Synthetic Fibres: Machines and Equipment, Manufacture, Properties", Hanser Publisher, Munich, 1999.

ENVIRONMENTAL PRACTICES IN TEXTILES

Subject Code: MTEXD1-213

L T P C

Duration – 60 Hrs

4 0 0 4

Course Objectives

CO1: To enable students to understand Environment Quality and role of an Environmental Engineer.

CO2: To create awareness about Types of pollution caused by Textile manufacturing processes.

CO3: To gain knowledge about Different types of waste and its management in a Textile Plant.

CO4: To familiarize students with Characters of Textile effluents and their treatment.

Course Outcomes

CO1: Understand and Define the contribution of an engineer towards Environment Quality.

CO2: Get Acquainted with the types of pollution caused by Textile Industry.

CO3: Understand the types of Textile wastes and their disposal.

CO4: Appreciate the Textile Effluent treatment techniques.

UNIT – I (15 Hrs)

Introduction to Environment, The Impact of Human upon the Environment, Improvement of Environment Quality, Role of Environmental Engineer.

UNIT - II (15 Hrs)

Different Types of Pollution: Water, Air, Solid Waste, Soil, Noise, Odours etc. Pollution Caused by Textile Industries.

UNIT – III (15 Hrs)

Waste: Definition, Characteristics and Perspectives, Different Types of Waste. Waste Water Collection, Treatment and Disposal, Solid Waste Generation, Collection and Disposal.

UNIT-IV (15 Hrs)

The Textile Effluents, Textile Waste Characteristics, Textile Waste Water Problems, Chemicals Used in Textile Industry, Treatment of Textile Effluents and its Testing.

Recommended Books

1. S. Asolekar, “Environmental Problems in Chemical Processing of Textiles”, 1st Edn., NCUTE, Department of Textile Technology, IIT-Delhi, 2000.
2. V. Padma, “Textile Effluents” 1st Edn., NCUTE, Department of Textile Technology, IIT-Delhi, 2002.
3. B. Edmund, “The Treatment of Industrial Wastes” 2nd Edn., Tata McGraw-Hill, New Delhi, 1976.
4. M.N. Rao, “Environmental Engineering” 2nd Edn., Tata McGraw-Hill, New Delhi,
5. 1993.

HIGH PERFORMANCE FIBRES AND COMPOSITES

Subject Code: MTEXD1-221

L T P C

Duration - 60 Hrs

4 0 0 4

Course Objectives:

CO1: Understand the various techniques for development/fabrication of composite structure.

CO2: Learn the details about the fibres used for composite.

CO3: Gain Knowledge about Carbon based composites.

CO4: Understand the properties and applications of composite and Nano Composites.

Course Outcomes

CO1: Understand the concepts behind composites.

CO2: Understand the applications of different fibres as a preform in composites.

CO3: Understand the manufacturing of high-performance composites/

CO4: Understand the application of different nanomaterials in composites and their applications.

UNIT- I (15 Hrs)

Definition of Composite, General Introduction to Fibres and Resins for Composites, Composite Fabrication Techniques, Matrices and Inter phase.

UNIT- II (15 Hrs)

Polyamide Fibres: Aliphatic Polyamide (N6 and 66) and Their Application in Rubber Tyre. Fully Aromatic Polyamides or Aramid Fibres (Nomex And Kevlar), Their Manufacture, Structure, Properties and Applications

UNIT-III (15 Hrs)

Carbon Fibres: Different Precursors, Preoxidation, Carbonization, Graphitization, Structure and Properties. Application in Composite. Flexible Chain High Performance Fibres, Manufacture and Application in Composite. Glass fiber, Manufacture, Properties and Applications in Composite.

UNIT-IV (15 Hrs)

Nanocomposite: Introduction, Advantages and Different Nano-materials Commonly Used as Fillers Carbon Nanotubes, Carbon Nano-fibres and Nano Clay.

Recommended Books

1. N.G. Mc Crum, C.P. Buckley and C.B. Bucknall, "Principle of Polymer Engineering", Oxford University Press, New York, 1990.
2. Ed. J.W. Stteare, "High Performance Fibres", Woodhead Publishing Co., England, 2001.
3. D. Hull, "An Introduction to Composite Materials", Cambridge University Press, UK, 1981.
4. H. Broody, "Synthetic Fiber Materials", Longman Scientific and Technical, UK,
5. 1994.

ADVANCED GARMENTS MANUFACTURING TECHNOLOGY

Subject Code: MTEXD1-222

**LTPC
4 0 0 4**

Duration- 60 Hrs

Course Objectives:

CO1: To enable students to understand the importance of automation in cutting and stitching machines.

CO2: To give knowledge various finishing machines used in garment construction.

CO3: To enable students to understand the importance of automation in material handling.

CO4: To enable students to understand the importance of robotics in garment construction process.

Course Outcomes

CO1: Acquire details about basic designing and pattern making, Discuss the process and machineries for the marker planning, spreading and lay planning automation in sewing machine.

CO2: To understand and analyse the importance of automation in apparel finishing

CO3: To understand and analyse the importance of automation in Material handling.

CO4: To understand and analyse the importance of robotics in apparel Industry.

UNIT-I(20hrs)

AUTOMATION IN APPAREL DESIGNING AND FIT ANALYSIS

Automated elements in clothing production - cutting of fabric - cutting by water jet, laser, plasma - automated sewing machines - Types of driving mechanism of sewing machines – single needle lock stitch machine, over lock and flat lock machine. Automation in special machines – bar tack, pocket making and patterning machines, button holing and sewing machines.

UNIT-II (10hrs)

AUTOMATION IN APPAREL FINISHING:

Automation in fusing, pressing and folding machines. Automation in apparel packing equipments.

UNIT-III(15hrs)

AUTOMATION IN MATERIAL HANDLING

Types of equipment- Automated storage and retrieval systems- Overview of conceptions of “Work Robots” and “Manipulators”. Conveyor systems – UNIT production systems. Ply separation; Transportation - position and orientation, pick and place – clamping grippers and pinch grippers.

UNIT-IV(15hrs)

ROBOTICS IN APPAREL INDUSTRY

Robotics in spreading and cutting; Robotics in sewing – double lock stitching, one side stitching, Tufting; Robotics for material handling; Robots as 2D and 3D folding machines.

Recommended Books:

1. Cooklin Gerry, “Garment Technology for fashion Designers”, Om Book Service Delhi,1997.
2. Carr Harold and Barbara, “The Technology of clothing Manufacture”,Om Book Service,Delhi,1998
3. Mehta P V and Bhardwaj S K “ Managing Quality in Apparel Industry”, New Age International (P) Ltd., Delhi-2002
4. “Garment Technology NCUTE Series”, Ed.Bhattacharye A, NCUTE- IIT, Delhi,2003.
5. Aldrich W, “ Metric pattern cutting”, Om Book Service, Delhi-1998.
6. Wilson J, “ Hand book of Textile Design”, Woodhead publishing Ltd., UK, 2002.

TECHNICAL TEXTILES

Subject Code: MTEXD1-223

**LTPC
4 0 04**

Duration- 60 Hrs

Course Objectives

- CO1: To understand the current scenario of technical textile.
- CO2: To familiarize students with various application of technical textile.
- CO3: To able to design and develop a product as per end use.
- CO4: To impart knowledge regarding the performance and its analysis of technical Textile.

Course Outcomes

- CO1: To analyse the role of technical textiles in modern are
- CO2: To apply Technical Textiles in diversified fields.
- CO3: Ability to design a product as per the specific requirements for end uses.
- CO4: Characterization of products and their performance.

UNIT-I(15hrs)

Definition and Scope for Technical Textiles, Brief Idea about Technical Fibres, Role of Yarn and Fabric Construction. Filtration Textiles: Definition of Filtration Parameters, Filtration Requirements

UNIT-II(15hrs)

Geotextiles: Brief Idea about Geosynthetics and Their Uses, Essential Properties of Geotextiles, Geotextiles Testing and Evaluation, Application Examples of Geotextiles. Medical Textiles: Classification of Medical Textiles, Description of Different Medical Textiles.

UNIT-III(15hrs)

Protective Clothing: Brief Idea about Different Type of Protective Clothing, Functional Requirement of Textiles in Defence including Ballistic Protection Materials and Parachute Cloth, Flame Retardant Clothing, Chemical Protective Clothing, Sports Textiles, functional requirement of sports textiles.

UNIT-IV(15hrs)

General Technical Textile: Textiles in Agriculture, Electronics, Power Transmission Belting, Hoses, Canvas Covers and Tarpaulins.

Recommended Books:

1. "Handbook of Technical Textiles", Ed. A R Horrocks and S C Anand, Woodhead Publication Ltd., Cambridge, 2000.
2. "Wellington Sears Handbook of Industrial Textiles", Ed. Sabit Adanaur, Technimic Publishing Company, Inc., Pennsylvania, USA, 1995.
3. Shukla S K, Yin Jian-hua, Fundamentals of Geosynthetic Engineering, Taylor & Francis, 2006, UK.
4. "Modern Textile Characterization Methods", Ed. M Raheel, Marcel Dekker, Inc., 1996.
5. Nonwoven Fabrics; Ed. W. Albrecht, H. Fuchs, and W. Kittelmann, WILEY VCH Publication, 2003, UK.

ADVANCED TEXTILE TESTING LAB

Subject Code: MTEXS1-204

**LPTC
0 0 4 2**

Duration-60 hrs

Course Objectives.

CO1: To develop understanding of different quality parameters and its applications.

CO2: To impart knowledge of modern instruments for testing of fibre and yarn.

CO3: To impart knowledge of modern instruments for fabric testing.

CO4: To able to implement various quality tools.

Course Outcomes

CO1: To evaluate various aspects of quality parameters and its role in modern era.

CO2: To access fibre and yarn quality by modern instruments for domestic and international market.

CO3: To estimate various fabrics quality parameters by modern instruments.

CO4: Able to implement various quality control tools.

No. of Experiments

Evaluation of tensile and compressional characteristics of different woven fabric.

Evaluation of tensile and compressional characteristics of different nonwoven fabric.

Assessment of yarn diameter, yarn structure using image analysis method.

Evaluation and analysis of HVI data for differently graded cotton material.

Evaluation and analysis of tearing strength of fabric using universal tester

Evaluation and analysis of tearing strength of fabric using Elmendorf tear tester.

Evaluation and analysis of AFIS data for differently graded cotton material

Evaluation and analysis of Classmate data for differently graded cotton material

Note: A minimum 6 Experiments should be performed by the student from the above given list of experiments or experiments relevant to syllabus.

RESEARCH METHODOLOGY AND IPR

Subject Code - MREMI0-101

**LTPC
4 0 0 4**

Duration-60 hrs

Course Objectives: To make the students to:

- CO1: Understand that how to formulate a research problem, analyze research related information, follow research ethics, and to design experiments.
- CO2: To learn to collect or sample data, process it and validate results etc.
- CO3: Do effective literature studies and develop a research proposal.
- CO4: Understand the need of information about Intellectual Property Right (IPR) in general & engineering in particular.
- CO5: Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D.

Course Outcomes: At the end of this course, students will be able to:

- CO1: Formulate a research problem, analyze research related information, and follow research ethics and design experiments.
- CO2: Collect, sample, scale, validate and process data.
- CO3: To do literature survey effectively and develop a good research proposal.
- CO4: Motivated to do research work and invest in R & D to create new and better products for economic growth and social benefits.

UNIT-I (15 Hrs.)

Research Problem: Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem, Approaches of investigation of solutions for research problems, Data collection, Analysis, Interpretation, Necessary instrumentation.

Design of Experiment: Basic Principal of Experimental Design, Randomized Block, Completely Randomized Block, Latin Square, Factorial Design.

Hypothesis: Types, Formulation of Hypothesis, Feasibility, Preparation and Presentation of Research Proposal.

UNIT-II (15 Hrs.)

Sources of Data: Primary and Secondary, Validation of Data

Data Collection Methods: Questionnaire Designing, Construction

Sampling Design & Techniques – Probability Sampling and Non Probability Sampling.

Scaling Techniques: Meaning & Types.

Reliability: Test–Retest Reliability, Alternative Form Reliability, Internal Comparison Reliability and Scorer Reliability.

Validity: Content Validity, Criterion Related Validity and Construct Validity.

Data Process Operations: Editing, Sorting, Coding, Classification and Tabulation.

UNIT-III (10 Hrs.)

Literature Survey: Importance of literature survey - Sources of information - Assessment of quality of journals and articles - Information through internet. Literature Review: Need of review - Guidelines for review - Record of research review.

Effective Literature Studies Approaches: Analysis Plagiarism, Research ethics, Effective technical writing, Essentials of report writing, Report Format, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee.

UNIT-IV (20 Hrs.)

Nature of Intellectual Property: Patents, Designs, Trade and Copyright, Process of Patenting and Development: Technological research, Innovation, Patenting, development, Introduction to international Scenario on Intellectual Property, Procedure for grants of patents, Patenting under PCT.

MRSPTU M.TECH. TEXTILE ENGINEERING SYLLABUS
2022 BATCH ONWARDS

Patent Rights: Scope of Patent Rights, Licensing and transfer of technology, Patent information and databases, Introduction to patent searching and World Intellectual Property Organization (WIPO).

New Developments in IPR: Administration of Patent System. New developments in IPR: introduction to IPR of Biological Systems, Computer Software etc. Traditional Knowledge Case Studies, IPR or IITs.

Recommended Books:

1. Stuart Melville and Wayne Goddard, 'Research Methodology: An Introduction for Science & Engineering Students', Juta & Co. Ltd., 1996.
2. Ranjit Kumar, 2nd Edn., 'Research Methodology: A Step by Step Guide for Beginners'.
3. C.R Kothari, "Research Methodology, Methods & Techniques", New Age International Publishers, New Delhi, 2004.
4. R. Ganesan, 'Research Methodology for Engineers', MJP Publishers, Chennai, 2011.
5. Ratan Khananabis and Suvasis Saha, "Research Methodology", Universities Press, Hyderabad, 2015.
6. Vijay Upagade and Aravind Shende, 'Research Methodology', S. Chand & Company Ltd., New Delhi, 2009.
7. G. Nageswara Rao, 'Research Methodology and Quantitative methods', BS Publications, Hyderabad, 2012.
8. Debora J. Halbert, 'Resisting Intellectual Property', Taylor & Francis Ltd., 2005, DOI <https://doi.org/10.4324/9780203799512>.
9. Robert P. Merges, Peter S. Menell, Mark A. Lemley, 'Intellectual Property in New Technological Age', 2016.
10. T. Ramappa, 'Intellectual Property Rights Under WTO', S. Chand, 2008.

PROJECT

Subject Code: MTEXS1-302

**L T P C
0 0 - 6**

Course Objectives: To learn, practice, and critique effective scientific writing and to formulate the research objectives clearly, state claims and evidence clearly, assess validity of claims, evidence, outcomes, and results.

Course Outcomes:

1. Execute a meaningful research project that demonstrates spatial thinking and uses the knowledge and skills.
2. Able to learn effectively record data and experiments so that others can understand them.
3. Communicate the findings by means of a thesis, written in the format specified by the department/institute.

Each student will be required to complete a Dissertation and submit a written report on the topic on any of the areas of modern technology related to Textile Engineering including interdisciplinary fields in the final semester of M. Tech Course.

SEMINAR

Subject Code: MTEXS1-303

**L T P C
0 0 2 1**

Course Outcomes

Student should undertake in depth independent study of a topic. The study should be carried out under the guidance of a faculty member. The subject area chosen by the student should be sufficiently different from the area of project being pursued by the student. The evaluation will be based on the report, seminar and viva- voce.

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF ENGINEERING AND TECHNOLOGY

SYLLABUS

FOR

**M.TECH. ELECTRICAL ENGINEERING (POWER SYSTEM)
2022 BATCH ONWARDS**

(For Full-Time and Part-Time Modes)

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**MRSPTU M.TECH. ELECTRICAL ENGINEERING (POWER SYSTEM)
SYLLABUS 2022 BATCH ONWARDS**

Study Scheme for M.Tech Regular Programme

1 st Semester		Contact Hrs.			Marks			Credits
Subject Code	Course	L	T	P	Int.	Ext.	Total	
MELES2-101	Advanced Power System Analysis	4	0	0	40	60	100	4
MELES2-102	Electrical Power Distribution System	4	0	0	40	60	100	4
MELES2-103	Electric and Hybrid Vehicles	4	0	0	40	60	100	4
MELES2-104	Power System Lab - I	0	0	4	60	40	100	2
Departmental Elective-I		4	0	0	40	60	100	4
MELED2-111	Restructured Power Systems							
MELED2-112	Energy Management and Energy Auditing							
MELED2-113	Artificial Intelligence Techniques							
Departmental Elective-II		4	0	0	40	60	100	4
MELED2-121	Industrial Load Modeling and Control							
MELED2-122	Advanced AC/DC LV/MV Drive Systems							
MELED2-123	Power System Transients							
Total		20	0	4	260	340	600	22

2 nd Semester		Contact Hrs.			Marks			Credits
Code	Course	L	T	P	Int.	Ext.	Total	
MELES2-201	Advanced Protection of Power System	4	0	0	40	60	100	4
MELES2-202	Power System Dynamics & Stability	4	0	0	40	60	100	4
MELES2-203	Smart Grids	4	0	0	40	60	100	4
MELES2-204	Power System Lab-II	0	0	4	60	40	100	2
Departmental Elective-III		4	0	0	40	60	100	4
MELED2-211	Power Quality							
MELED2-212	FACTS and Custom Power Devices							
MELED2-213	Digital Transformation in Industry							
Departmental Elective-IV		4	0	0	40	60	100	4
MELED2-221	Renewable Energy System and Distributed Generation							
MELED2-222	SCADA System and Applications							
MELED2-223	Optimization Techniques for Power Engineering							
Total		20	0	4	260	340	600	22

**MRSPTU M.TECH. ELECTRICAL ENGINEERING (POWER SYSTEM)
SYLLABUS 2022 BATCH ONWARDS**

3 rd Semester		Contact Hrs.			Marks			Credits
Code	Course	L	T	P	Int.	Ext.	Total	
MELES2-301	Project	0	0	--	60	40	100	6
MELES2-302	Seminar	0	0	2	100	--	100	1
MREMI0-101	Research Methodology & IPR	4	0	0	40	60	100	4
XXXXXX	Open Elective – (To be selected from the list of PG open electives from emerging technical areas and not from Humanities and Social Sciences)	3	0	0	40	60	100	3
Total		7	0	2	240	160	400	14

4 th Semester		Contact Hrs.			Marks		
Code	Course	L	T	P	Int.	Ext.	Total
MELES2-401	Dissertation	--	--	--	Satisfactory / Not Satisfactory as per CBCS-2016		
Total		--	--	--	--		

**MRSPTU M.TECH. ELECTRICAL ENGINEERING (POWER SYSTEM)
SYLLABUS 2022 BATCH ONWARDS**

Study Scheme for M.Tech. Part-Time Programme

1 st Semester		Contact Hrs.			Marks			Credits
Subject Code	Course	L	T	P	Int.	Ext.	Total	
MELES2-102	Electrical Power Distribution System	4	0	0	40	60	100	4
MELES2-103	Electric and Hybrid Vehicles	4	0	0	40	60	100	4
Departmental Elective-I		4	0	0	40	60	100	4
MELED2-111	Restructured Power Systems							
MELED2-112	Energy Management & Energy Auditing							
MELED2-113	Artificial Intelligence Techniques							
Total		12	0	0	120	180	300	12

2 nd Semester		Contact Hrs.			Marks			Credits
Subject Code	Course	L	T	P	Int.	Ext.	Total	
MELES2-101	Advanced Power System Analysis	4	0	0	40	60	100	4
MELES2-104	Power System Lab - I	0	0	4	60	40	100	2
Departmental Elective-II		4	0	0	40	60	100	4
MELED2-121	Industrial Load Modeling and Control							
MELED2-122	Advanced AC/DC LV/MV Drive Systems							
MELED2-123	Power System Transients							
Total		8	0	4	140	160	300	10

3 rd Semester		Contact Hrs.			Marks			Credits
Subject Code	Course	L	T	P	Int.	Ext.	Total	
MELES2-201	Advanced Protection of Power System	4	0	0	40	60	100	4
MELES2-203	Smart Grids	4	0	0	40	60	100	4
Departmental Elective-III		4	0	0	40	60	100	4
MELED2-211	Power Quality							
MELED2-212	FACTS and Custom Power Devices							
MELED2-213	Digital Transformation in Industry							
Total		12	0	0	120	180	300	12

**MRSPTU M.TECH. ELECTRICAL ENGINEERING (POWER SYSTEM)
SYLLABUS 2022 BATCH ONWARDS**

4 th Semester		Contact Hrs.			Marks			Credits
Code	Course	L	T	P	Int.	Ext.	Total	
MELES2-202	Power System Dynamics & Stability	4	0	0	40	60	100	4
MELES2-204	Power System Lab-II	0	0	4	60	40	100	2
Departmental Elective-IV		4	0	0	40	60	100	4
MELED2-221	Renewable Energy System & Distributed Generation							
MELED2-222	SCADA System & Applications							
MELED2-223	Optimization Techniques for Power Engineering							
Total		8	0	4	140	160	300	10

5 th Semester		Contact Hrs.			Marks			Credits
Code	Course	L	T	P	Int.	Ext.	Total	
MELES2-301	Project	0	0	--	60	40	100	6
MELES2-302	Seminar	0	0	2	100	--	100	1
MREMI0-101	Research Methodology & IPR	4	0	0	40	60	100	4
XXXXXX	Open Elective – (To be selected from the list of PG open electives from emerging technical areas and not from Humanities and Social Sciences)	3	0	0	40	60	100	3
Total		7	0	2	240	160	400	14

6 th Semester		Contact Hrs.			Marks		
Code	Course	L	T	P	Int.	Ext.	Total
MELES2-401	Dissertation	--	--	--	Satisfactory / Not Satisfactory as per CBCS-2016		
Total		--	--	--	--		

ADVANCED POWER SYSTEM ANALYSIS

Subject Code: MELES2-101

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objectives: Students will be able to:

Study various methods of load flow and their advantages and disadvantages.

Understand how to analyze various types of faults in power system.

Understand power system security concepts and study the methods to rank the contingencies.

Understand need of state estimation and study simple algorithms for state estimation.

Study voltage instability phenomenon.

Course Outcomes: Students will be able:

To do load flow analysis using various methods and economic operation of power system.

To calculate fault currents.

To know about automatic generation and voltage control.

To rank various contingencies according to their severity for security analysis.

To estimate state of power system by various methods.

UNIT-I (15 Hrs.)

Load Flow: Network modeling, Overview of Newton-Raphson, Gauss-Siedel, Decoupled and Fast decoupled methods, convergence properties, three-phase load flow, AVR in load flow.

Economic operation of Power System:

Economic dispatch including transmission losses using lambda iteration method, Solution of Coordination Equations, Formulation of optimal power flow-solution by Gradient Method, Newton's method.

Unit Commitment: Constraints in unit commitment (UC), Methods for UC; Priority list method and Dynamic programming.

UNIT-II (15 Hrs.)

Fault Analysis: Analysis of balanced and unbalanced three phase faults, Fault calculations, Short circuit faults, Open circuit faults, Generalized method of fault analysis.

Digital Techniques in Fault Calculations: Algorithm for formulation of bus impedance matrix, Equations and Flow chart for short circuit studies, Calculation of line currents, mutually coupled branches in Z_{BUS} .

UNIT-III (15 Hrs.)

Automatic generation control: Introduction, Load frequency control (single area and Two area) and economic dispatch control, Optimal load frequency control, Load frequency control with generation rate constraints,

Voltage Control: Effect of reactive power transmission on voltage, Surge impedance loading and voltage stability limit, P-V curve and V-Q curve, Voltage collapse, Prevention of voltage collapse, Voltage collapse proximity indices, Automatic voltage control of alternator.

UNIT- IV (15 Hrs.)

Security Analysis: Factors affecting power system security, Security state diagram, Contingency analysis, Sensitivity factors; generator shift distribution factors, line outage distribution factors, multiple line outages, Overload performance index ranking.

State Estimation: Introduction to power system state estimation, Weighted least squares estimation, State estimation of an AC network, State estimation by orthogonal decomposition and its algorithm, Detection and identification of bad measurements, Virtual and pseudo measurements, network observability and Pseudo-measurements, Application of power systems state estimation.

Recommended Books:

1. A.J. Wood, Bruce F. Wollenberg, 'Power Generation, Operation and Control', John Wiley, **2009**.
2. D.P. Kothari & I.J. Nagrath, Modern Power System Analysis, Tata McGraw Hill, 2012.
3. J.J. Grainger and W.D. Stevenson, 'Power System Analysis', McGraw Hill, **2003**.
4. R. Bergen and Vijay Vittal, 'Power System Analysis', Pearson, **2000**.
5. L.P. Singh, 'Advanced Power System Analysis and Dynamics', New Age International, 2006.
6. G.L. Kusic, 'Computer aided Power System Analysis', Prentice Hall India, **1986**.
7. P.M. Anderson, 'Faulted Power System Analysis', IEEE Press, **1995**.
8. J. Arrillaga and C.P. Arnold, 'Computer Analysis of Power Systems', John Wiley and Sons, New York, 1997.
9. M.A. Pai, 'Computer Techniques in Power System Analysis', Tata McGraw hill, New Delhi, 2006.
10. Dr. B.R. Gupta, Power System Analysis and Design, S. Chand & Company, 2014.

ELECTRICAL POWER DISTRIBUTION SYSTEM

Subject Code: MELES2-102

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objectives: Students will be able to:

Learning about power distribution system.

Learning of SCADA System.

Understanding Distribution Automation.

Course Outcomes: Students will be able to:

Understand of power distribution system.

Study of Distribution automation and its application in practice.

To learn SCADA system.

UNIT-I (15 Hrs.)

System Planning: Introduction, Distribution system planning, Factors affecting system planning, present planning techniques, planning models, Introduction to optimum line network, future trends in planning, systems approach, distribution automation.

Load Characteristics: Basic definitions, Relation between load and loss factors, Maximum diversified demand, Distribution of Power, Management, Power Loads, Load Forecasting Short-term & Long-term, Power system loading, Technological forecasting.

UNIT-II (15 Hrs.)

System Design and Operation: Criteria, system developers, dispersed generation, distribution systems, economics and finance, mapping, Design of substation and feeder, Operation criteria voltage measurements, harmonics, load variations, system losses, Introduction to energy management.

Calculation of Optimum Number of Switches, Capacitors, Optimum Switching Device Placement in Radial Distribution Systems, Sectionalizing Switches – Types, Benefits, Bellman's Optimality Principle, Remote Terminal Units, Energy efficiency in electrical distribution & Monitoring.

UNIT-III (20 Hrs.)

Distribution Automation: Advantages of Distribution Management System (D.M.S.) Definition, Restoration/Reconfiguration of Distribution Network, Different Methods and Constraints, Power Factor Correction.

Maintenance of Automated Distribution Systems: Difficulties in Implementing Distribution, Automation in Actual Practice, Urban/Rural Distribution, Energy Management, introduction to AI techniques applied to Distribution Automation.

Voltage Regulation and Automation: Quality of Service and Voltage Standards, Voltage Control, Line Drop Compensation, Distribution capacitor automation, Voltage fluctuations, SCADA and Communication with Load Dispatch Centers: Interconnection of Distribution, Control & Communication Systems, Remote Metering, Smart meter and Automatic Meter Reading and its implementation.

UNIT-IV (10 Hrs.)

Distribution System Protection: Objective of distribution system protection, high impedance faults coordination of protective devices: fuse to fuse co-ordination, re-closer to re-closer coordination, re-closer to fuse coordination, re-closer to substation transformer high side fuse coordination, fuse to circuit breaker coordination, re-closer to circuit breaker coordination, Lightning protection.

Recommended Books:

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

**MRSPTU M.TECH. ELECTRICAL ENGINEERING (POWER SYSTEM)
SYLLABUS 2022 BATCH ONWARDS**

1. A.S. Pabla, 'Electric Power Distribution', 6th Edn., Tata McGraw Hill Publishing Co. Ltd., 2011
2. M.K. Khedkar, G.M. Dhole, 'A Text Book of Electrical Power Distribution Automation', University Science Press, New Delhi.
3. Anthony J. Panseni, 'Electrical Distribution Engineering', CRC Press.
4. James Momoh, 'Electric Power Distribution, Automation, Protection & Control', CRC Press.
5. Gonen, Turan, 'Electric Power Distribution System Engineering', CRC PRESS, Third Indian Reprint, **2012**.
6. Thomas Allen Short , 'Electric Power Distribution Handbook'.

MRSPTU

ELECTRIC AND HYBRID VEHICLES

Subject Code: MELES2-103

L T P C
4 0 0 4

Duration: 60 Hrs.

Course Objectives: Students will be:

Introduced to conventional and hybrid electric vehicles.

Introduced to the Electric Propulsion unit and DC/AC drives.

Made familiar with electric and hybrid drive trains and sizing of the drive system.

Able to learn about energy storage in Hybrid and Electric Vehicles.

Course Outcomes: Students will be able to:

Acquire knowledge about conventional and hybrid electric vehicles.

Acquire knowledge about Electric Propulsion unit and DC/AC drives.

Match the electric machine and the internal combustion engine.

Estimate about energy storage requirements in Hybrid and Electric Vehicles.

UNIT-I (10 Hrs.)

Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics, Mathematical models to describe vehicle performance.

Introduction to Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies.

UNIT-II (20 Hrs.)

Electric Propulsion Unit: Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives.

Introduction to DC Motor Drives: Review of Four quadrant operation of a DC machine; Steady-state operation of multi-quadrant chopper fed DC drive, regenerative braking, Introduction to various PM motors, BLDC and PMSM drive configurations and their speed and torque control.

Introduction to AC Motor Drives: Voltage fed inverter control-V/f control, Vector control, direct torque and flux control (DTC) of induction machines, Open loop v/f control, vector control, direct torque control of synchronous motor drives.

UNIT-III (15 Hrs.)

Electric Drive-Trains: Basic concept of electric traction, Various electric drive-train topologies, Power flow control in electric drive-train topologies, Fuel efficiency analysis.

Hybrid Electric Drive-Trains: Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis.

Sizing the Drive System: Matching the electric machine and the internal combustion engine (ICE), Sizing the propulsion motor, sizing the power electronics, selecting the energy storage technology.

UNIT-IV (15 Hrs.)

Energy Storage: Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Hybridization of different energy storage devices.

Energy Management Strategies: Introduction to energy management strategies used in hybrid and electric vehicles, classification of different energy management strategies, comparison of different energy management strategies.

Recommended Books:

1. Iqbal Hussain, 'Electric and Hybrid Vehicles', CRC Press, 2nd Edition, 2010.
2. A.K. Babu, 'Electric and Hybrid Vehicles', Khanna Publishers, 2019.
3. Sira -Ramirez, R. Silva Ortigoza, 'Control Design Techniques in Power Electronics Devices', Springer.
4. Siew-Chong Tan, Yuk-Ming Lai, Chi Kong Tse, 'Sliding Mode Control of Switching Power Converters'.

MRSPTU

POWER SYSTEM LAB-I

Subject Code: MELES2-104

**L T P C
0 0 4 2**

Duration: 60 Hrs.

Course Objectives: To make the students able:

To do the load flow analysis using various methods.

To plan the economic operation of power systems by finding optimum loading schedule of the generators and to optimally commit the generating units.

To calculate fault currents.

To evaluate transient stability of single/ multi-machines connected to infinite bus.

To simulate automatic generation and voltage control and load frequency control.

Course Outcomes: Students will be able to use the relevant software for programming:

To do the load flow analysis using various methods.

To plan the economic operation of power systems by finding optimum loading schedule of the generators and optimal unit commitment.

To calculate fault currents. Also, to evaluate transient stability of machines connected to infinite bus.

To simulate automatic generation control and load frequency control.

LIST OF EXPERIMENTS

NOTE: Students should be made familiar with one or more available programming language/software like MATLAB, ETAP, GAMS, Power System Toolbox, Power world Simulator, Network Simulator, LABVIEW, etc. so as to develop programs using one or more of these for:

1. Review of basics of the available programming language.
2. Load flow analysis by using Gauss Seidel (G-S) method.
3. Load flow analysis by using Newton-Raphson (N-R) method.
4. Load flow analysis by using decoupled and fast decoupled N-R method.
5. Short circuit Fault analysis.
6. Economic dispatch of power generation.
7. To find optimum loading of generators neglecting transmission losses.
8. To find optimum loading of generators with penalty factors.
9. Optimal unit commitment.
10. Simulink model of single area load frequency control with and without PI controller.
11. Simulink model for two area load frequency control.
12. Simulink model for evaluating transient stability of single/multi machine connected to infinite bus.
13. Simulation of automatic generation control.

RESTRUCTURED POWER SYSTEM

Subject Code: MELED2 – 111

**L T P C
4 0 0 4**

Duration: 60 Hours

Course Objectives: To make the students to:

To introduce the concept of restructuring of the electricity market and its components

To make the students familiar about the deregulation of the electricity market

To introduce the concept of the Competitive Wholesale Electricity Markets

To make the students familiar about Transmission Open Access in electricity markets

Course Outcomes: Students will be able to:

To describe the process of restructuring of the electricity market

To understand the process of deregulation of the electricity market

To understand concept, types and challenges in Competitive Wholesale Electricity Markets

To understand the concept of Transmission Open Access in electricity markets

UNIT-I (15 Hrs.)

Components of Restructured Power System

Introduction, The Traditional Power Industry, Motivations for Restructuring the Power Industry, Unbundling Generation, Transmission and Distribution, Components of Restructured Power System (BOT Plant Operators & Contracted IPPs, Discos & Retailers, Transmission Owners (TOs), Independent System Operator (ISO), Power Exchange (PX), Scheduling Coordinators (SCs), PX Functions and Responsibilities, California Power Exchange, ISO Functions and Responsibilities, Classification of ISO types.

UNIT-II (15 Hrs.)

Deregulation of Electric Utilities

Introduction of Deregulation, Traditional Central Utility Model, Reform Motivations, Separation of Ownership and Operation, Central Dispatch Versus Market Solution, Competition and Direct Access in the Electricity Market (Energy Market and Auction Mechanisms), Direct Access/Wheeling, Independent System Operator (Pricing and Market Clearing, Risk Taking), Retail Electric Providers, Different Experiences of deregulation of England & Wales, Norway, California, Scotland, The European Union and Germany and New Zealand.

UNIT-III (15 Hrs.)

Competitive Wholesale Electricity Markets:

Introduction, Wholesale Electricity Market Characteristics (Small Test System, Central Auction, Bidding, Market Clearing and Pricing, Market Timing, Sequential and Simultaneous Markets, Bilateral Trading, Scheduling, Gaming, Ancillary Services, Physical and Financial Markets), Market models (Maximalist ISO, Minimalist ISO Model), Challenges (Market Power Evaluation and Mitigation, System Capacity, Reliability, Technical Issues).

UNIT-IV (15 Hrs.)

Transmission Open Access

Introduction, Trading Arrangements (The Pool, Pool and Bilateral Trades, Multilateral Trades) Transmission Pricing in Open-access Systems (Introduction, Rolled-in Pricing Methods. Incremental/ Marginal Pricing Methods, Embedded Cost Recovery, Transmission Pricing Method in the NGC & UK), Open Transmission System Operation, Dispatch, Transmission Loss Compensation (System Control, Ancillary Service Provision), Congestion Management in Open-access Transmission Systems (Normal Operation, Integrated Transmission Dispatch Strategy, Illustration Using a Small Power System), Open Access Coordination Strategies (Price Elasticity, ISO Executed Price Signalling, Coordination between Transactions, Illustration of Transaction Procedure and Integrated Coordination Procedure)

Recommended Books:

1. Loi Lei Lai, 'Power System Restructuring and Deregulation', John Wiley & Sons Ltd., 2002.
2. Lorrin Philipson, H. Lee Willis, 'Understanding Electric Utilities and De-regulation', Marcel Dekker, 1998.
3. **Gan Donghan Feng; Jun Xie, 'Electricity Markets And Power System Economics by; T&F India.**
4. Kankar Bhattacharya, Jaap E. Daadler, Math H.J. Boolen, 'Operation of Restructured Power Systems', Kluwer Academic Pub.,2001.
5. Mohammad Shahidehpour, Muwaffaq Alomoush, 'Restructured Electrical Power Systems: Operation, Trading and Volatility', Marcel Dekker.

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ENERGY MANAGEMENT AND ENERGY AUDITING

Subject Code: MELED2 – 112

**L T P C
4 0 0 4**

Duration: 60 Hours

Course Objectives: Students will be able to:

To understand the need for energy auditing

Understanding of various loads involved based on power consumption for auditing

To know about different audit instruments used in practice.

Course Outcomes: Students will be able:

To acquire the skills and techniques required to implement energy management. Able to perform Basic Energy Audit in an Organization.

To calculate different types of losses and hence evaluate and improve the energy efficiency of electric motors and transformers.

To apply Energy Efficient Technologies in Electrical Systems. Energy saving opportunities with energy efficient motors

Identify and quantify the energy intensive business activities in an organization.

UNIT – I (15 Hrs.)

Energy Scenario: Commercial and non-commercial energy, Primary energy resources, Commercial energy production, Final energy consumption, Energy needs of growing economy, Long term energy scenario, Energy pricing, Energy sector reforms, Energy and environment, Energy security, Energy conservation and its importance, Restructuring of the energy supply sector, Energy strategy for the future, Air pollution, Climate change, Energy Conservation Act-2001 and its features.

Energy Management and Audit: Definition, Energy audit, Need, Types of energy audit, Energy management (audit) approach, Energy costs, Bench marking, Energy performance, Matching energy use to requirement, Maximizing system efficiencies, Optimizing the input energy requirements, Fuel & energy substitution, Energy audit instruments, Material and energy balance, Methods for preparing process flow and Material and energy balance diagrams.

UNIT – II (15 Hrs.)

Electric motors: Energy efficient controls and starting efficiency, Motor Efficiency and Load, Analysis Energy efficient /high efficient Motors, Load Matching and selection of motors, Losses in induction motors, Factors affecting motor performance, Rewinding and motor replacement issues, Energy saving opportunities with energy efficient motors

Transformer: Loading/Efficiency analysis, Feeder/cable loss evaluation, case study, Reactive Power management-Capacitor, Sizing-Degree of Compensation-Capacitor losses, Location-Placement, Maintenance, Case study.

UNIT- III (15 Hrs.)

Energy Efficiency in Electrical Systems: Electrical system, Electricity tariffs, Electricity billing, Electrical load management and maximum demand control, Power factor improvement and its benefit, Selection and location of capacitors, Performance assessment of PF capacitors.

Energy Efficient Technologies in Electrical Systems: Maximum demand controllers, Automatic power factor controllers, Energy efficient motors, Soft starters with energy saver, Variable speed drives, Energy efficient transformers, Electronic ballast, Occupancy sensors, Energy efficient lighting controls, Energy saving potential of each technology.

UNIT – IV (15 Hrs.)

Electric loads of Air conditioning & Refrigeration: Energy conservation measures- Cool storage, Types-Optimal operation, case study.

Electric water heating: Geysers-Solar Water Heaters, Power Consumption in Compressors, Energy conservation measures, Electrolytic Process, Computer Controls- software-EMS

Energy Efficiency in Industrial Systems: Types, Performance evaluation, Efficient system operation, Flow control strategies and energy conservation opportunities in Fans and Blowers, Pumps and pumping system, Cooling tower.

Recommended Books:

1. Anthony J. Pansini, Kenneth D. Smalling, .Guide to Electric Load Management., Pennwell Pub; (1998)
2. Howard E. Jordan, .Energy-Efficient Electric Motors and Their Applications., Plenum Pub Corp; 2ndedition (1994)
3. Giovanni Petrecca, .Industrial Energy Management: Principles and Applications., The Kluwerinternational series -207,1999
4. Y P Abbi and Shashank Jain, Handbook on Energy Audit and Environment Management , TERI,2006
5. Albert Thumann, William J. Younger, Terry Niehus, Handbook of Energy Audits 2009

ARTIFICIAL INTELLIGENCE TECHNIQUES

Subject Code: MELED2 – 113

**L T P C
4 0 0 4**

Duration: 60 Hours

Course Objectives: To make the students to:

To understand basics of AI & Soft computing techniques.

Learn the concepts of biological foundations of artificial neural networks.

Understand Genetic Algorithm and Evolutionary programming.

Understand, fuzzy logic and fuzzy neural networks.

Learn to apply these techniques to practical problems.

Course Outcomes: The students will acquire the skills:

To apply artificial neural networks in various electrical and electronics engineering applications.

To apply Genetic Algorithm and Evolutionary programming to solve engineering problems.

To take up fuzzy systems approach to solve applications in engineering.

Required to innovate and build, smart and intelligent applications in industrial control systems by using all these methods.

UNIT-1 (15 Hrs.)

Artificial Neural Networks: Artificial Neuron models, Types of activation functions, Neural network architectures, Neural Learning: Correlation, Competitive, Feedback based weight adaptation, Evaluation of networks, Generalizability, Computational resources, Supervised learning: Perceptron's, linear separability, Multilayer networks, Back propagation algorithm and its variants, Unsupervised learning, Winner-take all networks, Adaptive resonance theory, Self-organizing maps, Hopfield networks, Typical application in identification, Optimization, and other industrial control methods.

UNIT-II (15 Hrs.)

Fuzzy Logic: Fuzziness vs probability, Crisp logic vs fuzzy logic, Fuzzy sets and systems, Operations on sets, Fuzzy relations, Membership functions, Fuzzy rule generation, Defuzzification, Mamdani and Takagi-Sugeno Model, Fuzzy controllers.

Database – rule base – Inference engine.

Genetic Algorithm (GA): Introduction, Working principle, Coding of variables, Fitness function, Comparison with traditional methods, Constraints and penalty function, GA operators; reproduction, cross over, mutation, Real coded GA, Applications of GA in optimization and to practical problems.

UNIT-III (15 Hrs.)

Evolutionary Computation: Introduction to optimization problem, Constraints, Objective functions, Unimodal / multimodal problems, Classical v/s Evolutionary computational techniques, Genetic Algorithms and its Operators,

Introduction to Advanced AI techniques: Particle Swarm Optimization, Ant Colony Optimization, Differential Evolution Hybrid techniques; Fuzzy Genetic, Genetic-Neural networks etc.

UNIT-IV (15 Hrs.)

Associative Models And Control Schemes In Nn

Auto & hetero associative memory – bi-directional associative memory – Self organizing feature Maps-Hopfield Networks-Neural Networks for non – linear system – Schemes of Neuro control – System identification – forward model and – Inverse model – Case studies.

Applications: Applications of Neural network, Fuzzy system & Genetic algorithms for power systems and power electronics Systems-Designing of controllers using Simulation Software, NN tool box & Fuzzy Logic Toolbox.

Recommended Books:

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SYLLABUS 2022 BATCH ONWARDS**

1. N.P. Padhy, 'Artificial Intelligence and Intelligent Systems', Oxford University Press, 2005.
2. S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education.
3. G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education.
4. J.M. Zurada, 'An Introduction to ANN', Jaico Publishing House, West, **1992**.
5. Simon Haykins, 'Neural Networks', Pearson Prentice Hall, **2005**.
6. Awrence Fausatt, 'Fundamentals of Neural Networks', Prentice Hall of India, New Delhi, **1994**.
7. Timothy J. Ross, 'Fuzzy Logic with Engineering Applications', McGraw Hill International Edition, USA, **1997**.
8. Driankov, Dimitra, 'An Introduction to Fuzzy Control', Narosa Publication.
9. Davis E. Goldberg, 'Genetic Algorithms in Search, Optimization, and Machine Learning', Adison Willey Publishing Company, **1989**.
10. Siva Nandam, 'Introduction to Fuzzy Logic using MATLAB', Springer Science & Business Media, **2006**.

INDUSTRIAL LOAD MODELING AND CONTROL

Subject Code: MELED2-121

**L T P C
4 0 0 4**

Duration: 60 Hours

Course Objectives: To acquaint the students with:
The energy demand scenario.
The modeling of load and to study load demand industrially.
To know electricity pricing models.
Study reactive power management in industries.

Course Outcomes: Students will be able to:

Manage load and pricing in industries.

Manage reactive power in industries and apply different energy saving opportunities in cooling and heating loads.

Apply load management to reduce demand of electricity during peak time.

Knowledge about load control techniques in industries and its application.

UNIT-I (15 Hrs.)

Industrial Load Management: Electric Energy Scenario, Demand side management, Load curves, Load Shaping Objectives, Methodologies, Barriers, Classification of industrial loads, Continuous and Batch processes, Load modeling.

Pricing and Control: Electricity pricing, Dynamic and spot pricing Models, Direct load control, Interruptible load control, Bottom up approach, Scheduling, Formulation of load Models, Optimization and control algorithms, Case studies.

UNIT- II (15 Hrs.)

Reactive Power Management in Industries: Power quality problems and Reactive power compensation at distribution level, Controls, Power quality impacts, Choice of filters, Application of filters, Energy saving in industries.

Cooling and Heating Loads: Load profiling, Modeling cool storage, Types, Control strategies, optimal operation, Problem formulation, Case studies.

UNIT-III (10 Hrs.)

Energy banking, industrial cogeneration and Captive power units: Operating and control strategies, Power Pooling, Operation models, Selection of Schemes, Optimal operating strategies, Peak load saving, Constraints problem formulation, Case study

UNIT- IV (20 hrs)

Integrated Load Control for Industries: Design of Multi-loop Controllers: Interactions and decoupling of control loops, Design of cross controllers and selection of loops using Relative Gain Array (RGA).

Advanced Control Schemes: Structure, analysis and application of Cascade control, Selective control, Ratio Control, Design of steady state and dynamic feed forward controller, Feed forward combined with feedback control, Structure, analysis and applications of inferential control, Dead time and inverse response compensators, Concepts and applications of Adaptive control.

Recommended Books:

1. C.O. Bjork, 'Industrial Load Management - Theory, Practice and Simulations', Elsevier, the Netherlands, 1989.
2. C.W. Gellings and S.N. Talukdar, 'Load Management Concepts', IEEE Press, New York, 1986.
3. Y. Manichaikul and F.C. Schweppe, 'Physically based Industrial load', IEEE Trans. on PAS, April, 1981.
4. H.G. Stoll, 'Least Cost Electricity Utility Planning', Wiley Interscience Publication, USA,
MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

1989.

5. I.J. Nagarath and D.P. Kothari, Modern Power System Engineering., Tata McGraw Hill publishers, NewDelhi, 1995
6. IEEE Bronze Book- 'Recommended Practice for Energy Conservation and Cost Effective planning in Industrial Facilities', IEEE Inc., USA.

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ADVANCED AC/DC LV/MV DRIVE SYSTEMS

Subject Code: MELED2-122

**L T P C
4 0 0 4**

Duration: 60 Hours

Course Objects: To make the students aware about:

The power electronic converters and their control strategies used for DC and AC motor speed control.

The principles of speed-control of DC motors and to apply these methods for speed control of DC drives.

The principles of speed-control of induction motors and to apply these methods for speed control of AC drives.

The principles of speed-control of Synchronous Motor Drives, Permanent Magnet Motor Drives, Switched Reluctance Motor Drives.

Course Outcomes: students will demonstrate the ability to:

Use the power electronic converters and their control strategies for DC and AC motor speed control.

Understand the principles of speed-control of DC motors and to apply these methods for speed control of DC drives.

Understand the principles of speed-control of induction motors and to apply these methods for speed control of AC drives.

Understand the principles of speed-control of Synchronous Motor Drives, Permanent Magnet Motor Drives, Switched Reluctance Motor Drives.

UNIT – I (15 hours)

Review of DC Motor Characteristics: Review of e.m.f and torque equations, and torque-speed characteristics of separately excited DC motor, Effect of change in armature voltage and load on torque-speed characteristics, Armature voltage control for varying motor speed, flux weakening for high speed operation.

Chopper Fed DC Drives: Review of DC chopper and duty ratio control, Chopper fed DC motor for speed control and its Steady state operation, Armature current waveform and ripple, Calculation of losses in DC motor and chopper, efficiency of DC drive, smooth starting.

UNIT – II (15 hours)

Multi-quadrant DC Drive: Review of motoring and generating modes operation of a separately excited DC machine, Four quadrant operation of DC machine; single-quadrant, two-quadrant and four-quadrant choppers; Steady-state operation of multi-quadrant chopper fed DC drive, regenerative braking.

Closed-loop control of DC Drive: Control structure of DC drive, Inner current loop and outer speed loop, Dynamic model of DC motor – dynamic equations and transfer functions.

UNIT – III (15 hours)

Review of Induction Motor characteristics: Review of induction motor equivalent circuit and torque-speed characteristic, variation of torque-speed curve with (i) applied voltage, (ii) applied frequency and (iii) applied voltage and frequency, Impact of rotor resistance on the torque-speed curve of slip ring induction motor, Power electronic based rotor side control of slip ring motor, Slip power recovery, Operating point, constant flux operation, flux weakening operation.

Induction Motor Drives: Different transformations and reference frame theory, modeling of induction machines, Voltage fed inverter control-V/f control, Vector control, direct torque and flux control (DTC).

Scalar Control or Constant V/f Control of Induction Motor: Review of three-phase voltage source inverter, generation of three-phase PWM signals, sinusoidal modulation, space vector theory, conventional space vector modulation; constant V/f control of induction motor, steady-state performance analysis based on equivalent circuit, speed drop with loading, slip regulation.

UNIT – IV (15 hours)

Synchronous Motor Drives: Modeling of synchronous machines, open loop v/f control, vector control, direct torque control, CSI fed synchronous motor drives.

Permanent Magnet Motor Drives: Introduction to various PM motors, BLDC and PMSM drive configuration, comparison, block diagrams, Speed and torque control in BLDC and PMSM.

Switched Reluctance Motor Drives: Evolution of switched reluctance motors (SRM), various topologies for SRM drives, comparison, Closed loop speed and torque control of SRM.

Recommended Books:

1. G. K. Dubey, “Power Semiconductor Controlled Drives”, Prentice Hall, 1989.
2. R. Krishnan, “Electric Motor Drives: Modeling, Analysis and Control”, Prentice Hall, 2001.
3. R. Krishnan, “Permanent Magnet Synchronous and Brushless DC motor Drives”, CRC Press, 2009.
4. G. K. Dubey, “Fundamentals of Electrical Drives”, CRC Press, 2002.
5. W. Leonhard, “Control of Electric Drives”, Springer Science & Business Media, 2001.
6. B. K. Bose, “Modern Power Electronics and AC Drives”, Pearson Education, Asia, 2003.

POWER SYSTEM TRANSIENTS

Subject Code: MELED2-123

**L T P C
4 0 0 4**

Duration: 60 Hours

Course Objectives: To make the students aware about:

The occurrence of transients in a power system.

The fundamental circuit analysis of electrical transients to know about change in parameters like voltage and frequency during transients.

The Generation of over-voltages on transmission lines due to lightning and switching phenomenon etc. and protection against these over voltages.

About insulation coordination.

Course Outcomes: Students will be able to:

Knowledge of various transients that could occur in power system.

Model the power system for transient analysis.

To design various protective devices in power system for protecting equipment and personnel against over-voltages.

Coordinating the insulation of various equipment in power system.

UNIT- I (15 Hrs.)

Surge parameters of plant: Equivalent circuit representations, Lumped and distributed circuit transients, Types of system transients, Travelling waves and propagation of surges, Reflection and Refraction of travelling waves, Attenuation and distortion of travelling waves, Traveling waves in distributed parameter multi-conductor lines, parameters as a function of frequency, Determination of system voltages produced by travelling waves.

Line energization and de-energization transients: Earth and earth wire effects, Current chopping in circuit breakers, Short line fault condition and its relation to circuit breaker duty, Trapped charge effects, Effect of source and source representation in short line fault studies, Control of transients.

UNIT- II (15 Hrs.)

Fundamental circuit analysis of electrical transients: Laplace Transform method of solving simple Switching transients, Damping circuits, Abnormal switching transients, Three-phase circuits and transients.

Computation of power system transients: Principle of digital computation, Matrix method of solution, Modal analysis, Z transform- Computation using EMTP (electromagnetic transients program).

UNIT- III (15 Hrs.)

Generation of over-voltages on transmission lines: Lightning, switching and temporary over voltages, Physical phenomena of lightning, Effect of lightning on power transmission system, Influence of tower footing resistance and earth resistance, switching: Short line or kilometric fault, energizing transients - closing and re-closing of lines, line dropping, load rejection, over voltages induced by faults.

Protective devices: Protection of system against over voltages, Surge diverters, Lightning arresters, Neutral grounding, Substation earthing, Simulation of surge diverters in transient analysis.

UNIT- IV (15 Hrs.)

Switching of HVDC line: travelling waves on transmission line, Circuits with distributed parameters wave equation, Reflection, Refraction, Behavior of Travelling waves at the line terminations, Lattice Diagrams – attenuation and distortion, Multi-conductor system and Velocity wave.

Insulation Co-ordination: Over voltage limiting devices, dielectric properties, breakdown of gaseous insulation, tracking and erosion of insulation, high current arcs, and metallic contacts.

Principle of insulation co-ordination in Air Insulated substation (AIS) and Gas Insulated Substation (GIS), Coordination between insulation and protection level, Statistical approach.

Recommended Books:

1. Allan Greenwood, 'Electrical Transients in Power System', Wiley & Sons Inc. New York, 1991.
2. J. Arrillaga and C.P. Arnold, 'Computer Aided Power System', John Wiley and Sons, 1994.
3. Sunil S. Rao, 'Switch Gear Protection and Power System', Khanna Publishers, 2008.
4. V.A. Vanikov, 'Transients in Power System', Mir Publications, Moscow.
5. L.V. Bewley, 'Traveling Waves on Transmission Lines', Dover Publications Inc., New York.
6. Ravindera Arora and Mosch Wolfgang, 'High Voltage Insulation Engineering', New Age International Publishers Limited

2nd Semester

ADVANCED PROTECTION OF POWER SYSTEM

Subject Code: MELES2-201

**L T P C
4 0 0 4**

Duration: 60 Hours

Course Objectives: To make the students familiar to:

Numerical and digital relays.

Mathematical approach towards protection.

The development of algorithms for numerical protection.

The Application of Artificial Intelligence Based technique for digital protection.

Course Outcomes: Students will be able:

To learn the evolution of Digital Relays.

To apply Mathematical approach for numerical protection.

To develop various Protection algorithms for use in digital relays.

Learn to apply Artificial Intelligence Based Numerical Protection.

UNIT-1 (10 Hrs.)

Fundamentals: Classification of protective schemes; Overcurrent, Distance, and Differential protection, Review of basic components of a conventional protection system; Current (CT) and Voltage (VT) transformers, Relays, circuit breakers and trip circuit, Essential qualities of protection, Classification of relays based on their function, Phase and amplitude comparators. Static Comparators.

Evolution of digital relays from electromechanical relays, Performance and operational characteristics of digital protection, Recent Advances in Digital Protection of Power Systems.

UNIT-II (20 Hrs.)

Numerical Protection: Block diagram of a typical numerical relay, Advantages of numerical relays, Data acquisition system, Mathematical background to protection algorithms; Sample and first derivative (Mann and Morrison) technique, Differential equation based technique,

Discrete Fourier transform (DFT) technique; Fourier series with real and complex coefficients, Discrete Fourier Transform (DFT), Extraction of Fundamental frequency components; Full-cycle window algorithm, Half-cycle window algorithm, Computation of apparent impedance.

Walsh-Hadamard transform technique and its algorithm, Block pulse functions technique, Wavelet transform technique based algorithms, Numerical overcurrent protection, Numerical distance protection, and Numerical differential protection.

UNIT-III (20 Hrs.)

Microprocessor Based Numerical Protective Relays: Basic elements of digital protection; IC elements and circuits for interface, A/D converter, Analog multiplexer, Sample and Hold circuit, Their interfacing with microprocessor, Signal conditioning, the sampling theorem, signal aliasing, Error, Digital filtering concepts.

Digital relays: Digital relays as a unit consisting of hardware and software, digital Overcurrent relay, digital Impedance relay, digital Directional relay, digital Reactance relay, Generalized mathematical expression for distance relays, Measurement of Resistance (R) and Reactance (X), Digital Mho relay, Quadrilateral relay, Generalized interface for distance relays.

UNIT-IV (10 Hrs.)

Artificial Intelligence Based Numerical Protection: Artificial Neural Network, Fuzzy logic, Application of Artificial Intelligence to power system protection, **Application of ANN and Fuzzy Logic to:** Overcurrent protection, Transmission line protection, Power transformer protection, Generator protection, Directional relay, ANN modular approach for fault detection, classification and location.

Recommended Books:

1. Badri Ram, D N Vishwakarma, 'Power System Protection and Switchgear', Tata McGraw-Hill, 2011.
2. A.G. Phadke and J.S. Thorp, 'Computer Relaying for Power Systems', Wiley/Research Studies Press, **2009**.
3. A.T. Johns and S.K. Salman, 'Digital Protection of Power Systems', IEEE Press, 1999.
4. Gerhard Zeigler, 'Numerical Distance Protection', Siemens Publicis Corporate Publishing, 2006.
5. S.R. Bhide, 'Digital Power System Protection', PHI Learning Pvt. Ltd., 2014.
6. T.S. Madhava Rao, 'Power System Protection: Static Relays: with Microprocessor Applications', 2017.
7. B. Ravindra Nath M. Chander, 'Power System Protection and Switch Gear', John Wiley Eastern, 1989.
8. Sunil S. Rao, 'Power System Protection and Switch Gear', Khanna Publishers, 1989.

POWER SYSTEM DYNAMICS & STABILITY

Subject Code: MELES2-202

**L T P C
4 0 0 4**

Duration: 60 Hours

Course Objectives: Students will be able to:

Study of system dynamics and its physical interpretation.

Development of mathematical models for synchronous machine and induction machines.

Understand small signal and large signal stability problems, and carry out stability analysis with and without power system stabilizer (PSS).

Analyze the effect of small speed changes in synchronous machines and voltage regulator governor system, and to enhance voltage stability margin of power system.

Course Outcomes: Students will be able to:

Develop mathematical models for synchronous machine.

Develop Models of induction motor.

Understand the system dynamics and analyze the stability of dynamic systems and voltage stability problem.

Implement modern control strategies for improving stability of the power system.

UNIT-I (15 Hrs.)

Modeling of Synchronous Machines: Simplest Model of the Synchronous Machine, Equations in Physical Quantities, Inductance of Synchronous Machine, Park's Transformation to dq0 components, Phasor Diagram, Equivalent Circuit and Phasor Diagram, Excitation Systems, Sub-synchronous resonance, Significance of SCR, Synchronous machine dynamics (Electromechanical transients).

UNIT-II (15 Hrs.)

Basic load modeling concepts: Static load models, Dynamic load models.

Modeling of induction motors: Equations of an induction machine, Steady-state characteristics, and Alternative rotor constructions.

UNIT-III (15 Hrs.)

Fundamental Concepts of Stability of Dynamic Systems: Stability definitions, State-space representation, Stability of dynamic system, Analysis of stability, Small signal stability of single machine infinite bus system: Generator represented by the classical model, Effects of synchronous machine field circuit dynamics.

Voltage stability: Basic concepts related to voltage stability, classification of voltage stability, Transmission system characteristics, Generator characteristics, Load characteristics, Characteristics of reactive compensating device, Multi-Machine Stability.

Voltage collapse: Typical scenario of voltage collapse, General characteristics based on actual incidents, Prevention of voltage collapse.

UNIT-IV (15 Hrs.)

Methods of Improving Stability: Automatic voltage regulator, Power system stabilizers, Active power and frequency control: Fundamental of automatic generation control, Implementation of AGC, Under frequency load shedding. Reactive power and voltage control: Production and absorption of reactive power, Method of voltage control, Shunt reactors, shunt capacitors, series capacitors, synchronous condensers, static VAR systems.

Recommended Books:

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

**MRSPTU M.TECH. ELECTRICAL ENGINEERING (POWER SYSTEM)
SYLLABUS 2022 BATCH ONWARDS**

1. P. Kundur, 'Power System Stability and Control' Mc GrawHill, 1994.
2. L. P. Singh, 'Advanced power systems Analysis and Dynamics', New Age International Publishers.
3. C. W. Taylor, 'Power System Voltage Stability' McGraw Hill.
4. P. M. Anderson and A. A. Fouad, 'Power System Control and Stability', IEEE Press.
5. E. Kimbark, 'Power System Stability', Vol.I, II & III, IEEE Press, 2002.
6. J. Machowski, J. Bialek and J.R.W. Bumby, 'Power System Dynamics and Stability', John Wiley & Sons, **1997**.
7. L. Leonard Grigsby (Ed.), 'Power System Stability and Control', 2nd Edn., CRC Press, 2007.

SMART GRIDS

Subject Code: MELES2-203

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objectives: Students will be able to:

To understand concept of Smart Grid and its Advantages and its metering.

To understand Smart Grid technologies.

To understand about Micro grid and power quality.

To understand about communication in smart grid and distribution management system.

Course Outcomes: Students will be able to:

To describe concept of Smart Grid and its Advantages and its metering.

To describe Smart Grid technologies.

To know about Micro grid and power quality.

To describe about communication in smart grid and distribution management system.

UNIT-I (10 Hrs.)

Introduction to Smart Grid: Evolution of Electric Grid, Concept of Smart Grid, Definitions and Necessity of Smart Grid, Today's Grid versus the Smart Grid, Functions of Smart Grid Components, General View of the Smart Grid Market Drive, Concept of Robust & Self-Healing grid, Present Development & International Policies in Smart Grid.

UNIT-II (20 Hrs.)

Introduction to Smart Metering: Evolution of Smart Metering, Key components of Smart metering, Real Time Pricing, Smart Appliances, Automatic Meter Reading (AMR), Outage Management System (OMS), Plug in Hybrid Electric Vehicles (PHEV), Vehicle to Grid, Smart Sensors, Home & Building Automation, Smart Substations, Substation Automation, Feeder Automation.

Smart Grid Technologies: Geographic Information System (GIS), Intelligent Electronic Devices (IED) & their application for monitoring & protection, Smart storage like Battery, Superconducting Magnetic Energy Storage (SMES), Pumped Hydro, Compressed Air Energy Storage (CAES), Wide Area Measurement System (WAMS), Phase Measurement Unit (PMU).

UNIT-III (15 Hrs.)

Micro-Grid: Concept, Necessity & Applications of Micro-Grid, Formation of Micro-Grid, Issues of Interconnection, Operation, Control & Protection of Micro-Grid. Plastic & Organic solar cells, Thin film solar cells, Variable Speed Wind Generators, Fuel-cells, micro- turbines, Captive power plants, Integration of renewable energy sources.

Power Quality: Electromagnetic Compatibility (EMC) of Smart Grid, Power Quality Issues of Grid Connected Renewable Energy Sources, Power Quality Conditioners for Smart Grid, Web based Power Quality monitoring, Power Quality Audit.

UNIT-IV (15 Hrs.)

Information and Communication Technology for Smart Grid: Advanced Metering Infrastructure (AMI), Home Area Network (HAN), Neighborhood Area Network (NAN), Wide Area Network (WAN), Bluetooth, Zig-Bee, GPS, Wi-Fi, Wi-Max based communication, Wireless Mesh Network, Basics of CLOUD Computing & Cyber Security for Smart Grid, Broadband over Power line (BPL), IP based protocols, Communication through GPRS and Power Line Carrier Communication, Internet of Things (IoT) based Protocols.

Distribution Management System: Introduction, Substation automation equipment, Faults in distribution system, Fault location & isolation and restoration, Components of fault isolation and restoration, Voltage regulation.

Recommended Books:

1. Janaka Ekanayake, Kithsiri Liyanage, Jianzhong Wu and Nick Jenkins, 'Smart Grid: Technology and Applications', Wiley Online Library, 2012.
2. James A. Momoh, "Smart Grid:-Fundamental of design and Analysis", IEEE Press, Wiley Publication.
3. Lars T.Berger, Krzyszt of, "Smart Grid:- Application, Communication, and Security", Wiley Publication.
4. Ali Keyhani, 'Design of Smart Power Grid Renewable Energy Systems', 2nd Edn., Wiley IEEE Press.
5. Clark W. Gellings, 'The Smart Grid: Enabling Energy Efficiency and Demand Response', CRC Press, 2009.
6. Stuart Borlase, 'Smart Grid: Infrastructure, Technology and solutions', CRC Press.

POWER SYSTEM LAB-II.

Subject Code: MELES2-204

**L T P C
0 0 4 2**

Duration: 60 Hrs.

Course Objectives: To make the students aware about:

The various parameters that affect the output of solar panels and wind turbines.

The operation, control and protection aspects of micro-grids and the methods to enhance power quality of power system.

The smart grid technologies, metering and application of real time pricing.

The use of communication technologies for advanced metering Infrastructure.

Course Outcomes: Students will be able:

To know the various parameters affecting the solar panel output and wind turbine output.

To operate, control and protect micro-grids.

To know methods to enhance power quality of power system.

To know about smart grid technologies, metering and to apply real time pricing.

To use communication technologies for advanced metering Infrastructure.

LIST OF EXPERIMENTS

1. Power Curves.
2. Build a Wind Farm.
3. Test the Capabilities of the Hydrogen Fuel Cells and Capacitors.
4. Effect of Temperature on Solar Panel Output.
5. Variables Affecting Solar Panel Output.
6. Effect of Load on Solar Panel Output.
7. Wind Turbine Output: The Effect of Load.
8. Test the Capabilities of Solar Panels and Wind Turbines.
9. Grid integration of solar power output using power electronics interfaces.
10. Application of real time pricing in smart grids.
11. Operation, control and protection of micro-grids.
12. Power quality analysis and enhancement of power system.
13. Use of communication technologies for advanced metering Infrastructure.

POWER QUALITY

Subject Code: MELED2-211

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objectives: To make the students aware about:

Review definitions and standards of common power quality phenomena.

Understand power quality monitoring and classification techniques.

Investigate different power quality phenomena causes and effects.

Understand different techniques for power quality problems mitigation.

Course Outcomes (COs): The students will be able to:

Acquire knowledge about the parameters of power quality and harmonics in power systems.

Acquire knowledge about the voltage sags and interruptions and their influence on various components.

Be able to model networks and components for power quality analysis and to apply harmonics filtering techniques.

Apply various methods for power quality monitoring.

UNIT-I (10 Hrs.)

Introduction: Definition of Electric Power Quality, Power Quality -- Voltage Quality, Power Quality Evaluation Procedure

Terms & Definitions: General Classes of Power Quality Problems, Transients, Long Duration Voltage Variations, Short-Duration Voltage Variations, Voltage Imbalance, Waveform Distortion, Voltage Fluctuations, Power Frequency Variations, Power Quality Terms.

UNIT-II (20 Hrs.)

Voltage Sags & Interruptions: Sources of Sags and Interruptions, Estimating Voltage Sag Performance: (i) Area of Vulnerability (Weakness, Exposure), (ii) Types of Equipment Sensitivity to Voltage Sags, (iii) Transmission system sag performance evaluation, (iv) Utility distribution system sag performance evaluation, Fundamental Principles of Protection, Solutions at the End-User Level, Voltage Sag Mitigation Technologies, Motor Starting Sags: (i) Motor-starting methods, (ii) Estimating the sag severity during full-voltage starting.

UNIT-III (20 Hrs.)

Transient Over Voltages: Sources of Transient Over Voltages: (i) Capacitor switching, (ii) Magnification of capacitor-switching transients, (iii) Lightning, (iv) Ferroresonance, Principle of Over Voltage Protection, Voltage Swell Mitigation Technologies, Utility Capacitor-Switching Transients, Utility System Lightning Protection, Switching Transient Problems with Loads.

Fundamentals of Harmonics: Harmonic Distortion, Voltage Versus Current Distortion, Harmonics Versus Transients, Power System Quantities under Non-sinusoidal Conditions, Harmonic Indices, Harmonic Sources from Commercial Loads, Locating Harmonic Sources, Effects of Harmonic Distortion, Harmonic Distortion Evaluations, Principles for Controlling Harmonics, Devices for Controlling Harmonic Distortions.

UNIT-IV (10 Hrs.)

Long Duration Voltage Variations: Principles of Regulating the Voltage, Devices for Voltage Regulation, Utility Voltage Regulator Application, Capacitors for Voltage Regulation, End-User Capacitor Application, , Flicker.

Power Quality Monitoring: Monitoring Considerations, Power Quality Measurement Equipments, Assessment of Power Quality Measurement Data, Application of Intelligent Systems, Power Quality Monitoring Standards.

Recommended Books:

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

**MRSPTU M.TECH. ELECTRICAL ENGINEERING (POWER SYSTEM)
SYLLABUS 2022 BATCH ONWARDS**

1. Roger C. Dugan, Surya Santoso, Mark F. McGranaghan, H. Wayne Beaty, 'Electrical Power Systems Quality', McGraw Hill Professional, **2002**.
2. Angelo Baggini, 'Handbook of Power Quality', Wiley, **2008**.
3. G.T. Heydt, 'Electric Power Quality', McGraw Hill Professional, **2007**.
4. Math H. Bollen, 'Understanding Power Quality Problems', IEEE Press, **2000**.
5. J. Arrillaga, 'Power System Quality Assessment', John Wiley, **2000**
6. J. Arrillaga and N. R. Watson, 'Power System Harmonics', Wiley.
7. George J. Wakileh, 'Power Systems Harmonics', Springer.

FACTS AND CUSTOM POWER DEVICES

Subject Code: MELED2-212

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objectives: To make the students:

To learn the active and reactive power flow control in power system.

To understand the need for static compensators.

To develop the different control strategies used for compensation.

Course Outcomes: Students will be able to:

Acquire knowledge about the fundamentals of Reactive Power Flow Control in Power Systems.

Acquire knowledge about the fundamental principles of passive and active reactive power compensation schemes at transmission and distribution level in power systems.

Learn various Static shunt and series VAR Compensation devices.

To develop analytical modeling skills needed for modeling and analysis of such Static VAR Systems.

UNIT-I (15 Hrs.)

Reactive Power Flow Control in Power Systems: Control of dynamic power unbalances in Power System, Power flow control, Constraints of maximum transmission line loading, Benefits of FACTS Transmission line compensation, Uncompensated line shunt compensation, Series compensation, Phase angle control, Reactive power compensation, Shunt and Series compensation principles, Reactive compensation at transmission and distribution level.

UNIT-II (15 Hrs.)

Static versus passive VAR compensator, Static shunt compensators: Static VAR compensator (SVC) and Static compensator (STATCOM), Operation and control of Thyristor switched capacitor (TSC), Thyristor controlled reactor (TCR) and STATCOM, Compensator control, Comparison between SVC and STATCOM, Multilevel inverter based DSTATCOM (Distributed Static Compensator) and its applications.

UNIT-III (15 Hrs.)

Static Series Compensation: Thyristor switched series capacitor (TSSC), Static synchronous series compensator (SSSC), Static voltage and phase angle regulators, Thyristor controlled voltage regulators (TCVR) and phase angle regulators (TCPAR): Operation and Control, Applications.

Unified power flow controller (UPFC), Circuit arrangement, Operation and control of UPFC, Basic Principle of active power (P) and reactive power (Q) control, Independent real and reactive power flow control- Applications, Comparison of UPFC and UPQC (unified power quality conditioner).

UNIT-IV (15 Hrs.)

Interline power flow controller (IPFC) & FACTS: Introduction to IPFC and FACTS, Modeling and analysis of FACTS controllers, Simulation of FACTS controllers, Power quality problems in distribution systems, Comparison of various custom power devices and their applications.

Recent Trends: Application of basic active filters, multilevel and multi-pulse converters and Z-source inverter in various FACTS and FACDS devices for improving the performances of transmission system network and distribution system network, respectively.

Recommended Books:

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

**MRSPTU M.TECH. ELECTRICAL ENGINEERING (POWER SYSTEM)
SYLLABUS 2022 BATCH ONWARDS**

1. K.R. Padiyar, 'FACTS Controllers in Power Transmission and Distribution', New Age International Publishers, 2007.
2. X.P. Zhang, C. Rehtanz, B. Pal, 'Flexible AC Transmission Systems- Modelling and Control', Springer Verlag, Berlin, 2006.
3. N.G. Hingorani, L. Gyugyi, 'Understanding FACTS: Concepts and Technology of Flexible AC Transmission Systems', IEEE Press Book, Standard Publishers and Distributors, Delhi, 2001.
4. K.S. Sureshkumar, S. Ashok, 'FACTS Controllers & Applications', e-book Edn., Nalanda Digital Library, NIT Calicut, 2003.
5. Y.H. Song and A.T. Johns, 'Flexible AC Transmission Systems', IEEE Press, 1999.
6. R.M. Mathur and R.K. Verma, 'Thyristor based FACTS controllers for Electrical Transmission Systems', IEEE Press, 2002.

DIGITAL TRANSFORMATION IN INDUSTRY

Subject Code: MELED2-213

**L T P C
4 0 0 4**

Duration: 60 Hours

Course Objectives: To make the students to:

To learn about Industry 4.0 and its foundation for the digital transformation term

To understand the concepts of digital supply chains and smart factory.

Learn basics of block chain technology and its application for crypto currency.

To acquire knowledge about real cases from different industries to know that how industries are evolving with the changes and to learn how to overcome the challenges of digital transformation projects.

Course outcomes: The students will be able:

To review the basic concepts about Industry 4.0 and its foundation for the digital transformation term.

To understand digital supply chains and smartly operate a factory.

To understand block chain technology and its application for crypto currency.

To acquire knowledge to learn to overcome the challenges of digital transformation projects.

UNIT-1 (12 Hrs.)

Introduction: Introduction to Industry 4.0, History of Industry 4.0, Industry 4.0 terminologies definition, Industrial Internet, First stages of maturity, The next maturity stages, Society 5.0, Society 5.0: breaking down 5 walls, The Various Industrial Revolutions: Evolution of Industrial Revolutions, INDUSTRY 4.0 - Drivers, Enablers, Challenges and Benefits.

UNIT-II (18 Hrs.)

Smart Factory: Traditional Supply Chains, Digital Supply Chains and Smart Factory, Characteristics of Smart Factory: Connected, Optimized, Transparency, Proactive, Agile
Introduction to Cloud technology, IoT and overview of deployment models (SaaS, PaaS, IaaS), Introduction to Horizontal and Vertical Integration

Digital Twin: Computer Simulation, Introduction to Augmented reality (AR), Virtual reality (VR) and Mixed Reality (MR) and Comparison of AR, VR and MR.

Role of Artificial intelligence & Machine learning in Industry 4.0.

UNIT-III (15 Hrs.)

Block Chain: Overview, Public Ledgers, Bitcoin, Smart Contracts, Block in a Block chain, Transactions, Distributed Consensus, Public v/s Private Block chain, Basic crypto currency, Crypto currency to Block chain, Permissioned Model of Block chain, Overview of Security aspects of Block chain, Basic Crypto Primitives: Cryptographic Hash Function and its Properties, Hash pointer and Merkle tree, Digital Signature, Public Key Cryptography.

Understanding Crypto Currency with Block Chain: Bitcoin and Block chain: Creation of coins, Payments and double spending, Bitcoin Scripts, Bitcoin P2P Network, Transaction in Bitcoin Network, Block Mining, Block propagation and

block relay, Working with Consensus in Bitcoin: Distributed consensus in open environments, Consensus in a Bitcoin network, Proof of Work (PoW).

UNIT-IV (15 Hrs.)

Digital Transformation: Introduction, Digital business transformation, Causes of disruption and transformation, Digital transformation myths and realities, Digital Transformation and customer experience, 4 pillars in customer experience transformation; IT uplift, Digitizing operations, Digital marketing and Digital businesses. -

Applications of Digital transformation:

Applications of Digital transformation across various industries, Retail industry, Government and the public sector, Insurance industry, Healthcare, Banking: Royal Bank of Scotland case

study, Fintech: Travelex case study, Public Sector: The MET office case study.

Recommended Books:

1. Srinivas R Pangali, Shankar Prakash, Jyothi R Korem, 'Digital Transformation Strategies', Sage publications, 2021
2. Thomas M Siebel, 'Digital Transformation', Rosettabooks, 2019.
3. Antony Lewis, 'The Basics of Bitcoins and Blockchain', Mango Media Incorporation, 2018.

MRSPTU

RENEWABLE ENERGY SYSTEM AND DISTRIBUTED GENERATION

Subject Code: MELED2-221

**L T P C
4 0 0 4**

Duration: 60 Hours

Course Objectives: Students will be able to:

To learn various renewable energy sources.

To gain understanding of integrated operation of renewable energy sources.

To understand Power Electronics Interface with the Grid.

To understand about Distributed Generation.

Course Outcomes: Students will be able to:

Know about various renewable energy sources, especially solar and wind energy in detail.

Know that how to tap hydro energy and energy from biomass.

Know the means and methods to harness energy from tides, waves, and geothermal energy as well as working of fuel cells.

Know the distributed generation system in autonomous/grid connected modes and its impact on Power System.

UNIT-I (15 Hrs.)

Introduction to Renewable Energy Resources: World Energy Future, Conventional Energy Sources, Non-Conventional Energy Sources, Prospects of Renewable Energy Sources, Types, Advantages, Limitations & scope of renewable energy resources.

Solar Energy: Introduction to Solar Radiation and its measurement, Introduction to Solar Energy Collectors and Storage, Solar Electric Power Generation, Solar Photo-Voltaic, Solar Cell Principle, Semiconductor Junctions, Conversion efficiency and power output, Basic Photovoltaic System for Power Generation.

Wind Energy: Introduction to Wind Energy Conversion (WEC), Wind data and energy estimation, Site selection considerations, Basic Components of a Wind Energy Conversion System, Classification of WEC Systems, Schemes for Electric Generation using Synchronous Generator and Induction Generator, Wind energy Storage.

UNIT-II (15 Hrs.)

Hydro Energy: Site selection, Types of power stations, Major components & their working.

Biomass Energy: Biomass conversion technologies, photosynthesis, Bio-gas generation, types of bio-gas plants, Biomass as a Source of Energy: Method for obtaining energy from Bio-mass, Biological Conversion of Solar Energy.

UNIT-III (15 Hrs.)

Tidal Energy: Basic principles of tidal energy, Tidal power generation systems.

Wave Energy: Wave energy conversion devices, Advantages and Disadvantages of wave energy.

Geothermal Energy: Origin and nature of geothermal energy; Classification of geothermal resources; Schematic of geothermal power plants.

Fuel Cells: Schematic of fuel cell, Characteristics, Working of different types of fuel cells.

UNIT-IV (15 Hrs.)

Distributed Generation: Introduction, Distributed v/s central station generation, Technologies of distributed generation as sources of energy such as Micro-turbines, Micro combined heat power, Rooftop solar PV, Solar and wind hybrid system, Impact of distributed generation on power grid reliability.

Distributed Generators: Introduction, Various types of distributed generators, such as, Permanent magnet generator, Self-excited Induction generators, Power Electronic Interface of distributed Generators with the Grid, Analysis of Effect of Distributed Generation on Transmission System Operation, Protection of Distributed Generators, Economics Issues of

Distributed Generation, Case Studies on distributed generations for electric vehicle and energy storage integration.

Recommended Books:

1. D.P. Kothari, K.C. Singal and Ranjan Rakesh, 'Renewable Energy Sources and Emerging Technologies', 2nd Edn., Prentice Hall of India, **2011**.
2. Math H. Bollen, Fainan Hassan, 'Integration of Distributed Generation in the Power System', Wiley-IEEE Press, **2011**.
3. Loi Lei Lai, Tze Fun Chan, 'Distributed Generation: Induction and Permanent Magnet Generators', Wiley-IEEE Press, **2007**.
4. A.Roger, Messenger and Jerry Ventre, 'Photovoltaic System Engineering', 3rd Edn., **2010**.
5. James F. Manwell, Jon G. McGowan and Anthony L. Rogers, 'Wind Energy Explained: Theory Design and Application', 2nd Edn., John Wiley and Sons **2010**.
6. G.D. Rai, 'Non-Conventional Sources of Energy', Khanna Publishers.
7. David Boyles, 'Bio Energy', Elis Horwood Ltd.
8. N.K. Bansal and M. Kleemann, M. Heliss, 'Renewable Energy Sources and Conversion Technology', Tata McGraw Hill, **1990**.
9. O.P. Vimal and P.D. Tyagi, 'Bio Energy Spectrum', Bio Energy and Wasteland Development Organization.

SCADA SYSTEM AND APPLICATIONS

Subject Code: MELED2-222

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objectives: To make the students to get insight into the:

Basic architecture and components of SCADA.

Functions and communication in SCADA.

Applications of SCADA.

Course Outcomes: Students will be able to:

Describe the basic tasks of supervisory control and data acquisition systems (SCADA) as well as their typical applications.

Acquire knowledge about SCADA architecture, various advantages and disadvantages of each system.

Knowledge about single unified standard architecture IEC 61850.

To learn about SCADA system components: remote terminal units, PLCs, intelligent electronic devices, HMI systems, SCADA server.

Learn and understand about SCADA applications in transmission and distribution sector, industries etc.

UNIT-I (15 Hrs.)

Introduction to SCADA, Data acquisition systems, Evolution of SCADA, Building blocks of SCADA systems, SCADA System Components, Classification of SCADA systems, Communication technologies, Monitoring and supervisory functions, SCADA applications in Industries and Utility Automation.

UNIT-II (15 Hrs.)

Remote Terminal Unit (RTU) and its components, Intelligent Electronic Devices (IED), Programmable Logic Controller (PLC), Logic subsystem, Termination subsystem, Testing and human-machine interface (HMI) subsystem, Power supplies, Advanced RTU functionalities, Data concentrators and merging units, Master Station: Master station software components, Master station hardware components, SCADA Server, SCADA/HMI Systems, Server systems in the master station, Global positioning systems (GPS), Master station performance.

UNIT-III (15 Hrs.)

SCADA Architecture, Various SCADA architectures, advantages and disadvantages of each system, Single unified standard architecture -IEC 61850.

SCADA Communication, Communication Network, Communication subsystem, various industrial communication technologies, wired and wireless methods and fiber optics, Open standard communication protocols, comparison with wide area monitoring system (WAMS).

UNIT-IV (15 Hrs.)

SCADA Applications: Utility applications, Transmission and distribution sector operations, monitoring, analysis and improvement, Situational awareness, Intelligent alarm filtering: Need and technique, Alarm suppression techniques, Operator needs and requirements, Industries - oil, gas and water, Case studies, Implementation, Simulation exercises.

Recommended Books:

1. Stuart A. Boyer, 'SCADA-Supervisory Control and Data Acquisition', Instrument Society of America Publications, USA, 2004.
2. Gordon Clarke, Deon Reynders, 'Practical Modern SCADA Protocols: DNP3, 60870.5 and Related Systems', Newnes Publications, Oxford, UK, 2004.
3. William T. Shaw, 'Cyber-security for SCADA Systems', Penn Well Books, 2006.

4. David Bailey, Edwin Wright, 'Practical SCADA for Industry', Newnes, 2003.
5. Michael Wiebe, 'A Guide to Utility Automation: AMR, SCADA, and IT Systems for Electric Power', Penn Well Books, 1999.
6. Bela G. Liptak, Halit Eren, 'Instrument Engineers Process Software and Digital Networks', 4th Edn., Vol.-3, 2016.

MRSPTU

OPTIMIZATION TECHNIQUES FOR POWER ENGINEERING

Subject Code: MELED2-223

**L T P C
4 0 0 4**

Duration: 60 Hrs.

Course Objectives: - To introduce the students:

To learn about basics of optimization and essential optimization techniques for applying to day to day problems.

To learn about linear and non-linear programming problems and apply the methods for solving these problems in various fields of engg. and technology.

To acquaint them with unconstrained and constrained multivariable optimization nonlinear programming problems.

To non-conventional optimization methods such as, Genetic Algorithm, Particle swarm optimization etc. and their applications in power system.

Course Outcomes: Students will be able:

To gain knowledge about basics of optimization.

To apply linear and non-linear programming for solving problems in various fields of Engg. and Tech.

To acquire skills to solve unconstrained and constrained multivariable optimization nonlinear programming problems.

To apply non-conventional optimization methods such as Simulated annealing method, Genetic Algorithm, Particle swarm optimization etc.

UNIT-I (10 Hrs.)

Introduction to Optimization: Statement of an optimization problem, Classification of optimization problems, Classical Optimization techniques, Single variable optimization, Multivariable optimization, Optimization with and without inequality constraints, Single objective and multi objective optimization, Engineering applications of optimization.

UNIT-II (20 Hrs.)

Linear Programming (LP): Standard form of linear programming, Simplex method, Revised simplex method, Computer implementation of the Simplex method, Duality theory, Constrained Optimization, Theorems and procedure, linear programming, mathematical model, solution technique, duality.

Non-Linear Programming (NLP): One-Dimensional Minimization Methods: Unimodal function, Dichotomous search, Fibonacci search, Golden Section, Cubic interpolation method, Direct root, Newton Raphson Method.

Transportation Problem: North-West Corner rule, least cost method, Vogel approximation method, testing for optimality.

UNIT-III (15 Hrs.)

Unconstrained Multivariable Optimization Techniques: Random search method, Steepest descent method, Conjugate gradient method, Sequential quadratic programming, Newton Raphson Method, Evolutionary search, Hooke-Jeeves Method, Simplex search Method.

Constrained Optimization Techniques: Interior Penalty function method, Exterior penalty function method, Method of Multipliers, KKT Conditions.

Dynamic Programming (DP): Multistage decision processes, concept of sub-optimization and principle of optimality, Recursive relations, Integer Linear programming, Branch and bound algorithm.

UNIT-IV (15 Hrs.)

Further Topics in Optimization: Critical path method (CPM), Program evaluation and review technique (PERT), Multi-objective Optimization Techniques, Weighting method, ϵ - constraint method, Genetic Algorithm, Particle swarm optimization.

Genetic Algorithm (GA): Introduction to Genetic Algorithm, working principle, coding of variables, fitness function, GA operators; Similarities and differences between GA and traditional methods; Unconstrained and constrained optimization using genetic Algorithm, real coded GA, Advanced GA, Applications to power system.

Recommended Books:

1. S.S. Rao, 'Optimization: Theory and Application', Wiley Eastern Press, 2nd Edn., **1984**.
2. Deb Kalyanmoy, 'Optimisation for Engineering Design - Algorithms and Examples', Prentice Hall India, **1998**.
3. H.A. Taha, 'Operations Research - An Introduction', Prentice Hall of India, **2003**.
4. R.L. Fox, 'Optimization Methods for Engineering Design', Addition Welsey, **1971**.
- A. Ravindran, K.M. Ragsdell and G.V. Reklaitis, 'Engineering Optimization: Methods and Applications', Wiley, **2008**.
5. Godfrey C. Onwubolu, B.V. Babu, 'New Optimization Techniques in Engineering', Springer, **2004**.
6. D.P. Kothari & J.S. Dhillon, 'Power System Optimization', Prentice-Hall of India, **2010**.

3rd & 4th Semester

PROJECT

Subject Code: MELES2-301

**L T P C
0 0 6 3**

The object of Project is to enable the student to take up investigative study in the broad field of Electrical Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis under the guidance of a supervisor from the department alone or jointly with a supervisor drawn from R&D laboratory/Industry. This is expected to provide a good initiation for the student in R&D work. The assignment to normally include:

Survey and study of published literature on the assigned topic.

Define the objective, formulate the problem and prepare an action plan for conducting the investigation.

Then perform the required Experiment/Develop a Simulation Model/Solve the Problem/Develop a Design/Explore the feasibility/Conduct a survey etc. depending upon the action plan.

Analyze the results and prepare a written report on the study conducted for presentation to the Department.

Final seminar, as oral presentation before a departmental committee.

SEMINAR

Subject Code: MELES2-302

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Course Objectives:

To identify, understand and discuss current advanced research topics.

To gain experience in the critical assessment of the available scientific literature

To practice the use of various resources to locate and extract information using offline & online tools, journals

Course Outcomes:

An ability to utilize technical resources

An ability to write technical documents and give oral presentations related to the work completed.

To learn preparation and presentation of scientific papers in an exhaustive manner

Each student will be required to prepare a Seminar Report and present a Seminar on a topic in any of the areas of modern technology related to Electrical Engineering including interdisciplinary fields.

NOTE: Seminar will carry 1 credit. It will be done on any topic within/outside the curriculum. Its evaluation will be done as under:

Sr. No.	Parameters for Evaluation	Internal Marks	External Marks
1	Depth & Coverage of Topic	40	-
2	PPT Presentation & Report	20	-
3	Presentation	20	-
4	Questions & Answers	20	-
Total		100	-

RESEARCH METHODOLOGY AND IPR

Subject Code - MREMI0-101

**LTPC
4 0 0 4**

Duration-60 hrs

Course Objectives: To make the students to:

1. Understand that how to formulate a research problem, analyze research related information, follow research ethics, and to design experiments.
2. To learn to collect or sample data, process it and validate results etc.
3. Do effective literature studies and develop a research proposal.
4. Understand the need of information about Intellectual Property Right (IPR) in general & engineering in particular.
5. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D.

Course Outcomes: At the end of this course, students will be able to:

1. Formulate a research problem, analyze research related information, and follow research ethics and design experiments.
2. Collect, sample, scale, validate and process data.
3. To do literature survey effectively and develop a good research proposal.
4. Motivated to do research work and invest in R & D to create new and better products for economic growth and social benefits.

UNIT-I (15 Hrs.)

Research Problem: Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem, Approaches of investigation of solutions for research problems, Data collection, Analysis, Interpretation, Necessary instrumentation.

Design of Experiment: Basic Principal of Experimental Design, Randomized Block, Completely Randomized Block, Latin Square, Factorial Design.

Hypothesis: Types, Formulation of Hypothesis, Feasibility, Preparation and Presentation of Research Proposal.

UNIT-II (15 Hrs.)

Sources of Data: Primary and Secondary, Validation of Data

Data Collection Methods: Questionnaire Designing, Construction

Sampling Design & Techniques – Probability Sampling and Non Probability Sampling.

Scaling Techniques: Meaning & Types.

Reliability: Test–Retest Reliability, Alternative Form Reliability, Internal Comparison Reliability and Scorer Reliability.

Validity: Content Validity, Criterion Related Validity and Construct Validity.

Data Process Operations: Editing, Sorting, Coding, Classification and Tabulation.

UNIT-III (10 Hrs.)

Literature Survey: Importance of literature survey - Sources of information - Assessment of quality of journals and articles - Information through internet. Literature Review: Need of review - Guidelines for review - Record of research review.

Effective Literature Studies Approaches: Analysis Plagiarism, Research ethics, Effective technical writing, Essentials of report writing, Report Format, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee.

UNIT-IV (20 Hrs.)

Nature of Intellectual Property: Patents, Designs, Trade and Copyright, Process of Patenting and Development: Technological research, Innovation, Patenting, development, Introduction to international Scenario on Intellectual Property, Procedure for grants of patents, Patenting under PCT.

Patent Rights: Scope of Patent Rights, Licensing and transfer of technology, Patent information

and databases, Introduction to patent searching and World Intellectual Property Organization (WIPO).

New Developments in IPR: Administration of Patent System. New developments in IPR: introduction to IPR of Biological Systems, Computer Software etc. Traditional Knowledge Case Studies, IPR or IITs.

Recommended Books:

1. Stuart Melville and Wayne Goddard, 'Research Methodology: An Introduction for Science & Engineering Students', Juta & Co. Ltd., 1996.
2. Ranjit Kumar, 2nd Edn., 'Research Methodology: A Step by Step Guide for Beginners'.
3. C.R Kothari, "Research Methodology, Methods & Techniques", New Age International Publishers, New Delhi, 2004.
4. R. Ganesan, 'Research Methodology for Engineers', MJP Publishers, Chennai, 2011.
5. Ratan Khananabis and Suvasis Saha, "Research Methodology", Universities Press, Hyderabad, 2015.
6. Vijay Upagade and Aravind Shende, 'Research Methodology', S. Chand & Company Ltd., New Delhi, 2009.
7. G. Nageswara Rao, 'Research Methodology and Quantitative methods', BS Publications, Hyderabad, 2012.
8. Debora J. Halbert, 'Resisting Intellectual Property', Taylor & Francis Ltd., 2005, DOI <https://doi.org/10.4324/9780203799512>.
9. Robert P. Merges, Peter S. Menell, Mark A. Lemley, 'Intellectual Property in New Technological Age', 2016.
10. T. Ramappa, 'Intellectual Property Rights Under WTO', S. Chand, 2008.

DISSERTATION

Subject Code: MELES2-401

**L T P C
0 0 --**

Note: Students should be advised to go through maximum research papers and conclude a particular domain to work further. Each student will be required to complete a Dissertation and submit a written report on the topic on any of the areas of modern technology related to Electrical Engineering including interdisciplinary fields in the final semester of M. Tech Course.

Course Objectives: To learn, practice, and critique effective scientific writing and to formulate the research objectives clearly, state claims and evidence clearly, assess validity of claims, evidence, outcomes, and results.

Course Outcomes:

Design a meaningful research project that demonstrates spatial thinking and uses the knowledge and skills.

Define and analyze a problem in latest research areas.

Formulate and write a research proposal.

Synopsis and its Presentation.

Execute a meaningful research project that demonstrates spatial thinking and uses the knowledge and skills.

Able to learn effectively record data and experiments so that others can understand them.

Communicate the findings by means of a thesis, written in the format specified by the department/institute.

The Dissertation will carry 20 credits and will be evaluated as under:

Sr. No.	Parameters for Evaluation	Internal Marks	External Marks
1.	Originality	12	08
2.	Presentation	12	08
3.	Contents & Volume of work	18	08
4.	Discussion (Contribution of the Candidate)	18	08
5.	Any research publication related to the thesis	-	08
Total		60	40

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF ENGINEERING AND TECHNOLOGY

SYLLABUS

M.TECH. (ELECTRONICS AND COMMUNICATION ENGINEERING)

2022 BATCH ONWARDS

(For Full-Time and Part-Time Modes)

Note: (i) Copy rights are reserved.

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Defaulters will be prosecuted.

(ii) Subject to change in the syllabi at any time.

Please visit the University website time to time.

SCHEME FOR M.TECH. (ECE) FULL-TIME MODE

<u>SEMESTER-I</u>		Contact Hours			Marks			Credits
Sub Code	Subject Name	L	T	P	Int	Ext	Total	
MECES1-101	Advanced Communication Systems	4	0	0	40	60	100	4
MECES1-102	Advanced Digital Circuit Design	4	0	0	40	60	100	4
MECES1-103	Soft Computing	4	0	0	40	60	100	4
Department Elective – I (Select Any One)								
MECED1-111	Antenna System Design	4	0	0	40	60	100	4
MECED1-112	Microcontrollers & Embedded Systems							
MECED1-113	IoT & its Applications							
Department Elective – II (Select Any One)								
MECED1-121	Information Theory & Coding	4	0	0	40	60	100	4
MECED1-122	Digital Image Processing							
MECED1-123	AI & Machine Learning							
MECES1-104	Research Lab-I	0	0	4	60	40	100	2
Total:		20	0	4	260	340	600	22

<u>SEMESTER-II</u>		Contact Hours			Marks			Credits
Sub Code	Subject Name	L	T	P	Int	Ext	Total	
MECES1-201	Wireless Adhoc & Sensor Networks	4	0	0	40	60	100	4
MECES1-202	Advanced Digital Signal Processing	4	0	0	40	60	100	4
MECES1-203	Wireless & Mobile Communications	4	0	0	40	60	100	4
Department Elective – III (Select Any One)								
MECED1-211	VHDL: Design, Synthesis & Simulation	4	0	0	40	60	100	4
MECED1-212	Advanced Computer Architecture							
MECED1-213	Deep Learning							
Department Elective – IV (Select Any One)								
MECED1-221	Optical Communication Systems	4	0	0	40	60	100	4
MECED1-222	Cloud Computing							
MECED1-223	Big Data Analytics							
MECES1-204	Research Lab-II	0	0	4	60	40	100	2
Total:		20	0	4	260	340	600	22

**MRSPTU M.TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)
SYLLABUS 2022 BATCH ONWARDS**

SEMESTER-III		Contact Hours			Marks			Credits
Sub Code	Sub Name	L	T	P	Int.	Ext.	Total	
XXXXX	Open Elective	3	0	0	40	60	100	3
WWWWW	Research Methodology and IPR	4	0	0	40	60	100	4
MECES1-301	Project	0	0	--	60	40	100	6
MECES1-302	Seminar	0	0	2	100	--	100	1
Total:		7	0	2	240	160	400	14

SEMESTER-IV		Contact Hours			Marks		
Sub Code	Sub Name	L	T	P	Internal	External	Total
MECES1-401	Dissertation #	--	--	--	Satisfactory / Not Satisfactory as per CBCS-2016		
Total:		--	--	--	--		

Note: In addition, it is proposed that:

1. Seminar shall be preferably on the Literature survey of the proposed Thesis work.
2. Project work shall preferably be related to work to be undertaken in the Thesis work.

**MRSPTU M.TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)
SYLLABUS 2022 BATCH ONWARDS**

SCHEME FOR M.TECH. (ECE) PART-TIME MODE

SEMESTER-I		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Int	Ext	Total	
MECES1-101	Advanced Communication Systems	4	0	0	40	60	100	4
MECES1-102	Advanced Digital Circuit Design	4	0	0	40	60	100	4
Department Elective-I (Select Any One)								
MECED1-111	Antenna System Design	4	0	0	40	60	100	4
MECED1-112	Microcontrollers & Embedded Systems							
MECED1-113	IoT & its Applications							
Total:		12	0	0	120	180	300	12

SEMESTER-2		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Int	Ext	Total	
MECES1-103	Soft Computing	4	0	0	40	60	100	4
Department Elective – II (Select Any One)								
MECED1-121	Information Theory & Coding	4	0	0	40	60	100	4
MECED1-122	Digital Image Processing							
MECED1-123	AI & Machine Learning							
MECES1-104	Research LAB-I	0	0	4	60	40	100	2
Total:		8	0	4	140	160	300	10

SEMESTER-III		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Int	Ext	Total	
MECES1-201	Wireless Adhoc & Sensor Networks	4	0	0	40	60	100	4
MECES1-202	Advanced Digital Signal Processing	4	0	0	40	60	100	4
Department Elective – III (Select Any One)								
MECED1-211	VHDL: Design, Synthesis & Simulation	4	0	0	40	60	100	4
MECED1 -212	Advanced Computer Architecture							
MECED1 -213	Deep Learning							
Total:		12	0	0	120	180	300	12

**MRSPTU M.TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)
SYLLABUS 2022 BATCH ONWARDS**

SEMESTER-IV		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Int	Ext	Total	
MECES1-203	Wireless & Mobile Communications	4	0	0	40	60	100	4
Department Elective – IV (Select Any One)								
MECED1-221	Optical Communication Systems	4	0	0	40	60	100	4
MECED1-222	Cloud Computing							
MECED1-223	Big Data Analytics							
MECES1-204	Research LAB-II	0	0	4	60	40	100	2
Total:		8	0	4	140	160	300	10

SEMESTER-V		Contact Hours			Marks			Credits
Subject Code	Subject Name	L	T	P	Int	Ext	Total	
XXXXX	Open Elective	3	0	0	40	60	100	3
WWWWW	Research Methodology and IPR	4	0	0	40	60	100	4
MECES1-301	Project	0	0	--	60	40	100	6
MECES1-302	Seminar	0	0	2	100	--	100	1
Total:		8	0	8	240	160	400	14

SEMESTER-IV		Contact Hours			Marks		
Sub Code	Sub Name	L	T	P	Internal	External	Total
MECES1-401	Dissertation #	--	--	--	Satisfactory / Not Satisfactory as per CBCS-2016		
Total:		--	--	--	--		

Note: In addition, it is proposed that:

1. Seminar shall be preferably on the Literature survey of the proposed Thesis work.
2. Project work shall preferably be related to work to be undertaken in the Thesis work.

ADVANCED COMMUNICATION SYSTEM

Subject Code: MECES1-101

L T P C

Duration: 60 Hrs.

4 0 0 4

Course Objectives

This course is meant to give knowledge to students for understanding of the various advanced concepts & techniques and applications in Communication Systems

1. To familiarize the students with digital communication systems.
2. To understand about bandlimited channels and estimation techniques.
3. To familiarize with fading and fading channels.
4. To understand OFDM and other 4G techniques.

Course Outcomes

1. To understand the concept of complex baseband representation and orthogonalization procedure.
2. To analyze the performance of band-limited channels.
3. To evaluate the receiver performance in fading channels.
4. To differentiate b/w various OFDM issues.

UNIT-I (15 Hrs)

Introduction: Digital Communication System (Description of different modules of the block diagram), Complex baseband representation of signals, Gram-Schmidt Orthogonalization procedure. M-ary orthogonal signals, bi-orthogonal signals, Simplex signal waveforms.

UNIT-II (15 Hrs)

Band-limited channels: Pulse shape design for channels with ISI: Nyquist pulse, Partial response signaling (Duobinary and modified Duobinary pulses), demodulation, Maximum likelihood estimation technique.

UNIT-III (15 Hrs)

Communication over fading channels: Characteristics of fading channels, Rayleigh and Rician channels, Receiver performance-average SNR, outage probability, Amount of Fading and Average Bit/Symbol Error Rate. Statistical channel modeling of Rayleigh and Rician fading channels.

UNIT-IV (15 Hrs)

4G Technology /OFDM: Introduction to OFDM, Multicarrier Modulation and Cyclic Prefix, BER performance over AWGN and Rayleigh fading, OFDM Issues like PAPR, Frequency and Timing Offset.

Recommended Books:

1. G. Proakis and M. Salehi, 'Fundamentals of Communication Systems', Pearson Education, 2005.
2. S. Haykins, 'Communication Systems', 5th Edn., John Wiley, 2008.
3. M.K. Simon, S.M. Hinedi and W.C. Lindsey, 'Digital Communication Techniques: Signaling and detection', PHI, 1995.
4. W. Tomasi, 'Advanced Electronic Communication Systems'. 4th Edn., Pearson Education, 1998.
5. M.K. Simon and M.S. Alouini, 'Digital Communication over Fading Channels', 2000.

Course Objectives:

This course shall provide the understanding to students about various conceptual techniques and their applications leading to Advanced Digital Circuit Design:

1. To understand codes, logic families and realization of logic gates.
2. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
3. To understand the concepts of combinational logic circuits and sequential circuits.
4. To understand the realization of circuit using multiplexers, decoders and PLDs

Course Outcomes: At the end of this course students will demonstrate the ability to:

1. Design of canonical functions based on composite gates.
2. Evaluate the minimization techniques, including VEM & glitches remedy.
3. Develop and analyze, combinational and sequential circuits.
4. Formulate and investigate PLD based logic design.

UNIT-I (15 Hrs)

Weighted and non-weighted codes: Properties & Applications. Error detection & correction. Parity check and Hamming code, Canonical functions based array design, Positive/Negative logic based gates and their properties. Composite gates – XOR/AOI/OAI & applications. Multilevel NAND/NOR realizations.

UNIT-II (15 Hrs)

Switching algebra & theorems. Duality & its applications. Mapping/ Karnaugh corner/Offset adjacencies. Analytical simplification. VEM upto 6-variables. Analysis and synthesis of combinational circuit design. CLA. Design using Decoders/ Multiplexers. Scaling. Glitches/ Hazards & remedies in combinational circuit design.

UNIT-III (15 Hrs)

Debounce switch, Flip-flop conversions. Racing & remedies. Analysis and synthesis of synchronous/asynchronous sequential circuit design using characteristics equations, excitation tables & state transition diagrams. Mealy and Moore models. Registers & their applications. Analysis and synthesis of 4-bit asynchronous and synchronous counters.

UNIT-IV (15 Hrs)

A/D conversion mechanism, characteristics and comparisons. Realization of circuit using PLDs: PAL/PLA, their performance comparison. FPGA based design. Comparative aspects of IC logic family: TTL/CMOS & their variants. Interfacing of TTL and CMOS. FSM/ASM. 555-timer applications. Digital twin technology. Emerging technologies. Digital India applications.

Text/Reference Books:

1. Switching and Finite Automata Theory-Zvi Kohavi & Niraj K. Jha, 3rd Edition, Cambridge.
2. Modern Digital Electronics - R. P. Jain, 3rd Edition, 2007 - Tata McGraw-Hill
3. Digital Design - Morris Mano, PHI, 4th Edition,2006
4. Introduction to Switching Theory and Logic Design - Fredriac J. Hill, Gerald R. Peterson, 3rd Ed., John Wiley & Sons Inc.
5. Fundamentals of Logic Design- Charles H. Roth, Cengage Learning, 5th, Edition, 2004.
6. Switching Theory and Logic Design - A. Anand Kumar, PHI, 2013.

SOFT COMPUTING

Subject Code: MECES1-103

L T P C

Duration: 60 Hrs.

4 0 0 4

Course Objectives:

This course is meant to give knowledge to students for understanding of the various concepts, techniques and applications in Soft Computing

1. To introduce soft computing concepts and techniques and foster their abilities in designing appropriate technique for a given scenario.
2. To implement soft computing based solutions for real-world problems.
3. To give students knowledge of non-traditional technologies and fundamentals of artificial neural networks, fuzzy sets, fuzzy logic, genetic algorithms.

Course Outcomes: After completion of course, students would be able to:

1. Identify and describe soft computing techniques and their roles in building intelligent machines
2. Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.
3. Apply genetic algorithms to combinatorial optimization problems.
4. Evaluate and compare solutions by various soft computing approaches for a given problem.

UNIT – I (15 Hrs)

Soft Computing: Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, applications of soft computing.

Fuzzy Logic: Fuzzy set versus crisp set, basic concepts of fuzzy sets, membership functions, basic operations on fuzzy sets and its properties. Fuzzy relations versus Crisp relation,

Fuzzy rule base system: Fuzzy propositions, formation, decomposition & aggregation of fuzzy rules, fuzzy reasoning, Fuzzy Inference Systems (FIS) – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models, Fuzzification and Defuzzification, fuzzy decision making & Applications of fuzzy logic.

UNIT – II (15 Hrs)

Structure and Function of a single neuron: Biological neuron, artificial neuron, definition of ANN and its applications. Neural Network architecture: Single layer and multilayer feed forward networks and recurrent networks. Course rules and equations: Perceptron, Hebb's, Delta, winner take all and out-star Course rules. Supervised Course Network: Perceptron Networks, Adaptive Linear Neuron, Multiple Adaptive Linear Neuron, Back Propagation Network, Associative memory networks, Unsupervised Course Networks: Competitive networks, Adaptive Resonance Theory, Kohonen Self Organizing Map

UNIT – III (15 Hrs)

Genetic Algorithm: Fundamentals, basic concepts, working principle, encoding, fitness function, reproduction, Genetic modelling: selection operator, cross over, mutation operator, Stopping Condition and GA flow, Constraints in GA, Applications of GA, Classification of GA.

UNIT – IV (15 Hrs)

Hybrid Soft Computing Techniques: An Introduction, Neuro-Fuzzy Hybrid Systems, Genetic Neuro-Hybrid systems, Genetic fuzzy Hybrid and fuzzy genetic hybrid systems

Recommended Books

1. S. Rajasekaran & G.A. Vijayalakshmi Pai, 'Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & Applications', PHI Publication, 2011.
2. S.N. Sivanandam & S.N. Deepa, 'Principles of Soft Computing', Wiley Publications, 2007.

Reference Books

1. Michael Negnevitsky, 'Artificial Intelligence', Pearson Education, New Delhi, 2008.
2. Timothy J. Ross, 'Fuzzy Logic with Engineering Applications', Wiley, 2010.

Course Objectives:

1. This course is meant to give knowledge to students for understanding of the various concepts, techniques and applications in Antenna System Design.
2. Study of propagation of waves through different media.
3. To study various types of antennas, antenna arrays and associated antenna parameters.
4. Familiarize the students with different design parameters of antennas.

Course Outcomes: After completion of course, students would be able to:

1. Review of EM wave propagation in free space & different media and radiating elements.
2. Analysis and characterization of antenna parameters.
3. Design and analysis of antennas arrays.
4. Design and analysis of antenna for broadband applications.

UNIT-I (15 Hrs)

Review of electromagnetic fields, Displacement current, Maxwell's equations in free space, plane wave & uniform plane wave in free space. Electromagnetic radiations, Physical concept of radiation, Retarded potential, Radiation from a Hertzian dipole, monopole and a half wavedipole, Fields in the vicinity of an antenna and far field approximation.

UNIT-II (15 Hrs)

Antenna Parameters: Radiation pattern, Gain, Directive gain, Directivity, Reciprocity theorem & its applications, effective aperture, radiation resistance, terminal impedance, noise temperature, elementary ideas about self & mutual impedance, front-to-back ratio, antenna beam width, antenna bandwidth, antenna beam efficiency, antenna beam area or beam solid angle, polarization, antenna temperature.

UNIT-III (15 Hrs)

Antenna Arrays: Various forms of antenna arrays, arrays of point sources, non-isotropic but similar point sources, multiplication of patterns, arrays of n-isotropic sources of equal amplitude and spacing, Dolph-Tchebysceff arrays, continuous arrays, rectangular arrays.

UNIT-IV (15 Hrs)

Broadband Antennas: Travelling wave antennas helical antennas, Biconical antennas Sleeve antennas, and Principles of frequency independent antennas, Spiral antennas, and Log - periodic antennas.

Aperture antennas, scanning antennas, smart antennas. Long Wire antenna, folded dipole antenna, Yagi-Uda antenna, Slot antenna, Micro Strip or Patch antennas, Antenna measurements.

Recommended Books

1. J.D. Krauss, 'Antennas', McGraw Hill Inc., New York, 1991.
2. Balanis A. Constantine, 'Antenna Theory, Analysis and Design', Wiley, New York.
3. K.D. Prasad, 'Antenna and Wave Propagation', 3rd Edn., Satya Prakashan, New Delhi.
4. W.L. Stutzman, G.A. Thiele, 'Antenna Theory and Design', Wiley, New York.

MICROCONTROLLERS AND EMBEDDED SYSTEMS

Subject Code: MECED1-112

L T P C

Duration: 60 Hrs.

4 0 0 4

Course Objectives

1. This course is meant to give knowledge to students for understanding of the various concepts, techniques and applications in Microcontrollers and Embedded Systems
2. To familiarize the students with typical embedded system.
3. To acquaint the students with ability to design and develop embedded system.
4. To introduce the students about ARM architecture and programming.

Course Outcomes

1. To understand and model a typical embedded system.
2. Design, development and analysis of embedded system.
3. To understanding of ARM architecture and ARM processor family.
4. Designing and programming of ARM processor.

UNIT-I (15 Hrs)

Typical Embedded System: Core of the Embedded System, Memory, Sensors and Actuators, Communication Interface, Embedded Firmware, Other System Components. Characteristics and Quality Attributes of Embedded Systems: Hardware Software Co-Design and Program Modelling: Fundamental Issues in Hardware Software Co-Design, Computational Models in Embedded Design, Introduction to Unified Modelling Language, Hardware Software Trade-offs.

UNIT-II (15 Hrs)

Embedded Hardware Design and Development: EDA Tools, how to Use EDA Tool, Schematic Design – Place wire, Bus, port, junction, creating part numbers, Design Rules check, Bill of materials, Netlist creation, PCB Layout Design – Building blocks, Component placement, PCB track routing.

UNIT-III (15 Hrs)

ARM Architecture: ARM Design Philosophy, Registers, Program Status Register, Instruction Pipeline, Interrupts and Vector Table, Architecture Revision, ARM Processor Families. ARM Programming Model – I: Instruction Set: Data Processing Instructions, Addressing Modes, Branch, Load, Store Instructions, PSR Instructions, Conditional Instructions. ARM Programming Model – II: Thumb Instruction Set: Register Usage, Other Branch Instructions, Data Processing Instructions, Single-Register and Multi Register Load- Store Instructions, Stack, Software Interrupt Instructions

UNIT-IV (15 Hrs)

ARM Programming: Simple C Programs using Function Calls, Pointers, Structures, Integer and Floating Point Arithmetic, Assembly Code using Instruction Scheduling, Register Allocation, Conditional Execution and Loops

Memory Management: Cache Architecture, Polices, Flushing and Caches, MMU, Page Tables, Translation, Access Permissions, Context Switch.

Recommended Books:

1. Andrew N. Sloss, Dominic Symes, Chris Wright, 'ARM Systems Developer's Guides- Designing & Optimizing System Software', 1st Edn., Elsevier, 2008.
2. K.V. Shibu, 'Introduction to Embedded Systems', 1st Edn., Tata McGraw Hill Education Private Limited, 2009.

Reference Books:

1. Jonathan W. Valvano – Brookes / Cole, 'Embedded Microcomputer Systems, Real Time Interfacing', 1st Edn., Thomas Course, 1999.
2. James K. Peckol, 'Embedded Systems – A contemporary Design Tool', 2nd Edn., John Wiley, 2008.

IoT & ITS APPLICATIONS

Subject Code: MECED1-113

L T P C

Duration: 60 Hrs

4 0 0 4

Course Objectives:

1. This course is meant to give knowledge to students for understanding of the various concepts, techniques and applications of Internet of Things:
2. To learn the definition and significance of the Internet of Things.
3. To understand about SDN and data handling methods.
4. To explore the relationship between IoT and cloud computing.
5. To acquire knowledge about the different application-domain.

Course Outcomes: At the end of this course students will demonstrate the ability to:

1. Explore the interconnection and integration of the physical world and the cyber space.
2. Develop skills to build machine to machine communication.
3. Design and develop of IoT Devices.
4. Identify how IoT differs from traditional data collection systems.

UNIT-I (15 Hrs)

Introduction to Internet of Things (IoT): Definition, Characteristics, Evolution, Applications, IoT versus M2M (Machine to Machine) and IoT versus WoT (Web of Things). Sensing, Actuation, Sensors-Definition, Features, Classes. Sensor versus Transducers, Sensor Networks, UAV Networks, Actuator-Definition, Types (Hydraulic, Pneumatic, Electrical, Thermal, Magnetic and Mechanical).

IoT Networking: IoT Components, IoT Categories (Industrial and Consumer).

Connectivity Technologies: LAN, WAN, Node, Gateway and Proxy, IPv4 versus IPv6. Communication Protocols.

UNIT-II (15 Hrs)

Machine-to-Machine Communications: Introduction, Applications, Features.

Interoperability in IoT: Current Challenges in IoT, Requirement, Types (User and Device).

IoT Platform Overview: Features and Types of Arduino Board. Integration of Sensors and Actuators with Arduino, Introduction to Python and Raspberry Pi.

UNIT-III (15 Hrs)

Software-Defined Networking (SDN): Current Network and its limitations, Introduction to SDN, Current Network to SDN, SDN Architecture, Components of SDN, SDN for IoT, Benefits of Integrating SDN in IoT, Data Handling and Analytics.

Cloud Computing: Recent Trends in Computing, Components of Cloud Computing, Service Models, Comparison of Different Service Models.

UNIT-IV (15 Hrs)

Fog Computing: Introduction, its Need, Architecture and working of Fog, Advantages, Challenges and Applications of Fog.

IoT Applications: Smart Cities and Smart Homes-IoT Challenges in Smart Cities, Data Fusion and its Opportunity in IoT, Stages of Data Fusion. Connected Vehicles-Introduction, Challenges, Vehicle-to-Everything (V2X) Paradigm. Smart Grid-Introduction, Benefits of Smart Grid, Smart Grid Architecture. Industrial IoT.

Case Study: Agriculture, Healthcare and Activity Monitoring.

Text/Reference Books:

1. Raj Kamal, “Internet of Things - Architecture and Design Principles” McGrawHill
2. Mayur Ramgir, “Internet of Things - Architecture, Implementation, and Security”, First Edition, Pearson Education.
3. Olivier Hersent, David Boswarthick and Omar Elloumi, “The Internet of Things: Key Applications and Protocols”, 2nd Edition, Wiley.
4. Arsheep Bahga and Vijay Madiseti “Internet of Things: A Hands-On Approach” Orient Blackswan Publishers.

MOOCs Course Mapping:

“Introduction to Internet of Things” by Prof. Sudip Misra, Department of Computer Science and Engineering, IIT Kharagpur (<https://nptel.ac.in/courses/106/105/106105166/>)

Course Objectives:

1. This course is meant to provide the knowledge to students for understanding of the various concepts, techniques and applications of Information Theory & Coding:
2. To understand channel and source coding schemes.
3. To learn baseband and bandpass sampling theorems.
4. To understand various digital modulation techniques and its applications.
5. To understand waveform coding techniques and its uses.

Course Outcomes: At the end of this course students will demonstrate the ability to:

1. Apply various channel and source coding schemes.
2. Differentiate between baseband and bandpass sampling theorems.
3. Performance evaluation of various digital modulation techniques.
4. Applications of waveform coding techniques.

UNIT-1 (15 Hrs)

Elements of Information Theory: Source coding theorem, Huffman coding, Channel coding theorem, channel capacity theorem, Shenonfano theorem, entropy

UNIT-2 (15 Hrs)

Sampling Processes: Base band and band pass sampling theorems reconstruction from samples, Practical aspects of sampling and signal recovery TDM

UNIT-3 (15 Hrs)

Waveform Coding Techniques: PCM Channel noise and error probability DPCM and DM Coding speech at low bit rates Prediction and adaptive filters. Base band shaping for data transmission, PAM signals and their power spectra Nyquist criterion ISI and eye pattern Equalization.

UNIT- 4 (15 Hrs)

Digital Modulation Techniques: Binary and M-ary modulation techniques, Coherent and non-coherent detection, Bit Vs symbol error probability and bandwidth efficiency. Bit error analysis, using orthogonal Signalling. Error Control Coding Rationale for coding Linbear block codes, cyclic codes and convolution codes Viterbi decoding algorithm and trellis codes.

Recommended Books

1. J. Dass., S.K. Malik & P.K. Chatterjee, 'Principles of Digitals Communication', Wiley-Blackwel, **1991**.
2. Vera Pless,'Introduction to the Theory of Error Correcting Codes', 3rd Edn., **1998**.
3. Robert G. Gallanger, 'Information Theory and Reliable Communication', McGraw Hill, 1992.

DIGITAL IMAGE PROCESSING

Subject Code: MECED1-122

L T P C

Duration: 60 Hrs.

4 0 0 4

Course Objectives:

1. This course is meant to provide the in depth knowledge to students for understanding of the various concepts, techniques and applications of Digital Image Processing:
2. To understand image transforms for image manipulations.
3. To learn different operations on image processing for many applications.
4. To understand the concept of image compression along with spatial and frequency domain techniques.
5. To understand various image processing applications.

Course Outcomes: At the end of this course students will demonstrate the ability to:

1. Apply various image transforms for image manipulations.
2. Deal with different operations on image processing for real time applications.
3. Understand the need for image compression and to learn the spatial and frequency domain techniques of image compression.
4. Develop various image processing applications.

UNIT I (15 Hrs)

Digital Image Fundamentals: Digital Image Processing: Definition, Fundamental Steps in Digital Image Processing, Components of an Image Processing System, Elements of visual perception – Image sampling and Quantization, Basic relationship between pixels – Basic geometric transformations - Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform – FFT – Separable Image Transforms -Walsh – Hadamard – Discrete Cosine Transform, Haar.

UNIT II (15 Hrs)

Image Enhancement Techniques: Spatial Domain methods: Basic grey level transformation, Histogram Equalization, Image Subtraction, Image averaging, Spatial filtering: Smoothing, sharpening filters – Laplacian filters, Frequency domain filters: Smoothing – Sharpening filters, Homomorphic filtering.

UNIT III (15 Hrs)

Image Restoration: Model of Image Degradation/restoration process, Noise models, Inverse filtering, least mean square filtering, Blind image restoration, Singular value decomposition.

UNIT IV (15 Hrs)

Image Compression and Segmentation: Lossless compression: Variable length coding, LZW coding, bit plane coding, Predictive coding-DPCM, Lossy Compression: Transform coding, Wavelet coding, Basics of Image compression standards: JPEG, MPEG, Edge detection, Thresholding, Region Based segmentation.

Recommended Books

1. R.C. Gonzalez and R.E. Woods, 'Digital Image Processing', Pearson Education, **2002**.
2. G.A. Baxes, 'Digital Image Processing', Indian Edn., John Wiley, **1994**.
3. R.J. Schalkoff, 'Digital Image Processing and Computer Vision', John Wiley, **1989**.
4. Sid Ahmed, 'Image Processing', McGraw Hill, **1994**.
5. William K. Pratt, 'Digital Image Processing', John Willey, **2001**.
6. Millman Sonka, Vaclav Hlavac, Roger Boyle, 'Image Processing Analysis and Machine Vision', Broos/colic, Thompson Course, **1999**.
7. A.K. Jain, 'Fundamentals of Digital Image Processing', PHI, **2002**.
8. Chanda Dutta Magundar, 'Digital Image Processing and Applications', Prentice Hall of India, **2000**.

AI & MACHINE LEARNING

Subject Code: MECED1-123

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Objectives:

1. To study the concepts of Artificial Intelligence.
2. To learn the methods of solving problems using Artificial Intelligence.
3. To introduce Image processing and NLP as application areas of AI.

Course Outcomes: At the end of the course the students will demonstrate the ability to:

1. Apply the concepts of knowledge representation, planning and reasoning for real world applications.
2. Apply AI techniques to solve complex problems of Industry using machine learning.
3. Apply AI techniques to solve problems in Image Processing and NLP.
4. Learn to use AI with complete Ethics and Follow legal considerations.

UNIT-I (15 Hrs)

Introduction to AI: Introduction to artificial intelligence, History, AI applications, Problem spaces and search, Knowledge and rationality, Heuristic search strategies, Search and optimization (gradient descent), Adversarial search, Planning and scheduling.

UNIT-II (15 Hrs)

Knowledge Representation and Reasoning: Propositional logic, First-order logic, Knowledge representation, Quantifying uncertainty, Probabilistic reasoning.

UNIT-III (15 Hrs)

Machine Learning Supervised methods: What is machine learning, Supervised vs. unsupervised learning, Regression - linear, logistic, ridge, Classification – decision trees, SVM, random forests, Model performance evaluation – MSE, lift, AUC, Type 1 vs 2 errors.

Deep Learning: Neural networks and back-propagation, Convolutional neural networks, Recurrent neural networks and Long Short-Term Memory (LSTM) networks.

Machine Learning: Unsupervised Methods, Dimensionality reduction: PCA, Clustering – k-means, hierarchical clustering, Semi-supervised methods, Reinforcement learning, Choosing among machine learning techniques.

UNIT-IV (15 Hrs)

AI and Machine learning in industry Image Processing: Introduction to computer vision, Image segmentation, Object and motion detection, Object classification.

Natural Language Understanding: Intro to natural language understanding, Application of deep learning to NLP.

Ethical and Legal Considerations in AI: Privacy, Bias, AI and the future of work, Appropriate uses of AI, Future of AI: Emerging developments.

Recommended Text Books / Reference Books:

1. Stuart Russell and Peter Norvig, “Artificial Intelligence: A Modern Approach”, 3rd Edition, Prentice Hall, 2001.
2. Goodfellow, I., Bengio, Y. and Courville A., “Deep Learning”, MIT Press, 2016.
3. Elaine Rich and Kevin Knight, “Artificial Intelligence”, Tata McGraw Hill, 2008.
4. Trivedi, M.C., “A Classical Approach to Artificial Intelligence”, Khanna Publishing House, Delhi.
5. Artificial Intelligence, George F. Luger, Pearson Education, 2001.

RESEARCH LAB.-1

Subject Code: MECES1-104

L T P C

4 0 0 4

Course Objectives

1. To acquaint the students with state-of-the-art software's related to Electronics and Communications.
2. To prepare the students to apply the software tools in experimentation, application and project.

Course Outcomes: At the end of the course the students shall demonstrate the ability of:

1. Using of various software tools available in the field of ECE pertaining to their curriculum.
2. Application of these toolboxes for developing experiments/applications/project work etc.

List of Experiments

Design and development of experiments shall cover the areas including but not restricted to:

1. Combinational Circuit Design
2. Sequential Circuit design
3. Simulation of different digital modulation techniques and calculation of BER
4. Design and testing of digital communication system through simulation
5. Problem solving through different Fuzzy based models including Mamdani & Suzeno Models
6. Simulation based design and development of Antenna in 4G/5G applications
7. Simulation based design and development of digital signal processing applications
8. Speech processing using Wavelet toolbox
9. Image processing with or without Image/Wavlet toolbox
10. Machine Learning Basics

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS

FOR

**B.TECH. COMPUTER SCIENCE & ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)**

(4 YEARS PROGRAMME)

2022 BATCH ONWARDS

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**B.TECH. CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING) SYLLABUS
2022 BATCH ONWARDS**

**GROUP-A
1ST SEMESTER**

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BPHYS1-101	Physics (Semiconductor Physics)	3	1	0	40	60	100	4
BMATH1-101	Mathematics-I (Calculus, Linear Algebra)	3	1	0	40	60	100	4
BMECE0-101	Engineering Graphics & Design	2	0	0	40	60	100	2
BELEE0-101	Basics Electrical Engineering	3	1	0	40	60	100	4
BPHYS1-102	Physics (Semiconductor Physics) Lab.	0	0	2	60	40	100	1
BMECE0-102	Engineering Graphics & Design Lab.	0	0	6	60	40	100	3
BELEE0-102	Basics Electrical Engineering Lab.	0	0	2	60	40	100	1
BMNCC0-004	Drug Abuse: Problem, Management and Prevention	2	0	0	100	0	100	0
BMNCC0-010	Universal Human values – I	22 hrs (to be completed during 21 days SIP)*			Satisfactory/ Unsatisfactory			0
ZZZZZ	Introduction to Concerned Branch of Engineering	2	0	0	100	0	100	0
Total		15	3	10	540	360	900	19

Note:

- There will be Induction Programme of 3 weeks before start of normal classes.
- Drug Abuse: Problem, Management and Prevention and Introduction to Concerned Branch of Engineering are non-credit Courses; however, it is necessary to secure atleast E grade in each of them.

* As per AICTE SIP Manual Hour Plan available at <http://fdp-si.aicte-india.org>

2ND SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BCHEM0-101	Chemistry-I	3	1	0	40	60	100	4
BMATH1-201	Mathematics-II (Probability and Statistics)	3	1	0	40	60	100	4
BHUMA0-101	English	2	0	0	40	60	100	2
BCSCE0-101	Programming for Problem Solving	3	0	0	40	60	100	3
BCHEM0-102	Chemistry-I Lab.	0	0	2	60	40	100	1
BHUMA0-102	English Lab.	0	0	2	60	40	100	1
BCSCE0-102	Programming for Problem Solving Lab.	0	0	4	60	40	100	2
BMFPR0-101	Manufacturing Practices	1	0	4	60	40	100	3
Total		12	2	12	400	400	800	20

Note:

- Marks of 4 Week Manufacturing Practices Training during Summer Vacation will be included in 3rd Semester

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(3rd SEMESTER)

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
BMATH1-301	Calculus and Ordinary Differential Equation	3	0	0	40	60	100	3
BCSES1-301	Computer Peripherals & Interfaces	3	0	0	40	60	100	3
BCSES1-302	Data structure & Algorithms	3	1	0	40	60	100	4
BCSES1-303	Digital Electronics	3	1	0	40	60	100	4
BCSES1-304	Data structure & Algorithms Laboratory	0	0	4	60	40	100	2
BCSES1-305	Digital Electronics Laboratory	0	0	2	60	40	100	1
BCSES1-306	IT Workshop (SciLab / MATLAB) Laboratory	0	0	4	60	40	100	2
BCSES1-307	Training-I*	-	-	-	60	40	100	3
BHSMC0-007	Development of Societies	3	0	0	40	60	100	3
BMNCC0-052	The Maharaja of People	2	0	0	100	-	100	0
Total 6 Theory & 3 Lab. Courses		17	2	10	540	460	1000	25

*NOTE: Training after the 2nd Semester.

(4th SEMESTER)

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
BMATH1-401	Discrete Mathematics	3	1	0	40	60	100	4
BCSES1-401	Computer Organization & Architecture	3	0	0	40	60	100	3
BCSES1-402	Operating Systems	3	1	0	40	60	100	4
BCSES1-403	Object Oriented Programming	3	1	0	40	60	100	4
BCSES1-404	Operating Systems Laboratory	0	0	2	60	40	100	1
BCSES1-405	Object Oriented Programming Laboratory	0	0	4	60	40	100	2
BHSMC0-016	Organizational Behaviour	3	0	0	40	60	100	3
BHSMC0-026	Universal Human values – II Understanding Harmony	2	1	0	40	60	100	3
Total 6 Theory & 2 Lab. Courses		17	4	06	360	440	800	24

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(5th SEMESTER)

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
BCSES2-501	Introduction To Machine Learning	3	1	0	40	60	100	4
BCSES2-502	Database Management System	3	0	0	40	60	100	3
BCSES2-503	Artificial Intelligence	3	0	0	40	60	100	3
BCSES2-504	Design & Analysis of Algorithms	3	1	0	40	60	100	4
BCSES2-505	Database Management System Laboratory	0	0	2	60	40	100	1
BCSES2-506	Machine Learning Laboratory	0	0	4	60	40	100	2
BCSES2-507	Training-II*	-	-	-	60	40	100	4
	Departmental Elective-I	3	0	0	40	60	100	3
BCSED2-511	Compiler Design							
BCSED2-512	Formal Language And Automata Theory							
BCSED2-513	Web Technologies							
BCSED2-514	Java Programming							
BHSMC0-015	Finance & Accounting	3	0	0	40	60	100	3
Total 6 Theory & 2 Lab. Courses		-	-	-	420	480	900	27

*NOTE: During the summer vacation after 4th

(6th SEMESTER)

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
BCSES2-601	Software Engineering	3	0	0	40	60	100	3
BCSES2-602	Deep Learning	3	1	0	40	60	100	4
BCSES2-603	Deep Learning Laboratory	0	0	2	60	40	100	1
BCSES2-604	***Project-I	0	0	4	60	40	100	2
	Departmental Elective-II (Select any One)	3	0	0	40	60	100	3
BCSED2-611	Mobile Application Development							
BCSED2-612	Computer Graphics							
BCSED2-613	Natural Language Processing							
BCSED2-614	Computer Networks							
	Departmental Elective-III (Select any One)	3	0	0	40	60	100	3
BCSED2-621	Data Mining							
BCSED2-622	Data and Visual analytics in AI							
BCSED2-623	Human Computer Interaction							
BCSED2-624	Embedded Systems							
XXXX	Open Elective**	3	0	0	40	60	100	3
Total 5 Theory & 2 Lab. Courses		-	-	-	320	380	700	19

** Open Elective Subject may be chosen from the list of open elective offered by other departments of university

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(7th SEMESTER)

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
BCSES2-701	* Project-II	0	0	4	60	40	100	2
BCSES2-702	***Training-III	-	-	-	60	40	100	4
	Departmental Elective-IV (Select any One)	3	0	0	40	60	100	3
BCSED2-711	Advanced ML							
BCSED2-712	Soft Computing							
BCSED2-713	Parallel Processing							
BCSED2-714	Ad-hoc & Sensor Networks							
	Departmental Elective-V (Select any One)	3	0	0	40	60	100	3
BCSED2-721	Bioinformatics							
BCSED2-722	Image processing							
BCSED2-723	Cryptography & Network Security							
BCSED2-724	Optimization Techniques in ML							
XXXX	Open Elective**	3	0	0	40	60	100	3
BMNCC0-002	Environmental Sciences	2	0	0	100	00	100	0
	Mandatory Courses- noncredit****	2	0	0	100	00	100	0
BMNCC0-001	Constitution of India							
BMNCC0-006	Essence of Indian Knowledge Tradition							
Total		-	-	-	440	260	700	15

* Open Elective Subject may be chosen from the list of open elective offered by other departments of university

**Continued from VII Semester, Project work, seminar and internship in industry or at appropriate work place

***During the summer vacation after 6th semester.

***choose any one subject from mandatory Courses.

(8th SEMESTER)

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
BCSES2-801	Project-III**	0	0	10	60	40	100	5
	Departmental Elective-VI	3	0	0	40	60	100	3
BCSED2-811	Enterprise Resource Planning							
BCSED2-812	Internet of things							
BCSED2-813	Cloud Computing							
BCSED2-814	Software Project Management							
XXXX	Open Elective*	3	0	0	40	60	100	3
XXXX	Open Elective*	3	0	0	40	60	100	3
Total		-	-	-	180	220	400	14

* Open Elective Subject may be chosen from the list of open elective offered by other departments of university

**Project III to be made by student during the semester.

**B.TECH. CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING) SYLLABUS
2022 BATCH ONWARDS**

PHYSICS (SEMICONDUCTOR PHYSICS)

Subject Code: BPHYS1-101

**L T PC
3 1 0 4**

Duration: 38Hrs.

Course Outcomes

1. Understanding of Quantum theory, Electronic Material, Semiconductors and Light-Semiconductor Interactions and Fiber Optics Communication.
2. Skill enhancement to solve numerical problems related with Quantum theory, Electronic Material, Semiconductors and Light- Semiconductor Interactions and Fiber Optics Communication.
3. Apply knowledge of Quantum theory, Electronic Material, Semiconductors and Light-Semiconductor Interactions and Fiber Optics Communication to go for higher studies in diverse fields.
4. To inculcate and develop the ability to think abstractly.

UNIT-I

Quantum Theory: (10 Hrs.)

Need and origin of Quantum Concept, Wave-particle duality, Matter waves, Group and Phase velocities, Concept of Uncertainty Principle and its application: nonexistence of electron in the nucleus, wave function & its significance, normalization of wave function, Schrodinger wave equation: time independent and dependent, Eigen functions & Eigen values, particle in a box in 1-D. Concept of scattering from a potential barrier and tunneling.

UNIT-II

Electronic Materials: (8 Hrs.)

Free electron theory, Density of states and energy band diagrams, Introduction to bandgap theory, Direct and indirect gaps. Types of electronic materials: metals, semiconductors and insulators, Occupation probability, Fermi level, Effective mass, phonons.

UNIT-III

Semiconductors and Light- Semiconductor Interactions: (12 Hrs.)

Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier- concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal-semiconductor junction (Ohmic and Schottky), Semiconductor materials of interest for optoelectronic devices. Optical transitions in bulk semiconductors: absorption, spontaneous emission, and stimulated emission; Lasers: principles and working of laser: population inversion, pumping, types of lasers with emphasis on the semiconductor Lasers.

UNIT-IV

Fibre Optics Communication: (8 Hrs.)

Introduction and importance of use of optical fibres in data transmission, optical fibre as a dielectric wave guide: total internal reflection, numerical aperture and various fibre parameters, losses associated with optical fibres, step and graded index fibres, applications of optical fibres.

Recommended Books:

1. Satyaparkash, 'Quantum Mechanics'.
2. A. Ghatak and Lokanathan, 'Quantum Mechanics'.
3. J. Singh, 'Semiconductor Optoelectronics: Physics and Technology', McGraw Hill Inc., 1995.
4. S.M. Sze, 'Semiconductor Devices: Physics and Technology', Wiley, 2008.
5. A. Yariv and P. Yeh, 'Photonics: Optical Electronics in Modern Communications', Oxford University Press, New York, 2007.
6. P. Bhattacharya, 'Semiconductor Optoelectronic Devices', Prentice Hall of India, 1997.
7. M R Shenoy, 'Online Course: Semiconductor Optoelectronics', NPTEL.
8. Monica Katiyar and Deepak Gupta, 'Online Course: Optoelectronic Materials and

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- Devices', NPTEL.
9. Ben. G. Streetman, 'Solid State Electronics Devices', Pearson PrenticeHall.

MATHEMATICS-I (CALCULUS, LINEAR ALGEBRA)

Subject Code: BMATH1-101

**L T P C
3 1 0 4**

Duration: 46Hrs.

Course Outcomes:

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

The students will learn:

1. To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.
2. The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
3. The tool of power series and Fourier series for learning advanced Engineering Mathematics.
4. To deal with functions of several variables that are essential in most branches of engineering.
5. The essential tool of matrices and linear algebra in a comprehensive manner.

UNIT-I

Calculus: (12 Hrs.)

Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminate forms and L' Hospital's rule; Maxima and minima. Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

UNIT -II

Sequences and Series: (10 Hrs.)

Convergence of sequence and series, tests for convergence (Comparison test, Ratio test, Raabe's test, Logarithmic test, Cauchy's root test, Cauchy's Integral test, series of positive and negative terms); Power series, Taylor's series, series for exponential, trigonometric and logarithm functions.

UNIT -III

Multivariable Calculus: (12 Hrs.)

Limit, continuity and partial derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence: Geometrical interpretation and basic properties, Directional derivative.

UNIT -IV

Linear Algebra: (12 Hrs.)

Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

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2022 BATCH ONWARDS**

Recommended Books:

1. G.B. Thomas and R.L. Finney, 'Calculus and Analytic Geometry', 9thEdn., Pearson, Reprint, **2002**.
2. Erwin Kreyszig, 'Advanced Engineering Mathematics', 9thEdn, John Wiley & Sons,**2006**.
3. T.Veerarajan, 'Engineering Mathematics for First Year', Tata McGraw Hill, New Delhi, **2008**.
4. B.V. Ramana, 'Higher Engineering Mathematics', 11thReprint, Tata McGraw Hill, New Delhi,**2010**.
5. D. Poole, 'Linear Algebra: A Modern Introduction', 2ndEdn., Brooks/Cole,**2005**.
6. B.S. Grewal, 'Higher Engineering Mathematics', 36thEdn., Khanna Publishers, **2010**.

ENGINEERING GRAPHICS & DESIGN

Subject Code: BMECE0-101

**L T P C
2 0 0 2**

Duration: 30 Hrs.

Course Objective

- 1 To understand the concept of Engineering drawing, Drawing instruments, Graphic standards and its application in Engineering.
- 2 To develop Skills in Preparation of Basic Drawings.
- 3 To develop Skills in Reading and Interpretation of Engineering Drawings.
- 4 Understand the concept of projection and acquire visualization skills
- 5 To prepare the student to communicate effectively.
- 6 To understand the concept of 2D and 3D drawings

Course Outcomes

- 1 Knowledge of Engineering drawing, drawing instruments and application .
- 2 Exposure to preparation of simple drawings
- 3 Inculcate the Concept of 2D and 3D and the related drawings
- 4 Exposure to creating working drawings
- 5 Exposure to improved communication and ability to visualize objects

1. Introduction

Engineering Drawing/Engineering Graphics/Technical Drawing - a Visual Science. Types of Engineering Drawing, Introduction to drawing equipment and use of instruments. Symbols and conventions in drawing Practice. Types of lines and their use, BIS codes for lines, Technical lettering as per BIS codes, Introduction to Dimensioning, Concepts of scale in drawing, Types of scales. Basic Definition of geometrical objects: Points, lines, planes and solids.

2. Theory of Projections - Relevance of projection, Type of projections, Perspective, Orthographic, Axonometric and their basic principles, System of orthographic projection: in reference to quadrants and octants, illustration through simple problems of projection.
3. Projection of Points- Projection of points in quadrants and octants. Projection of point on Auxiliary planes.
4. Projection of Lines -Parallel to both H P and V P, Parallel to one and inclined to other, and inclined to both, contained in profile plane. True length and angle orientation of straight line: rotation method and auxiliary plane method. Distance between two nonintersecting lines, and trace of line.
5. Projection of Planes- Difference between plane and lamina. Projection of lamina Parallel to one and perpendicular to other, Perpendicular to one and inclined to other, Inclined to both reference planes, and Lamina oblique to three reference planes. Application of auxiliary planes, and trace of planes.
6. Projection of Solids- Definition of solids, types of solids, and elements of solids. Projection of solids in first or third quadrant, with axis parallel to one and perpendicular to other, axis parallel to one inclined to other, axis inclined to both the principle plane, axis perpendicular to profile plane and parallel to both H P and V P. Visible and invisible details in the projection. Use rotation and auxiliary plane method to draw the projections.

**B.TECH. CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING) SYLLABUS
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7. Section of Solids Definition of Sectioning and its purpose. Procedure of Sectioning, Types of sectional planes. Illustration through examples.
8. Development of Surface Purpose of development, Parallel line, radial line and triangulation method. Development of prism, cylinder, cone and pyramid surface for both right angled and oblique solids, and development of surface of sphere.
9. Isometric Projection Classification of pictorial views, Basic Principle of Isometric projection, Difference between isometric projection and isometric drawing. Isometric projection of solids such as cube, prism, pyramid and cylinder, and assignments on isometric projection of simple machine parts.
10. Orthographic Projection Review of principle of Orthographic Projection, Sketch/drawing of blocks, and of simple machine parts.

Recommended Text/Reference Books

1. N.D. Bhatt, V.M. Panchal & P.R. Ingle, 'Engineering Drawing', Charotar Publishing House, 2014.
2. M.B. Shah & B.C. Rana, 'Engineering Drawing and Computer Graphics', Pearson Education, 2008.
3. B. Agrawal & C.M. Agrawal, 'Engineering Graphics', TMH Publication, 2012.
4. K.L. Narayana & P. Kannaiah, 'Text book on Engineering Drawing', Scitech Publishers, 2008.

BASIC ELECTRICAL ENGINEERING

Subject Code: BELEE0-101

L T PC

Duration: 42Hrs.

3 1 0 4

Course Outcomes:

1. To understand and analyze basic DC and AC circuits.
2. To study the use and working principle of single phase transformers.
3. To study the application and working principles of three phase and single phase induction motors.
4. To introduce to the components of low voltage electrical installations.

UNIT-1

DC Circuits: (8 Hrs.)

Electrical circuit elements (R, L and C), voltage and current sources, Ohm's law, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation Superposition, Thevenin and Norton Theorems. Step response of RL, RC circuits.

UNIT-2

AC Circuits: (12 Hrs.)

Representation of sinusoidal waveforms, average, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC series and parallel combinations, series and parallel resonance. Three phase voltage source, phase sequence, three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-3

Transformers: (10 Hrs.)

Magnetic materials, BH characteristics, Single-phase Transformer, no load and full load

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18. Measurement of susceptibility of a liquid or a solution by Quincke's method:
19. AFM experiment to study the sample with the nano-scale objects and measure surface topography with different scales, width and height of nano objects, and force-distance curves.
20. To study the temperature coefficient of Resistance of copper.

Physics Virtual Lab. Experiments:

21. To plot the characteristics of thermistor and hence find the temperature coefficient of resistance.
22. To determine the resistivity of semiconductors by Four Probe Method.
23. To study the forward and reverse biased characteristics of PNP and NPN transistors.
24. To study the B-H Curve.
25. To study the Hall effect experiment to determine the charge carrier density.
26. To determine the magnetic susceptibilities of paramagnetic liquids by Quincke's Method.
27. To study the phenomena of magnetic hysteresis and calculate the retentivity, coercivity and saturation magnetization of a material using a hysteresis loop tracer.
28. Verification and design of combinational logic using AND, OR, NOT, NAND and XOR gates.

Note: Any other experiment based on the above mentioned topics may be included.

ENGINEERING GRAPHICS & DESIGNLAB.

Subject Code: BMECE0-102

**L T P C
0 0 6* 3**

Duration: 45 Hrs.

Course Objective

1. To have an overview of interactive computer graphics.
2. To learn the various 2D and 3D draw commands for drawing preparation
3. To understand the use of modify commands for making of drawings
4. To learn the dimensioning of drawings
5. To understand the use of the software in different Engineering applications

Course Outcomes

- 1 Understand the basics of computer graphics
- 2 Expertise to draw 2D and 3D drawings
- 3 Ability to do editing and dimensioning of drawings
- 4 Exposure to solid modeling

1. Overview of Computer Graphics

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

2. Customization & CAD Drawing

Consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerance; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

3. Annotations, Layering & other Functions

Applying dimensions to objects, applying annotations to drawings; Setting up and use of

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Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques.

*Lab work will be performed in two parts:

- (i) **Computer Lab (2 hours)** Computer Graphics, CAD Drawing etc.
- (ii) **Drawing Hall (04 hours)** Manual practice on drawing sheets of theory content the relevant theory part of Engineering Graphics & Design may also be covered in Lab work.

MRSPTU

BASIC ELECTRICAL ENGINEERING LAB

Subject Code: BELEE0-102

L T P C

0 0 2 1

Course Outcomes:

1. Get an exposure to common electrical components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the usage of common electrical measuring instruments.
4. Understand the basic characteristics of transformers and electrical induction motors.

EXPERIMENTS/DEMONSTRATIONS

1. To study basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. real-life resistors, capacitors and inductors.
2. To verify Ohm's law.
3. To verify Kirchhoff's voltage and current laws.
4. To verify Superposition Theorem.
5. To verify Thevenin Theorem.
6. To obtain the sinusoidal steady state response of R-L circuit – impedance calculation and verification. Observation of phase differences between current and voltage.
7. To obtain the sinusoidal steady state response of R-C circuit – impedance calculation and verification. Observation of phase differences between current and voltage.
8. To study resonance phenomenon in R-L-C series circuits.
9. To perform open circuit and short circuit test on a single phase transformer and calculate the efficiency.
10. Demonstration of cut-out sections of machines: Induction machine (squirrel cage rotor and slipring arrangement) and single-phase induction machines.
11. To connect, start and reverse the direction of rotation by change of phase-sequence of connections of three phase induction motor.
12. To connect, start and reverse the direction of rotation of single-phase induction motor.
13. To demonstrate working of DOL starter for three-phase induction motor.
14. To demonstrate working of star-delta starter for three-phase induction motor.
15. To demonstrate the components of LT switchgear.

DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION

Subject Code: BMNCC0-004

L T P C

Duration: 30 Hrs.

2 0 0 0

Course Outcomes:

1. Differentiate between physical and psychological dependence of drug abuse.
2. Understanding the consequences of drug abuse.
3. Explain prevention of drug abuse.
4. Identify treatments and management of drug abuse.

UNIT-I

Meaning of Drug Abuse:

Meaning: Drug abuse, Drug dependence and Drug addiction. Nature and extent of drug abuse in India and Punjab.

UNIT-II

Consequences of Drug Abuse:

Individual: Education, Employment, Income.

Family: Violence.

Society: Crime.

Nation: Law and Order problem.

UNIT-III

Prevention of Drug Abuse:

Role of Family: Parent-child relationship, Family support, supervision, shipping values, active scrutiny.

School: Counselling, Teacher as role-model, Parent-teacher-health professional coordination, Random testing on students.

UNIT-IV

Treatment and Control of Drug Abuse:

Medical Management: Medication for treatment and to reduce withdrawal effects.

Psychological Management: Counselling, Behavioural and Cognitive therapy.

Social Management: Family, Group therapy and Environmental intervention.

Treatment: Medical, Psychological and Social Management.

Control: Role of Media and Legislation.

Recommended Books:

1. Ram Ahuja, 'Social Problems in India', Rawat Publications, Jaipur, 2003.
2. 'Extent, Pattern and Trend of Drug Use in India', Ministry of Social Justice and Empowerment, Govt. of India, 2004.
3. J.A. Inciardi, 'The Drug Crime Connection', Sage Publications, Beverly Hills, 1981.
4. T. Kapoor, 'Drug Epidemic among Indian Youth', Mittal Publications, New Delhi, 1985.
5. Kessel, Neil and Henry Walton, 'Alcoholism, Harmond Worth', Penguin Books, 1982.
6. Ishwar Modi and Shalini Modi, 'Addiction and Prevention', Rawat Publications, Jaipur, 1997.
7. 'National Household Survey of Alcohol and Drug Abuse', Clinical Epidemiological Unit, All India Institute of Medical Sciences, New Delhi, 2003 & 2004.
8. Ross Coomber and Others, 'Key Concept in Drugs and Society', Sage Publications, New Delhi, 2013.
9. BhimSain, 'Drug Addiction Alcoholism, Smoking Obscenity', Mittal Publications, New Delhi, 1991.
10. Ranvinder Singh Sandhu, 'Drug Addiction in Punjab: A Sociological Study', Guru Nanak Dev University, Amritsar, 2009.
11. Chandra Paul Singh, 'Alcohol and Dependence among Industrial Workers', Shipra, Delhi, 2000.
12. S. Sussman and S.L. Ames, 'Drug Abuse: Concepts, Prevention and Cessation', Cambridge University Press, 2008.
13. P.S. Verma, 'Punjab's Drug Problem: Contours and Characteristics', Vol. LII, No. 3, P.P. 40-43, Economic and Political Weekly, 2017.
14. 'World Drug Report', United Nations Office of Drug and Crime, **2016.**
15. 'World Drug Report', United Nations Office of Drug and Crime, **2017.**

CHEMISTRY-I

Subject Code: BCHEM0-101

**L T PC
3 1 0 4**

Duration: 42Hrs.

Course Objectives:

1. To understand the atomic and & molecular nature of various molecules
2. To understand the band structures
3. To elaborate the applications of spectroscopic techniques
4. To understand the thermodynamic functions and their applications
5. To rationalize periodic properties
6. To understand the concepts of stereochemistry and preparation of organic molecules

Course Outcomes:

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.

Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

1. Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
2. Rationalize bulk properties and processes using thermodynamic considerations.
3. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
4. Rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
5. List major chemical reactions that are used in the synthesis of molecules.

UNIT-I

1. Atomic and Molecular Structure: (12 Hrs.)

Bohr Theory of Hydrogen atom, Spectrum of H atom, Sommerfeld extension of Bohr Theory, Particle and wave nature of electron, De-Broglie equation, Aufbau principle, Compton effect, Schrodinger wave equation, Laplacian and Hamiltonian operator, Linear Combination of atomic orbitals. Molecular orbitals of diatomic molecules and Energy level diagrams of homo nuclear and hetero nuclear diatomics. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

UNIT-II

2 Spectroscopic Techniques and Applications: (8 Hrs.) Principles and selection rules of Electronic spectroscopy and Fluorescence spectroscopy along with their applications. Principles and selection rules of Vibrational and rotational spectroscopy of diatomic molecules and their Applications. Nuclear magnetic resonance up to spin-spin coupling and magnetic resonance imaging.

3. Intermolecular Forces and Potential Energy Surfaces: (4 Hrs.)

Ideal gas equation, Ionic, dipolar and van Der Waals interactions. Real gas equation. Equations of state of real gases and critical phenomena. Potential energy surfaces of H₃, and HCN

UNIT-III

4 Use of Free Energy in Chemical Equilibria: (6 Hrs.)

Ideal Solution, Non Ideal Solutions, Thermodynamic functions: energy, entropy and free energy. Numerical problems based on entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria. Thermodynamic properties of ideal solutions. Introduction to Electrochemical Corrosion and its mechanism. Use of free energy considerations in metallurgy through Ellingham diagrams.

5. Periodic Properties: (4 Hrs.)

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases principle

UNIT-IV

6 Stereochemistry: (4 Hrs.)

Representations of 3-dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis of butane. Isomerism in transitional metal compounds.

7. Organic Reactions and Synthesis of a Drug Molecule: (4 Hrs.)

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule – β lactum, Paracetamol, Chloroquine and Aspirin

Recommended Books:

1. B.H. Mahan, 'University Chemistry'.
2. M.J. Sienko and R.A. Plane 'Chemistry: Principles and Applications'.
3. C.N. Banwell, 'Fundamentals of Molecular Spectroscopy'.
4. B.L. Tembe, Kamaluddin and M.S. Krishnan, 'Engineering Chemistry (NPTEL Web-book)
5. P.W. Atkins, 'Physical Chemistry'.
6. K.P.C. Vollhardt and N.E. Schore 'Organic Chemistry: Structure and Function', 5th Edn., <http://bcs.whfreeman.com/vollhardtschore5e/default.asp>

MATHEMATICS-II (PROBABILITY AND STATISTICS)

Subject Code: BMATH1-201

**L T PC
3 1 0 4**

Duration: 40Hrs.

COURSE OBJECTIVE

Students will learn

1. Understanding Probability theory.
2. Probability distribution, bivariate distribution, conditional densities
3. Statistical analysis, correlation and regression, moment, skewness and kurtosis.
4. Statistical hypothesis about real world problem, curve fitting, small samples.

Course Outcomes (CO)

Students will be able

1. To express the concept of basic probability and its features, expected values and moments.
2. To explain the concept of continuous probability distribution and bivariate distribution
3. To describe basic statistics (moments, skewness, kurtosis, correlation and regression).
4. To explain about applied statistics and small samples.

UNIT-I

Basic Probability: (12 Hrs.)

Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Chebyshev's Inequality.

UNIT -II

Continuous Probability Distributions: (6 Hrs.)

Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities.

Bivariate Distributions: (6 Hrs.) Bivariate distributions and their properties, distribution of sums and quotients, conditional densities, Bayes' rule.

UNIT -III

Basic Statistics: (10 Hrs.)

Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation.

UNIT -IV

Applied Statistics: (8 Hrs.)

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

Small Samples: (4 Hrs.)

Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

Recommended Books:

1. E. Kreyszig, 'Advanced Engineering Mathematics', John Wiley & Sons, 2006

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2. P.G. Hoel, S.C. Port and C.J. Stone, 'Introduction to Probability Theory', Universal Book Stall, **2003**.
3. S. Ross, 'A First Course in Probability', Pearson Education India, **2002**.
4. W. Feller, 'An Introduction to Probability Theory and its Applications', Vol.-1, Wiley, **1968**.
5. B.S. Grewal, 'Higher Engineering Mathematics', Khanna Publishers, **2000**.
6. T. Veerarajan, 'Engineering Mathematics', Tata McGraw Hill, New Delhi, **2010**.

ENGLISH

Subject Code: BHUMA0-101

**L T PC
2 0 0 2**

Duration: 25Hrs.

Course Objectives:

1. Students should be able to enhance language proficiency, critical thinking and analytical skills
2. To expose the students to various spoken skills
3. To strength their professional skills
4. To maintain good linguistic competency and accuracy in grammar

Course Outcomes:

1. The students will be able to understand specific piece of information
2. Be able to express themselves in writing for social occasions
3. Be able to identify the language functions in the spoken discourse
4. Improvement of technical communication skills , such as writing reports giving presentations and effectively communicating ideas related to respective field

UNIT-I

1. Vocabulary Building:

The concept of Word Formation

Root words from foreign languages and their use in English

Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives. Synonyms, antonyms, and standard abbreviations.

UNIT-II

2. Basic Writing Skills:

Sentence Structures

Use of phrases and clauses in

sentences Importance of proper

punctuation Creating coherence

Organizing principles of paragraphs in

documents Techniques for writing precisely

UNIT-III

3. Identifying Common Errors in Writing:

Subject-verb

agreement Noun-

pronoun agreement

Misplaced modifiers

Articles

Prepositions

Redundancies

Clichés

UNIT-IV

4. Nature and Style of sensible Writing:

- Describing
- Defining
- Classifying
- Providing examples or evidence
- Writing introduction and conclusion

5. Writing

Practices:

- Comprehension
- Précis Writing
- Essay Writing

Recommended Books:

1. Michael Swan, 'Practical English Usage', OUP, 1995.
2. F.T. Wood, 'Remedial English Grammar', Macmillan, 2007.
3. William Zinsser, 'On Writing Well', Harper Resource Book, 2001.
4. Liz Hamp-Lyons and Ben Heasley, 'Study Writing', Cambridge University Press, 2006.
5. Sanjay Kumar and Pushp Lata, 'Communication Skills', Oxford University Press, 2011.
6. 'Exercises in Spoken English', Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

PROGRAMMING FOR PROBLEMSOLVING

Subject Code: BCSCE0-101

L T PC

Duration: 41Hrs.

3 0 0 3

Course Objectives:

1. To be familiarize with flow of algorithm to solve simple problems
2. To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
3. To develop modular, reusable and readable C Programs using the concepts like functions, arrays, strings, pointers and structures.

Course Outcomes:

The student will learn

1. To learn the basic terms related to programming and understand arithmetic expressions.
2. To understand the concept of arrays.
3. To implement functions and recursion.
4. To learn structure, pointers and file handling

UNIT-I

1. Introduction to Programming: (6 Hrs.)

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.). Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

2 Arithmetic Expressions and Precedence: (12Hrs.)

Conditional Branching and Loops. Writing and evaluation of conditionals and consequent branching. Iteration and loops.

UNIT-II

3 Arrays: (5 Hrs.)

Arrays (1-D, 2-D), Character arrays and Strings

4 Basic Algorithms: (5 Hrs.)

Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

UNIT-III

5. Function: (4Hrs.)

Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference

6 Recursion: (4Hrs.)

Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

UNIT-IV

7. Structure: (3 Hrs.)

Structures, Defining structures and Array of Structures. Pointers: (2Hrs.)

Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

8 File Handling: (only if time is available, otherwise should be done as part of the lab)

Recommended Text Books:

1. Byron Gottfried, 'Schaum's Outline of Programming with C', McGraw Hill.
2. E. Balaguruswamy, 'Programming in ANSI C', Tata McGraw Hill.

Recommended Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, 'The C Programming Language', Prentice Hall of India.

CHEMISTRY-I LAB

Subject Code: BCHEM0-101

L T P C

0 0 2 1

Course Objectives:

1. To learn the preparation and standardization of solutions
2. To learn the estimation of various physical properties of given liquid samples
3. To estimate various crucial parameters for water sample
4. To learn the preparation of various molecules and detection of functional groups.

Course Outcomes:

The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:

1. Estimate rate constants of reactions from concentration of reactants/products as a function of time
2. Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
3. Synthesize a small drug molecule and analyze a salt sample

Choice of 10-12 experiments from the following:

1. Preparation of a standard solution
2. Determination of surface tension and viscosity
3. Thin layer chromatography
4. Determination of total Alkalinity/ Acidity of a water sample.
5. Determination of residual chlorine in water sample
6. Estimation of total, temporary and permanent hardness of water
7. Determination of the rate constant of a reaction
8. Determination of strength of an acid conductometrically
9. Potentiometry - determination of redox potentials and emfs
10. Synthesis of apolymer
11. Saponification /acid value of anoil
12. Detection and confirmation of organic functional groups.
13. Models of spatialorientation
14. Totestthe validity of Lambert Beerlaw/ Determinationof λ_{\max} / Determination of unknown concentration of a solution.
15. Determination of the partition coefficient of a substance between two immiscible liquids
16. Adsorption of acetic acid bycharcoal
17. Synthesis of a drug – Acetaminophen, Aspirin

ENGLISH LAB.

Subject Code: BHUMA0-102

L T P C

0 0 2 1

Course Objectives:

1. To enhance LSRW Skills
2. To improve the fluency in spoken English
3. To familiarize students with the use of English in everyday situations
4. To maintain good linguistic competency and accuracy in grammar

Course Outcomes:

1. Identify common errors in spoken and written communication
2. List familiarized with English vocabulary and language proficiency
3. Improve nature and style of sensible writing.
4. Improve acquire employment and work place communication skills.

Oral Communication

(This unit involves interactive practice sessions in Language Lab.)

1. Listening Comprehension
2. Pronunciation, Intonation, Stress and Rhythm
3. Common Everyday Situations: Conversations and Dialogues
4. Communication at Workplace
5. Interviews
6. Formal Presentations

PROGRAMMING FOR PROBLEM SOLVING LAB.

Subject Code: BCSCE0-102

L T P C

0 0 4 2

Course objectives:

1. To be familiarize with flow of algorithm to solve simple problems
2. To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
3. To develop modular, reusable and readable C Programs using the concepts like functions, arrays, strings, pointers and structures.

Course Outcomes:

1. Correct syntax errors as reported by the compilers and logical errors encountered at run time
2. Develop programs by using decision making and looping constructs.
3. Implement real time applications using the concept of array, pointers, functions and structures.
4. Solve real world problems using matrices, searching and sorting

NOTE: The laboratory should be preceded or followed by a tutorial to explain the approach algorithm to be implemented for the problem given.

Tutorial 1: Problem solving using computers:

Lab1: Familiarization with programming environment

Tutorial 2: Variable types and type conversions:

Lab 2: Simple computational problems using arithmetic expressions

Tutorial 3: Branching and logical expressions:

Lab 3: Problems involving if-then-else structures

Tutorial 4: Loops, while and for loops:

Lab 4: Iterative problems e.g., sum of series

Tutorial 5: 1D Arrays: searching, sorting:

Lab 5: 1D Array manipulation

Tutorial 6: 2D arrays and Strings

Lab 6: Matrix problems, String operations

Tutorial 7: Functions, call by value:

Lab 7: Simple functions

Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical integration):

Lab 8 and 9: Programming for solving Numerical methods problems

Tutorial 10: Recursion, structure of recursive calls

Lab 10: Recursive functions

Tutorial 11: Pointers, structures and dynamic memory allocation

Lab 11: Pointers and structures

Tutorial 12: File handling:

Lab 12: File operations

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MANUFACTURING PRACTICES (THEORY & LAB)

Subject Code: BMFPR0-101

**L T PC
1 0 4 3**

Duration: 80 Hrs.

Course objectives.

- 1 Understand the operations of manufacturing methods and processes.
- 2 Perform the various manufacturing operations.
- 3 Understand the basics of advanced manufacturing methods.
4. Understanding the basics of computer numerical control machines.

Course outcomes:

After the completion of this course students will be able:-

1. To perform various metal forming operations.
2. To perform various metal cutting operations.
3. To perform various metal joining operations.
4. To write simple CNC part programming.

Lectures & Videos: (10 Hrs.)

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing Methods.
2. CNC machining, Additive manufacturing.
3. Fitting operations & power tools.
4. Sheet Metal Operations.
5. Electrical & Electronics.
6. Carpentry.
7. Plastic moulding (injection moulding, blow moulding, extrusion moulding), glasscutting.
8. Metalcasting.
9. Welding (arc welding & gas welding), brazing.

Recommended Text/Reference Books:

1. S.K. Hajra Choudhury, A.K. Hajra Choudhury and S.K. Nirjhar Roy, 'Elements of Workshop Technology', Vol.-I, **2008** and Vol.-II **2010**, Media Promoters and Publishers Pvt. Ltd., Mumbai.
2. S. Kalpakjian, Steven S. Schmid, 'Manufacturing Engineering and Technology', 4th Edn., Pearson Education India Edn., 2002.
3. Gowri P. Hariharan and A. Suresh Babu, 'Manufacturing Technology – I', Pearson, 2008.
4. Roy A. Lindberg, 'Processes and Materials of Manufacture', 4th Edn., Prentice Hall India, 1998.
5. P.N. Rao, 'Manufacturing Technology', Vol.-I and Vol.-II, Tata McGraw Hill House, 2017.

Workshop Practice: (70 Hrs.)

1. Machine shop (**10Hrs.**)
2. Fitting shop (**8Hrs.**)
3. Carpentry (**6Hrs.**)
4. Electrical & Electronics (**8 Hrs.**)
5. Welding shop (**8 Hrs. (Arc welding 4 Hrs. + Gas welding 4Hrs.)**)
6. Casting (**8Hrs.**)
7. Sheet Metal Operations (**10 Hrs.**)
8. Smithy (**6Hrs.**)
9. Plastic moulding & Glass Cutting (**6Hrs.**)
10. Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

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INTRODUCTION TO COMPUTER SCIENCE & ENGINEERING

Subject Code: BMNCC0-014

**L T PC
2 0 0 0**

Duration: 24Hrs.

Course Outcomes:

1. Basic knowledge of Computer Science and Engineering
2. Exploring Computer Science Fields and Opportunities
3. Understanding Computer Hardware and Software
4. Software Types and Operating Systems

UNIT-I

Introduction to Computer Science & Engineering, Difference between science & engineering, Applications of Computer Science & engineering.

UNIT-II

Different branches/fields of Computer Science, Scope of Computer Science in industry, self-employment etc.

UNIT-III

Introduction to Computer, parts of computer system. Difference between Hardware & software, Configuration of computer systems, Types of memory-RAM, ROM, Introduction to UPS-Online and Offline, printers etc.

UNIT-IV

Different types of Software- Application software and System Software, Types of Languages- High level and low level languages, Introduction to Operating System.

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Calculus and Ordinary Differential Equation

Subject Code- BMATH1- 301

**L T P C
3 0 0 3**

Duration – 45hrs

Course Objectives:

Students will learn

1. Basics of sequence and series and their results to check convergence.
2. Multivariable concepts and their real life problems.
3. Green's theorem, Stokes theorem, and Gauss theorem and their applications.
4. Linear, non-linear ordinary differential equations of first and higher order.

Course Outcomes (CO)

Students will be able

1. To apply concepts of convergence of sequence and series.
2. To apply Green's theorem, Stokes's theorem and Gauss's theorem in real life situations.
3. To solve linear and non-linear ordinary differential equations.
4. To solve second and higher order linear, non-linear differential equation.

COURSE CONTENT

UNIT-I (12 Hrs)

Sequences and Series: Basic concept of Convergence, tests for convergence, power series, Taylor's series, Series for exponential, trigonometric and logarithmic functions.

Multivariable Calculus: Partial derivatives, directional derivatives, total derivative, Tangent plane and normal line, Maxima, minima and saddle points, Method of Lagrange multipliers.

UNIT-II (11 Hrs)

Multiple Integration: double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables, Theorems of Green, Gauss and Stokes (without proof), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds.

UNIT-III (11 Hrs)

First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p , equations solvable for y , equations solvable for x and Clairaut's type.

UNIT-IV (11 Hrs)

Ordinary differential equations of higher orders: Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

RECOMMENDED BOOKS

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
4. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
5. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India, 2009.
6. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
7. Earl A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.

COMPUTER PERIPHERALS & INTERFACES

Subject Code- BCSES1-301

**L T P C
3 0 0 3**

Duration – 45 hrs.

COURSE OBJECTIVE

To learn the functional and operational details of various peripheral devices.

COURSE OUTCOMES

1. To be able to learn system resources, IDE & SCSI Interfaces.
2. To be able to learn different video Hardware.
3. To learn different, I/O Interfaces and Input/ Output Driver Software Aspects.
4. To be able to design and implement different peripheral devices.

COURSE CONTENT

UNIT I (12 Hrs)

SYSTEM RESOURCES: Interrupt, DMA Channel, I/O Port Addresses and resolving and resolving the conflict of resources. I/O buses- ISA, EISA, Local bus, VESA Local bus, PCI bus, PCI Express, Accelerated graphics port bus.

IDE & SCSI Interfaces: IDE origin, IDE Interface ATA standards. ATA feature, ATA RAID and SCSI RAID, SCSI Cable and pin Connector pin outs SCSI V/s IDE Advantages and limitation, SATA, SSD drives.

UNIT II (11 Hrs)

Video Hardware: Video display technologies, DVI Digital signals for CRT Monitor, LCD, LED, OLED Panels, Video adapter types, Integrated Video/ Motherboard chipset, Video RAM, Video driver and multiple Monitor, Graphic accelerators. Advanced 3D Technologies, TV Tuner and Video Capture upgrades troubleshooting Video Cards and Drivers.

UNIT III (11 Hrs)

I/O Interfaces: I/O Interfaces from USB1.0, 2.0, 3.0, lighting port, I/O Interface from serial, Parallel to SCSI converter. Testing of serial and parallel port, USB Mouse/ Keyboard Interfaces like HDMI

Input/ Output Driver software aspects: Role of device driver DOS and UNIX/ LINUX device drivers.

UNIT IV (11 Hrs)

Design & Integration of Peripheral devices to a computer system as a Case Study.

Future Trends: Detailed Analysis of recent Progress in the Peripheral devices. Some aspects of cost Performance analysis and applications of latest digital devices like WiFi-LED projectors, HDMI devices, wireless printers and other devices

RECOMMENDED BOOKS

1. Douglas V. Hall, "Microprocessors and Interfacing", Tata McGraw Hill 2006.
2. Barry B. Brey & C.R. Sarma, "The intel microprocessors," Pearson 2003.
3. P. Pal Chandhari, "Computer Organization and design" Prentice Hall of India Pvt. Ltd, 1994.
4. Del Corso, H. Kirrman, JD Nicond "Microcomputer buses & links" Academic Press 1986.

DATA STRUCTURE & ALGORITHMS

Subject Code- BCSES1-302

**L T P C
3 1 0 4**

Duration – 60hrs

COURSE OBJECTIVE

1. To impart the basic concepts of data structures, algorithms and time complexity.
2. To understand concepts about stacks and queues.
3. To understand concepts about linked lists and trees.
4. To enable them to learn and write algorithms for hashing, sorting and graphs.

COURSE OUTCOMES

1. To impart the basic concepts of data structures, algorithms and time complexity.
2. To understand concepts about stacks and queues
3. To understand concepts about linked lists and trees
4. To enable them to learn and write algorithms for hashing, sorting and graphs

COURSE CONTENT

UNIT-I (15 Hrs)

Introduction: Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. Searching: Linear Search and Binary Search Techniques and their complexity analysis.

UNIT-II (15 Hrs)

Stacks and Queues: ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation –corresponding algorithms and complexity analysis. ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.

UNIT-III (15 Hrs)

Linked Lists: Singly linked lists: Representation in memory, Algorithms of several Operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: all operations their algorithms and the complexity analysis.

Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Binary Search trees, Binary Search Tree, Tree operations on each of the trees and their algorithms with complexity analysis. Introduction to B Tree, B+ Tree and AVL Tree

UNIT-IV (15 Hrs)

Sorting and Hashing: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and comparison among all the methods, Hashing.

Graph: Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.

RECOMMENDED BOOKS:

1. "Fundamentals of Data Structures", Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer Science Press.

SUGGESTED REFERENCE BOOKS:

2. Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
3. "How to Solve it by Computer", 2nd Impression by R.G. Dromey, Pearson Education.

Digital Electronics

Subject Code- BCSES1-303

**L T P C
3 1 0 4**

Duration – 60 Hrs

COURSE OBJECTIVE

To learn the basic methods for the design of digital circuits and provide the fundamental concepts used in the design of digital systems.

COURSE OUTCOMES: At the end of this course, students will demonstrate the ability to

1. Understand working of logic families and logic gates.
2. Design and implement Combinational and Sequential logic circuits.
3. Understand the process of Analog to Digital conversion and Digital to Analog conversion.
4. Be able to use PLDs to implement the given logical problem.

COURSE CONTENT

UNIT-I (15hrs)

Fundamentals of Digital Systems and logic families: Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one's and two's complements arithmetic, codes, error detecting and correcting codes, characteristics of digital ICs, digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-state logic.

Combinational Digital Circuits: Standard representation for logic functions, K-map representation, simplification of logic functions using K-map, minimization of logical functions. Don't care conditions, Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serial adder, ALU, elementary ALU design, popular MSI chips, digital comparator, parity checker/generator, code converters, priority encoders, decoders/drivers for display devices, Q-M method of function realization.

UNIT-II (15hrs)

Sequential circuits and systems: A 1-bit memory, the circuit properties of Bistable latch, the clocked SR flip flop, J- K-T and D types flip flops, applications of flip flops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple (Asynchronous) counters, synchronous counters, counters design using flip flops, special counter IC's, asynchronous sequential counters, applications of counters.

UNIT-III (15hrs)

A/D and D/A Converters: Digital to analog converters: weighted resistor/converter, R-2R Ladder D/A converter, specifications for D/A converters, examples of D/A converter ICs, sample and hold circuit, analog to digital converters: quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, A/D converter using Voltage to frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs

UNIT-IV (15hrs)

Semiconductor memories and Programmable logic devices: Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory (RAM), content addressable memory (CAM), charge de coupled device memory (CCD), commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDs), Field Programmable Gate Array (FPGA).

RECOMMENDED BOOKS

1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.
3. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.

DATA STRUCTURE & ALGORITHMS LABORATORY

Subject Code- BCSES1-304

L T P C

0 0 4 2

COURSE OUTCOMES

1. To implementing searching algorithms and operations on stacks.
2. To enable the students to learn and implement sorting algorithms.
3. To implement operations for different types of queues.
4. To implement programs related to various types of Linked Lists.

PRACTICALS

1. Write a program for Linear search methods.
2. Write a program for Binary search methods.
3. Write a program for insertion sort, selection sort and bubble sort.
4. Write a program to implement Stack and its operation.
5. Write a program for quick sort.
6. Write a program for merge sort.
7. Write a program to implement Queue and its operation.
8. Write a program to implement Circular Queue and its operation.
9. Write a program to implement singly linked list for the following operations: Create, Display, searching, traversing and deletion.
10. Write a program to implement doubly linked list for the following operations: Create, Display, inserting, counting, searching, traversing and deletion.
11. Write a program to implement circular linked list for the following operations: Create, Display, inserting, counting, searching, traversing and deletion.

DIGITAL ELECTRONICS LABORATORY

Subject Code- BCSES1-305

L T P C

0 0 2 1

COURSE OUTCOMES

- 1 To Familiarization with Digital Trainer Kit and associated equipment.
- 2 To Study and design of TTL gates
- 3 To learn the formal procedures for the analysis and design of combinational circuits.
- 4 To learn the formal procedures for the analysis and design of sequential circuits

PRACTICALS: Implementation all experiments with help of Bread- Board.

1. Study of Logic Gates: Truth-table verification of OR, AND, NOT, XOR, NAND and NOR gates; Realization of OR, AND, NOT and XOR functions using universal gates.
2. Half Adder / Full Adder: Realization using basic and XOR gates. 13 13 Punjab Technical University B.Tech. Computer Science Engineering (CSE)
3. Half Subtractor / Full Subtractor: Realization using NAND gates.
4. 4-Bit Binary-to-Gray & Gray-to-Binary Code Converter: Realization using XOR gates.
5. 4-Bit and 8-Bit Comparator: Implementation using IC7485 magnitude comparator chips.

6. Multiplexer: Truth-table verification and realization of Half adder and Full adder using IC74153 chip.
7. Demultiplexer: Truth-table verification and realization of Half subtractor and Full subtractor using IC74139 chip.
8. Flip Flops: Truth-table verification of JK Master Slave FF, T-type and D-type FF using IC7476 chip.
9. Asynchronous Counter: Realization of 4-bit up counter and Mod-N counter using IC7490 & IC7493 chip.
10. Synchronous Counter: Realization of 4-bit up/down counter and Mod-N counter using IC74192 & IC74193 chip.
11. Shift Register: Study of shift right, SIPO, SISO, PIPO, PISO & Shift left operations using IC7495 chip.
12. DAC Operation: Study of 8-bit DAC (IC 08/0800 chip), obtain staircase waveform using IC7493 chip.
13. ADC Operations: Study of 8-bit ADC.

IT WORKSHOP (SciLab / MATLAB) LABORATORY

Subject Code- BCSES1-306

L T P C

0 0 4 2

COURSE OUTCOMES

1. Introduction to Sci Labs / MATLAB environment and types of Sci Labs / MATLAB files.
2. To be able to write programs for Matrix manipulations.
3. MATLAB code for computing factorial of a number
4. To be able to write programs using functions and plotting results

Following experiments to be conducted using Sci Labs / MATLAB

1. Introduction to Sci Labs / MATLAB environment and types of Sci Labs / MATLAB files.
2. Use of help command to get help about different inbuilt functions.
3. Write a program to show the output of various unary and binary operators.
4. Write programs for Matrix Manipulations, (reshaping matrices, expanding matrix size, appending or deleting a row/column to a matrix, concatenation of matrices).
5. Write programs which demonstrate the use special matrices.
6. Write programs to show output for various matrix and array operations.
7. Write programs for demonstrating the use for various control statements.
8. Write a MATLAB code for computing factorial of a number n. Assume n is already defined. The code should return a scalar, not a vector.
9. Write programs using functions and plot results.

*other programs related to some application area may also be done

TRAINING-1

Subject Code- BCSES1-307

**L T P C
0 0 0 3**

Duration – 4 WEEKS

Training after the 2nd Semester, students are required to be involved in Inter/ Intra Institutional Activities viz; Training with higher Institutions; Soft skill training organized by Training and Placement Cell of the respective institutions; contribution at incubation/ innovation /entrepreneurship cell of the institute; participation in conferences/ workshops/ competitions etc.; Learning at Departmental Lab/Tinkering Lab/ Institutional workshop; Working for consultancy/ research project within the institutes and Participation in all the activities of Institute's Innovation Council for eg: IPR workshop/Leadership Talks/ Idea/Design/ Innovation/ Business Completion/ Technical Expos etc.

DEVELOPMENT OF SOCIETIES

Subject Code- BHSMC0-007

**L T P C
3 0 0 3**

Duration – 45hrs

Course Outcomes

Students will be able to

- 1 Become familiar with development of different social systems, connectedness of human being with society and able to evaluate different models of social development.
- 2 Develop ideas about political system and identify discriminating features of various governing systems.
- 3 Build up knowledge about different economic systems and evaluate various ideas of economic developmental ideologies.
- 4 Understand the relationship between human and society both historically and analytically

Course objectives

To make the students

1. To Understand societal development and various societal models
2. To understand and analyze different political systems
3. To develop knowledge about economic systems and ideologies
- 4 To understand the economic development in different periods of history.

UNIT-I (15 hrs)

Social Development: Concepts behind the origin of Family, Clan and Society, Different Social Systems, Relation between Human being and Society, Comparative studies on different models of Social Structures and their evolution

UNIT-II (15 hrs)

Political Development: Ideas of Political Systems as learnt from History, Different models of Governing system and their comparative study

UNIT-III (15 hrs)

Economic Development: Birth of Capitalism, Socialism, Marxism, Concept of development in pre-British, British and post British period- Barter, Jajmani, Idea of development in current context., E. F. Schumacher's idea of development, Buddhist economics. Gandhian idea of development. Swaraj and Decentralization.

RECOMMENDED BOOKS:

TEXTBOOK:

1. 'Indian Society' by Dr S.K Jena & B.N Mohanty
2. 'Indian Society' by C.N Shankar Rao
3. 'Foundations of Political Science, Indian Constitution & Government' by Gulshan Rai, SomNathVerma& Suresh Kumar

***REFERENCE BOOKS:**

1. 'The Interpretation of Cultures: Selected Essays' by Geertz & Clifford. 1973, New York
2. 'Dictionary of Modern Sociology Hault' by Thomas Ford, ed. 1969) Totowa, New Jersey, United States: Littlefield, Adams & Co.
3. 'Sociology –In a Changing Society' by William Korblum
4. 'The Origin of Humankind' by Leakey, Richard 1996, New York Basic Books

4. OTHER SESSIONS

*TUTORIALS:

*LABORATORY:

*PROJECT: Possible projects in this course could be

- a) Interact with local communities and understand their issues.
- b) Study local cottage industry and agricultural practices. Role of engineering and specialized knowledge.
- c) Evaluation of technology in the context of its application. Social impact of technology. Environmental impact of technology. Evaluation from a holistic perspective.

THE MAHARAJA OF PEOPLE

Subject Code: BMNCC0-052

**L T P C
2 0 0 0**

Duration: 30 Hrs.

UNIT-I (8 Hrs)

The Early Life: Early life of Maharaja Ranjit Singh, First battle, Death of Father, Act of bravery, Unifying Punjab, Coronation

UNIT-II (8 Hrs)

Conquests: Jhang, Kasoor, Multan, Peshawar, Naushehra, Annexation of Peshawar into Sikh Kingdom, Jamraudh, Kashmir, Ladakh, Tibbet, Formation of State of J & K

UNIT-III (8 Hrs)

Administrative Capabilities

Administration: Central Govt., Provincial & local Govt., Financial Administration, Judicial systems, Secular State, Military System, Creation of a regular force, Organization of Army, Recruitment & Payment, Education System, Pattern of the arts, a unique portrait, Touchstone, The court of Maharaja Ranjit Singh, Europeans at Sikh Court

UNIT-IV (6 Hrs)

The Legacy: Diamond Kohinoor, Love for common Folk, A ruler much ahead of his times, Graciousness of Maharaja, True Nationalist, Maharaja's Notion of Nationalism & Secularism, the last journey, The enduring legacy of Maharaja, Secrets of popularity of Maharaja, Nature of Maharaja's polity.

Recommended Books:

1. Rajmohan Gandhi: Punjab: A History from Aurangzeb to Mountbatten, 2013.
2. Grewal, J.S.: The Sikhs of the Punjab, Cambridge University Press, 1968.
3. Khushwant Singh: A History of the Sikhs Vol. 1 1469-1839, Oxford University Press, 1963.
4. Untold story of Maharaja Ranjit Singh

DISCRETE MATHEMATICS

Subject Code- BMATH1-401

**L T P C
3 1 0 4**

Duration – 60 hrs.

COURSE OBJECTIVE

Throughout the course, students will be expected to demonstrate their understanding of Discrete Mathematics by being able to do each of the following:

1. Use mathematically correct terminology and notation.
2. Construct correct direct and indirect proofs.
3. Use division into cases in a proof.
4. Use counterexamples.
5. Apply logical reasoning to solve a variety of problems.

COURSE OUTCOMES

At the end of this course, students will demonstrate the ability to

1. For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives
2. For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference
3. For a given a mathematical problem, classify its algebraic structure
4. Evaluate Boolean functions and simplify expressions using the properties of Boolean Algebra
5. Develop the given problem as graph networks and solve with techniques of graph theory.

COURSE CONTENTS

UNIT-I (15 hrs)

Sets, Relation and Function: Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernstein theorem.

Principles of Mathematical Induction: The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic.

UNIT-II (15 hrs)

Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination.

Propositional Logic: Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. Proof Techniques: Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.

UNIT-III (15 hrs)

Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form

UNIT-IV (15 hrs)

Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring Edges, List Colouring, Perfect Graph, definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi-connected component and Articulation Points, Shortest distances.

RECOMMENDED BOOKS:

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw – Hill
2. Susanna S. Epp, Discrete Mathematics with Applications, 4th edition, Wadsworth Publishing Co. Inc.
3. Satinder Bal Gupta, Discrete Mathematics and structures, University Science Press, New Delhi.
4. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw – Hill.

SUGGESTED REFERENCE BOOKS:

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application to Computer Science", TMG Edition, TataMcgraw-Hill
2. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press. Schaum's Outlines Series, Seymour Lipschutz, Marc Lipson,
3. Discrete Mathematics, Tata McGraw - Hill

COMPUTER ORGANIZATION & ARCHITECTURE

Subject Code- BCSES1-401

L T P C

Duration – 45hrs

3 0 0 3

COURSE OBJECTIVE

To expose the students to the following:

1. How Computer Systems work & the basic principles
2. Instruction Level Architecture and Instruction Execution
3. The current state of art in memory system design
4. How I/O devices are accessed and its principles.
5. To provide the knowledge on Instruction Level Parallelism
6. To impart the knowledge on micro programming
7. Concepts of advanced pipelining techniques.

COURSE OUTCOMES

1. Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
2. Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
3. Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
4. Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU.
5. Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology

COURSE CONTENT

UNIT-I (11 hrs)

Functional blocks of a computer: CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU—registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction sets of some common CPUs.

Data representation: signed number representation, fixed and floating pointer presentations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look ahead adder etc. multiplication shift and add.

UNIT-II (12 hrs)

Introduction to x86 architecture.

CPU control unit design: hardwired and micro-programmed design approaches.

Memory system design: semiconductor memory technologies, memory organization.

UNIT-III (11 hrs)

Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers—program controlled, interrupt driven and DMA, software interrupts and exceptions. Programs and processes—role of interrupts in process state transitions.

UNIT-IV (11 hrs)

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards.

Parallel Processors: Introduction to parallel processors.

Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping, replacement algorithms.

RECOMMENDED BOOKS:

1. “Computer Organization and Design: The Hardware/Software Interface”, 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
2. “Computer Organization and Embedded Systems”, 6th Edition by Carl Hamacher, McGraw Hill Higher Education.

SUGGESTED REFERENCE BOOKS:

1. “Computer Architecture and Organization”, 3rd Edition by John P. Hayes, WCB/McGraw-Hill
2. “Computer Organization and Architecture: Designing for Performance”, 10th Edition by William Stallings, Pearson Education.
3. “Computer System Design and Architecture”, 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

OPERATING SYSTEMS

Subject Code- BCSES1-402

**L T P C
3 1 0 4**

Duration – 60hrs

COURSE OBJECTIVE

To learn the fundamentals of Operating Systems.

1. To learn the mechanisms of OS to handle processes and threads and their communication
2. To learn the mechanisms involved in memory management in contemporary OS
3. To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
4. To know the components and management aspects of concurrency management
5. To learn to implement simple OS mechanisms

COURSE OUTCOMES

At the end of this course, students will demonstrate the ability to1.

Create processes and threads.

2. Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
3. For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4. Design and implement file management system and For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

COURSE CONTENT

UNIT-I (15hrs)

Introduction: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS-Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System.

UNIT-II (16hrs)

Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching

Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, **Scheduling criteria:** CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time;

Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF.

Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer\ Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dining Philosopher Problem etc.

UNIT-III (15hrs)

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation -Hardware support for paging, Protection and sharing, Disadvantages of paging.

Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

UNIT-IV (14hrs)

File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation(linear list, hashtable), efficiency and performance.

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks

RECOMMENDED BOOKS

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.

SUGGESTED REFERENCE BOOKS:

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

OBJECT ORIENTED PROGRAMMING

Subject Code- BCSES1-403

**L T P C
3 1 0 4**

Duration – 60 hrs

COURSE OBJECTIVE

To introduce the principles and paradigms of Object Oriented Programming Language for design and implement the Object Oriented System

COURSE OUTCOME

1. To introduce the basic concepts of object oriented programming language and its representation
2. To allocate dynamic memory, access private members of class and the behavior of inheritance and its implementation.
3. To introduce polymorphism, interface design and overloading of operator.
4. To handle backup system using file, general purpose template and handling of raised exception during programming

COURSE CONTENT

UNIT-I (15hrs)

Introduction to C++, C++ Standard Library, Illustrative Simple C++ Programs. Header Files, Namespaces, Application of object oriented programming.

Object Oriented Concepts, Introduction to Objects and Object Oriented Programming, Encapsulation, Polymorphism, Overloading, Inheritance, Abstract Classes, Accessifier (public/protected/ private), Class Scope and Accessing Class Members, Controlling Access Function, Constant, Class Member, Structure and Class

UNIT-II (15hrs)

This Pointer, Dynamic Memory Allocation and Deallocation (New and Delete), Static Class Members, Constructors, parameter Constructors and Copy Constructors, Deconstructors, Introduction of inheritance, Types of Inheritance, Overriding Base Class Members in aDerived Class, Public, Protected and Private Inheritance

UNIT-III (15hrs)

Polymorphism, Pointer to Derived class, Virtual Functions, Pure Virtual Function, Abstract Base Classes, Static and Dynamic Binding

Fundamentals of Operator Overloading, Rules for Operators Overloading, Implementation of Operator Overloading Like <<, >> Unary Operators, Binary Operators.

Basics of C++ Exception Handling, Try, Throw, Catch, multiple catch, Re-throwing an Exception.

UNIT-IV (15hrs)

Text Streams and binary stream, Sequential and Random Access File, Stream Input/ Output Classes, Stream Manipulators.

Templates: Function Templates, Overloading Template Functions, Class Template, Class Templates

Introduction: design patterns, Classifications

Introduction: model- view- controller pattern

RECOMMENDED BOOKS:

4. Robert Lafore, 'Object Oriented Programming in Turbo C++', 2nd Ed., The WAITE Group Press, 1994.
5. Herbert shield, 'The complete reference C ++', 4th Ed., Tata McGraw Hill, 2003.
6. Shukla, 'Object Oriented Programming in C++', Wiley India, 2008.
7. H M Deitel and P J Deitel, 'C++ How to Program', 2nd Ed., Prentice Hall, 1998.
8. D Ravichandran, 'Programming with C++', 3rd Ed., Tata McGraw Hill, 2003.
9. Bjarne Stroustrup, 'The C++ Programming Language', 4th Ed., Addison Wesley, 2013.
10. R. S. Salaria, 'Mastering Object-Oriented Programming with C++', Salaria Publishing House, 2016.

OPERATING SYSTEMS LABORATORY

Subject Code- -BCSES1-404

L T P C

0 0 2 1

COURSE OUTCOMES

1. To be able to install various operating systems
 2. To learn commands for files and directories.
 3. To learn about background processes and commands to print something.
 4. To be able to learn shell programming.
-
1. Installation Process of various operating systems
 2. Virtualization, Installation of Virtual Machine Software and installation of Operating System on Virtual Machine
 3. Commands for files & directories: cd, ls, cp, md, rm, mkdir, rmdir. Creating and viewing files using cat. File comparisons. Disk related commands: checking disk free spaces. Processes in linux, connecting processes with pipes, background processing, managing multiple processes. Manual help. Background process: changing process priority, scheduling of processes at command, batch commands, kill, ps, who, sleep. Printing commands, grep, fgrep, find, sort, cal, banner, touch, file. File related commands ws, sat, cut, grep.
 4. Shell Programming: Basic of shell programming, various types of shell, Shell Programming in bash, conditional & looping statement, case statements, parameter passing and arguments, shell variables, shell keywords, creating shell programs for automate system tasks, report printing.

OBJECT ORIENTED PROGRAMMING USING C++ LABORATORY

Subject Code- BCSES1-405

L T P C

0 0 4 2

COURSE OUTCOMES

1. To learn the concept of classes and objects.
2. To be able to implement constructors and destructors.
3. To implement initializer list and operator overloading
4. To learn type casting and inheritance.

PRACTICALS

1. Classes and Objects- Write a program that uses a class where the member functions are defined inside a class.
2. Classes and Objects- Write a program that uses a class where the member functions are defined outside a class.
3. Classes and Objects- Write a program to demonstrate the use of static data members.
4. Classes and Objects- Write a program to demonstrate the use of const data members.
5. Constructors and Destructors- Write a program to demonstrate the use of zero argument and parameterized constructors.
6. Constructors and Destructors- Write a program to demonstrate the use of explicit constructor.
7. Initializer Lists- Write a program to demonstrate the use of initializer list.
8. Operator Overloading- Write a program to demonstrate the overloading of increment and decrement operators.
9. Operator Overloading- Write a program to demonstrate the overloading of binary arithmetic operators.
10. Typecasting- Write a program to demonstrate the typecasting of basic type to class type.
11. Typecasting- Write a program to demonstrate the typecasting of class type to basic type.
12. Typecasting- Write a program to demonstrate the typecasting of class type to class type.
13. Inheritance- Write a program to demonstrate the multilevel inheritance

ORGANIZATIONAL BEHAVIOR

Subject Code- BHSMC0-016

L T P C

Duration – 45hrs

3 0 0 3

Course Objectives: The course aims to provide an understanding of basic concepts, theories and techniques in the field of human behavior at the individual, group and organizational levels in the changing global scenario. The course must be taught using case study method.

Course Outcomes:-

1. After Studying this course the students will equip with ability to identify, explore and examine factors
2. Impinge on Individual and group behavior in organizations in the new millennium
3. Explain the terminology associated with organizational behavior
4. Incorporate and apply the predominate organization behavior theories to gain
5. knowledge of contemporary issues in organizational behavior
6. Frameworks to work with real life organizational issues concerned with human behavior at work place

UNIT-I (12Hrs)

Organizational Behaviour: Concepts, Theories and organization aspects of OB, Contributing Disciplines to OB, challenges and opportunities for OB. Foundations of Individual Behaviour: Biographical Characteristics, Course, Theories of Course, Attitudes, Attitude Change, Values & Beliefs, Prejudices Personality: Determinants of Personality, Perception, Attribution Theory, Person's Perception.

UNIT-II (11Hrs)

Motivation: Definition & Process, Early Theories of Motivation, Contemporary Theories of Motivation, Nature and process of Motivation, Application of Motivation Concept. Job Satisfaction: Nature & Significance of Job satisfaction. Leadership: Nature Significance & Theories; Leadership Effectiveness Model; Leadership Traits & Skills; Behavioural Styles in Leadership. Transactional Analysis, Life Position, Johari Window Model.

UNIT-III (11Hrs)

Foundations of Group Behaviour: Nature & Concept of Group Formation, Stages of Group Formation, Theories of Group Formation. Teams, Difference between Group and Team Group Decision Making: Meaning & Nature, Decision Making Process; Decision Making Styles; Advantages & disadvantages of Decision Making; Techniques of Decision Making; Group Size & Decision Making.

UNIT-IV (11Hrs)

Organizational Change & Development: Meaning & Definition, Change Agents, Change Models, Resistance to Change. Power and Politics in Organization: Nature & Concepts, Sources & Types of Power, Techniques of Politics. Stress Management: Meaning and Concept of Stress, Stress in Organizations

Recommended Books

1. Robbins, 'Organization Behavior', Pearson Education.
2. Luthans, 'Organization Behavior', Tata McGraw Hill.
3. Hersey, 'Management of Organizational Behavior', Prentice Hall India.
4. Aswathappa, 'Organization Behavior', Himalaya Publications.
5. L.M. Prasad, 'Organization Behavior', Sultan Chand & Sons
6. Parikh, Gupta, 'Organizational Behavior', Tata McGraw Hill

UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY

Subject Code: BHSMC0-026

**L T P C
2 1 0 3**

Duration: 45Hrs

Course Objectives

This course is intended to provide a much needed orientational input in value education to the young enquiring minds.

Course Outcomes

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

UNIT I (09 Hrs.)

Introduction to Value Education Lecture: Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity – the Basic Human Aspirations, Right Understanding, Relationship and Physical Facility, Happiness and Prosperity – Current Scenario, Method to Fulfill the Basic Human Aspirations

UNIT II (12 Hrs.)

Harmony in the Human Being: Understanding Human being as the Co-existence of the Self and the Body Lecture 8: Distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health

UNIT III (09 Hrs.)

Harmony in the Family and Society : Harmony in the Family – the Basic Unit of Human Interaction, Values in Human-to-Human Relationship, 'Trust' – the Foundational Value in Relationship, 'Respect' – as the Right Evaluation, Exploring the Feeling of Respect, Understanding Harmony in the Society, Vision for the Universal Human Order

UNIT IV (15 Hrs.)

Harmony in the Nature/Existence: Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature, Realizing Existence as Co-existence at All Levels, The Holistic Perception of Harmony in Existence

Implications of the Holistic Understanding – a Look at Professional Ethics: Natural Acceptance of Human Values, Definitiveness of (Ethical) Human Conduct, A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics, Holistic Technologies, Production Systems and Management Models- Typical Case Studies, Strategies for Transition towards Value-based Life and Profession

Suggested Readings:

Text Book and Teachers Manual

- a. The Textbook A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
- b. The Teacher's Manual Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978- 93-87034-53-2 3.2

Recommended Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff(Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J CKumarappa
8. Bharat Mein Angreji Raj - Pandit Sunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

5th
SEMESTER

INTRODUCTION TO MACHINE LEARNING

Subject Code: BCSES2-501

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Objective:

The students will understand the basics of Machine Learning. They will also learn and will be able to apply different machine learning models to various datasets.

Course Outcomes: After completion of course, students would be able to:

1. Understand basic applications and issues of Machine Learning
2. Understand the different types of datasets
3. Analyze and work with different datasets
4. Analyze various Machine Learning techniques and algorithms

Detailed Contents:

Module 1: Introduction (15 Hours)

What Is Machine Learning? How Do We Define Learning?, How Do We Evaluate Our Networks?, How Do We Learn Our Network?, What are datasets and how to handle them?, Feature sets, Dataset division: test, train and validation sets, cross validation. Applications of Machine Learning, processes involved in Machine Learning.

Module 2: Supervised learning (15 Hours)

Introduction to Machine Learning Techniques: Supervised Learning, Unsupervised Learning and Reinforcement Learning, Real life examples of Machine Learning.

Classification and Regression: K-Nearest Neighbor, Linear Regression, Logistic Regression, Support Vector Machine (SVM), Evaluation Measures: SSE, MME, R2, confusion matrix, precision, recall, F-Score, ROC-Curve.

Module 3: Unsupervised learning (15 Hours)

Introduction to clustering, Types of Clustering: Hierarchical, Agglomerative Clustering and Divisive clustering; Partitional Clustering - K-means clustering.

Module 4: Miscellaneous (15 Hours)

Dimensionality reduction techniques: PCA, LDA, ICA. Introduction to Deep Learning, Gaussian Mixture Models, Natural Language Processing, Computer Vision.

Text Books/Suggested References:

1. Introduction to Machine Learning, By Jeeva Jose, Khanna Book Publishing Co., 2020.
2. Machine Learning for Dummies, By John Paul Mueller and Luca Massaron, For Dummies, 2016.
3. Machine Learning, By Rajeev Chopra, Khanna Book Publishing Co., 2021.
4. Machine Learning: The New AI, By Ethem Alpaydin, The MIT Press, 2016.
5. Machine Learning, Tom M. Mitchell, McGraw Hill Education, 2017.
6. <https://www.udacity.com/course/intro-to-machine-learning--ud120>
7. <https://www.coursera.org/learn/machine-learning-duke>

DATABASE MANAGEMENT SYSTEM

Subject Code: BCSES2-502

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

This course will help student to understand the concepts used in database management systems. They will also help to create database using DDL and DML. They will learn to implement database security and various advanced topics will also be covered.

COURSE OUTCOMES:

1. To be able to learn different DBMS languages, data models and normalization.
2. For a given specification construct the SQL queries for Open source and Commercial DBMS-MYSQL, ORACLE, and DB2.
3. Able to learn about query processing and transaction processing system
4. Implement database security and recovery techniques.

COURSE CONTENTS:

UNIT I (11 Hrs)

Database system architecture: introduction, Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML).

Data models: Entity-relationship model, network model, relational and object oriented data models, integrity constraints.

UNIT II (11 Hrs)

Relational query languages: Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, introduction to MYSQL, ORACLE, DB2, SQL server.

Relational database design: Domain and data dependency, Normal forms, Dependency preservation, Lossless design.

UNIT III (12 Hrs)

Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.

Transaction processing: Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes,

UNIT IV (11 Hrs)

Database recovery: Introduction, log based recovery, shadow page recovery. **Database Security:** Authentication, Authorization and access control, DAC, MAC and RBAC models, introduction to SQL injection.

Advanced topics: Introduction to Object oriented, Distributed databases.

RECOMMENDED BOOKS

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F.Korth, S. Sudarshan, McGraw-Hill.
2. "Principles of Database and Knowledge – Base Systems", Vol 1 by J. D. Ullman, Computer Science Press.
3. "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education
4. "Foundations of Databases", Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley.

ARTIFICIAL INTELLIGENCE

Subject Code: BCSES2-503

L T P C

Duration: 45 Hrs.

3 0 0 3

Course Objective:

Students will learn the basic concepts and techniques of Artificial Intelligence. They should be able to develop AI algorithms for solving practical problems.

Course outcomes: After completion of course, students would be able to:

1. Understand the basic concepts and techniques of Artificial Intelligence.
2. Apply AI algorithms for solving practical problems
3. Describe human intelligence and AI and Apply basics of Fuzzy logic and neural networks.
4. Explain how intelligent system works and Explain Expert System and implementation

Detailed Contents:

Module 1: Introduction (11 Hours)

Artificial Intelligence and its applications, Artificial Intelligence Techniques, Level of models, criteria of success, Intelligent Agents, Nature of Agents, Learning Agents. AI Techniques, advantages, and limitations of AI, Impact and Examples of AI, Application domains of AI. The AI Ladder - The Journey for Adopting AI Successfully, Hotbeds of AI Innovation.

Module 2: Problem solving techniques (12 Hours)

State space search, control strategies, heuristic search, problem characteristics, production system characteristics., Hill climbing, best first search, A* search, Constraint satisfaction problem, Mean-end analysis, Min-Max Search, Alpha-Beta Pruning, Iterative Deepening. LOGIC: Propositional logic, predicate logic, Resolution, Resolution in propositional logic and predicate logic.

Module 3: Knowledge Representation schemes and reasoning (11 Hours)

Mapping between facts and representations, Approaches to knowledge representation, procedural vs declarative knowledge, Forward vs. Backward reasoning, Matching, conflict resolution, Non- monotonic reasoning, Default reasoning, statistical reasoning, fuzzy logic Weak and Strong filler structures, semantic nets, frame, conceptual dependency.

Module 4: Planning (11 Hours)

The Planning problem, planning with state space search, partial order planning, planning graphs, planning with propositional logic, Analysis of planning approaches, Hierarchical planning, conditional planning, Continuous and Multi Agent planning.

Text Books/Suggested References:

1. A Classical Approach to Artificial Intelligence, M.C. Trivedi, Khanna Book Publishing, 2019.
2. Artificial Intelligence: A modern approach by Stuart Russel, Pearson Education, 2010.
3. Artificial Intelligence by Rich and Knight, The McGraw Hill, 2017.
4. Artificial Intelligence: A new synthesis by Nils and Nilson, Elsevier, 1997.
5. Artificial Intelligence by Luger, Pearson Education, 2002.
6. Artificial Intelligence by Padhy, Oxford Press, 2005.
7. <https://www.edx.org/course/artificial-intelligence-ai>
8. <https://www.udemy.com/course/artificial-intelligence-az/>

DESIGN & ANALYSIS OF ALGORITHMS

Subject Code: BCSES2-504

L T P C

Duration: 60 Hrs.

3 1 0 4

COURSE OBJECTIVE:

1. Analyze the asymptotic performance of algorithms.
2. Write rigorous correctness proofs for algorithms.
3. Demonstrate a familiarity with major algorithms and data structures.
4. Apply important algorithmic design paradigms and methods of analysis.
5. Synthesize efficient algorithms in common engineering design situations.

COURSE OUTCOMES:

1. For a given algorithms analyze worst-case running times of algorithms based on asymptotic analysis.
2. Describe the algorithmic strategies.
3. Describe the different graph and tree traversal algorithms.
4. Describe the tractable and intractable problems.

UNIT I (15 Hrs)

Introduction: Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behaviour; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters' theorem.

UNIT II (15 Hrs)

Fundamental Algorithmic Strategies: Brute-Force, Greedy, Dynamic Programming, Branch and Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem Solving, Bin Packing, Knap Sack TSP. Heuristics –characteristics and their application domains.

UNIT III (15 Hrs)

Graph and Tree Algorithms: Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sorting, Network Flow Algorithm.

UNIT IV (15 Hrs)

Tractable and Intractable Problems: Computability of Algorithms, Computability classes –P, NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems, and Reduction techniques. Introduction to recent advancements in design and analysis of algorithms.

RECOMMENDED BOOKS:

1. Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L Rivest and Clifford Stein, MIT Press/McGraw-Hill.
2. Fundamentals of Algorithms – E. Horowitz et al.
3. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson.
4. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.
5. Algorithms—A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA.

DATABASE MANAGEMENT SYSTEM LABORATORY

Subject Code: BCSES2-505

L T P C

0 0 2 1

COURSE OBJECTIVE:

To learn the implementation of SQL queries to perform DBMS operations.

COURSE OUTCOMES:

1. To understand basic DDL, DML, DCL commands.
2. To understand the SQL queries using SQL operators and implement the database constraints.
3. To understand the concept of relational algebra and SQL functions.
4. To implement sub queries and transaction processing.

PRACTICALS:

1. Write the queries for Data Definition Language (DDL) in RDBMS.
2. Write the queries for Data Manipulation Language (DML) in RDBMS.
3. Write the queries for Data Control Language (DCL) in RDBMS.
4. Write SQL queries using logical operators
5. Write SQL queries using SQL operators
6. Write SQL query using character, number, date and group functions
7. Write SQL queries for relational algebra
8. Write SQL queries for extracting data from more than one table
9. Write SQL queries for sub queries, nested queries
10. Concepts for ROLL BACK, COMMIT & CHECK POINTS.
11. Case studies on normalization

MACHINE LEARNING LABORATORY

Subject Code: BCSES2-506

L T P C

0 0 4 2

Course Objective:

The students will understand the basics of Machine Learning. They will also learn and will be able to apply different machine learning models to various datasets.

Course Outcomes: After completion of course, students would be able to

1. Understand basic applications and issues of Machine Learning
2. Understand the different types of datasets
3. Analyze and work with different datasets
4. Analyze various Machine Learning techniques and algorithms

Practicals:

1. Python Introduction:
2. Loops and Conditions and other preliminary stuff,
3. Functions, Classes and Modules,
4. Exceptions, Database access,
5. Mathematical computing with Python packages like: numpy, Mat- plotLib, pandas Tensor Flow, Keras
6. Implement basic ML models like SVM, KNN, K-Means, Logistic Regression, Linear Regression

COMPILER DESIGN

Subject Code: BCSED2-511

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

This course will help students to understand the process involved in a compiler. This course will make student aware about the working of top down and bottom up parsers. This will help students to better understand the different phases of compilation and generation of target code for a machine.

COURSE OUTCOMES:

1. For a given grammar specification, develop the lexical analyser.
2. For a given parser specification design top-down and bottom-up parsers.
3. Use syntax directed translation schemes to develop intermediate code.
4. Learn algorithms to generate code for a target machine

UNIT I (10 Hrs)

Introduction: Phases of compilation and overview.

Lexical Analysis (scanner): Regular languages, finite automata, regular expressions, from regular expressions to finite automata, scanner generator (LEX).

UNIT II (10 Hrs)

Syntax Analysis (Parser): Context-free languages and grammars, push-down automata, LL(1) grammars and top-down parsing, operator grammars, LR(O), SLR(1), LR(1), LALR(1) grammars and bottom-up parsing, ambiguity and LR parsing, LALR(1) parser generator (YACC)

Semantic Analysis: Attribute grammars, syntax directed definition, evaluation and flow of attribute in a syntax tree. Symbol Table: Its structure, symbol attributes and management. Run-time environment: Procedure activation, parameter passing, value return, memory allocation, and scope.

UNIT III (15 Hrs)

Intermediate Code Generation: Translation of different language features, different types of intermediate forms.

Code Improvement (optimization): control-flow, data-flow dependence etc.; Code improvement local optimization, global optimization, loop optimization, peep-hole optimization etc.

UNIT IV (10 Hrs)

Target code generation: Architecture dependent code improvement: instruction scheduling, Introduction to code generation, Target Machine, Register allocation, issues in code generation, A simple code generation algorithm.

RECOMMENDED BOOKS

1. V. Aho, R. Sethi, and J. Softec, D. Ullman, 'Compilers: Principles, Techniques and Tools', 2nd Edn., Addison-Wesley, **2006**.
2. Fischer and R. LeBlanc, 'Crafting a Compiler', Benjamin Cummings, **2009**.
3. C. Fischer and R. LeBlanc, 'Crafting a Compiler in C', Benjamin Cummings, **1991**.
4. C. Holub, 'Compiler Design in C', Prentice-Hall Inc., **1993**.
5. 'Modern Compiler Implementation in C: Basic Design', Cambridge Press, **2004**.
6. 'Modern Compiler Implementation in Java: Basic Design', 2nd Edn., Cambridge Press, **2002**.
7. Fraser and Hanson. A Retargetable C, 'Compiler: Design and Implementation', Addison-Wesley, **1995**.

FORMAL LANGUAGE AND AUTOMATA THEORY

Subject Code: BCSED2-512

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

1. Develop a formal notation for strings, languages and machines.
2. Design finite automata to accept a set of strings of a language.
3. Identify the hierarchy of formal languages, grammars and machines.

COURSE OUTCOMES:

1. Design finite automata to accept a set of strings of a language.
2. Design context free grammars to generate strings of context free language.
3. Design Turing machine for accepting context sensitive languages.
4. To learn Rice's theorem.

UNIT I (11 Hrs)

Introduction: Alphabet, languages and grammars, productions and derivation, Chomsky hierarchy of languages.

Regular languages and finite automata: Regular expressions and languages, deterministic finite automata (DFA) and equivalence with regular expressions, nondeterministic finite automata (NFA) and equivalence with DFA, regular grammars and equivalence with finite automata, properties of regular languages, pumping lemma for regular languages, minimization of finite automata.

UNIT II (12 Hrs)

Context-free languages and pushdown automata: Context-free grammars (CFG) and languages (CFL), Chomsky and Greibach normal forms, nondeterministic pushdown automata (PDA) and equivalence with CFG, parse trees, ambiguity in CFG, pumping lemma for context-free languages, deterministic pushdown automata, closure properties of CFLs.

UNIT III (12 Hrs)

Context sensitive languages: Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence with CSG.

Turing machines: The basic model for Turing machines (TM), Turing-recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines, nondeterministic TMs and equivalence with deterministic TMs, unrestricted grammars and equivalence with Turing machines, TMs as enumerators.

UNIT IV (10 Hrs)

Undecidability: Church-Turing thesis, universal Turing machine, the universal and diagonalization languages, reduction between languages and Rice's theorem, undecidable problems about languages.

RECOMMENDED BOOKS

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia.
2. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson Education Asia.
3. Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer.
4. Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.
5. John Martin, Introduction to Languages and The Theory of Computation, Tata McGrawHill.

WEB TECHNOLOGIES

Subject Code: BCSED2-513

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

1. Designing the HTML pages along with style sheets
2. Familiar with client and server side scripting.
3. Able to develop a web application.
4. Students will gain the skills and project-based experience needed for entry into web application and development careers.

COURSE OUTCOMES:

1. To understand the HTML and Style Sheets
2. To have knowledge of client side scripting using JSP.
3. To understand the basics and object oriented concepts of PHP.
4. To access database using PHP programming.

UNIT – I (12 Hrs)

Introduction, History of HTML, Structure of HTML Document: Text Basics, Structure of HTML Document: Images and Multimedia, Links and webs, Document Layout, Creating Forms, Frames and Tables.

Style sheets : Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS.

UNIT – II (09 Hours)

Javascript : What is Javascript, Client side scripting, Data types, variables, operators, conditional statements, loops and repetition, array object, date object, string object, Documentobject model - Event handling.

UNIT – III (12 Hours)

Introduction to PHP, Writing PHP, Control Structures, if-else, switch, ? operator, while, do- while, for, for each, break, continue, goto, exit, arrays, functions

Introduction – Declaring a class – Objects – constructor – Destructor – Public, private, protected – Static properties and method – Inheritance

UNIT – IV (12 Hours)

Working with data, form element, Get, Post, Request, Cookies, Sessions and Access Control: Cookies - PHP and HTTP Authentication – sessions - using Auth_HTTP to Authenticate.

Working MySQL with PHP-database connectivity- usage of MYSQL commands in PHP, processing result sets of queries- handling errors-debugging and diagnostic functions- validating user input through Database layer and Application layer- formatting query output.

RECOMMENDED BOOKS:

1. PHP: The Complete Reference, “Steven Holzner”, Tata McGraw Hill.
2. Programming PHP, “Kevin Tetroi”, O' Reilly.
3. Robin Nixon, Learning PHP, MySQL, and JavaScript, Shroff/O'Reilly
4. VikramVaswani, “PHP and MySQL”, Tata McGraw-Hill, 2005
5. Marty Hall, Larry Brown, ‘Core Servlets and Java Server Pages Vol. 1: Core

**B.TECH. CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING) SYLLABUS
2022 BATCH ONWARDS**

- Technologies’, 2nd Edn., Pearson, 2003.
6. Dietel, Niet, ‘Internet and World Wide Web – How to Program’, 5th Edn., PHI/Pearson Education,2011.
 7. Wang, ‘An Introduction to web Design and Programming’, 1st Edn.,Cengage COURSE,2003.
 8. Thomas A Powell, The Complete Reference HTML & CSS, 5th Edition, Tata McGraw Hill
 9. Laura Lemay, Rafe Colburn, Jennifer Kyrnin, ‘Mastering HTML, CSS &Javascript Web Publishing’,Sams Teach Yourself.
 10. Sebesta, ‘Programming World Wide Web’, 4th Edn., Pearson, 2008

MRSPTU

JAVA PROGRAMMING

Subject Code: BCSED2-514

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

1. To learn the basic and advanced concepts of Java Programming language.
2. To experience the working environment required for programming in Java language and enhances their programming skills.

COURSE OUTCOMES:

1. To learn the basics of Java and to understand the implementation of Classes and Inheritance with respect to Java.
2. To describe the concept of handling of exceptions and multithreading.
3. To understand how to implement I/O, Applets and Graphics in Java
4. To comprehend the advanced topics of Java Programming

UNIT-I (12 Hrs)

Introduction to Java: Features of Java, difference between Java and C++, JVM, Bytecode, data types, variables, arrays, Type Conversion and Casting.

Classes and Inheritance: Class Fundamentals, methods, constructors, garbage collection, this keyword, Overloading constructors, Nested and Inner classes. Basics and types of inheritance, Method Overriding, Abstract Classes, final keyword, packages and interfaces.

UNIT-II (12 Hrs)

Exception Handling: Basics, Exception Types, uncaught exceptions, try and catch, throwing exceptions.

Introduction to Multithreading: Java thread model, thread priorities, synchronization, interthread communication, creating, suspending, resuming threads.

UNIT-III (12 Hrs)

I/O: Input/Output, reading and writing files.

Applets and Graphics: Applet basics, Applet class, Applet initialization and termination, event handling, keyboard and mouse events, AWT class, Layout managers, panels, canvases, Frame windows, drawing lines, rectangles, ellipses.

UNIT-IV (09 Hrs)

Advance Concepts: JDBC Connectivity, Introduction to Java Beans, Java Swings, Java Server Pages.

RECOMMENDED BOOKS:

1. Patrick Naughton & Herbert Schildt, 'The Complete Reference Java 2', 5th Edn., Tata McGraw Hill, 2002.
2. Balagurusamy, 'Programming in JAVA', BPB Publications, 2006.
3. Deitel and Deitel, 'Java: How to Program', 10th Edn., Pearson Education, 2014

FINANCE & ACCOUNTING

Subject Code: BHSMC0-015

L T P C

Duration: 45 Hrs.

3 0 0 3

Course Objectives:

The main aim of this course is:

1. To provide an in-depth view of the process in financial management of the firm
2. To develop knowledge on the allocation, management and funding of financial resources.
3. To improving students' understanding of the time value of money concept and the role of a financial manager in the current competitive business scenario.
4. To enhancing student's ability in dealing short-term and long term dealing with day-to-day working capital decision and raising finance.

Course Outcomes: After completing this course the students should be able to:

1. Explain the concept of fundamental financial concepts, especially time value of money.
2. Apply capital budgeting projects using traditional methods.
3. Analyze the main ways of raising capital and their respective advantages and disadvantages in different circumstances
4. Integrate the concept and apply the financial concepts to calculate ratios and do the capital budgeting.

Unit-I (12 Hrs.)

Introduction to Accounting: Meaning, Objectives, Basic Accounting Terms. Accounting Principles: Meaning and Nature, Accounting Concepts, Bases of Accounting, Nature of Accounts, Origin of Transactions Source Documents and Vouchers Accounting Equations Rules of Debit and Credit Recording of Transactions: Book of Original Entry-Journal, Ledger Posting from Journal and Ledger Balancing, Subsidiary Books

Unit-II (11 Hrs.)

Nature, Scope and Objectives of Financial Management, Profit Maximization Vs Wealth Maximization, Financial Planning, Forms of Business Organization, Role of Financial Manager. Capital Structure – Introduction, Factors Affecting Capital Structure, Liquidity Ratios. Capital Structure Theories: Net Income Approach, Net Operating Income Approach, Traditional Approach, Modigliani-Miller Model (MM).

Unit-III (11 Hrs.)

Working Capital Decision: Meaning, Nature and Scope of Working Capital - Component of Working Capital – Factors affecting Working Capital, Working Capital Strategies, Capital Budgeting Techniques: Discounted and Non-Discounted Methods (Pay Back, ARR, NPV, IRR, Benefit Cost Ratio), Long Term and Short Term Sources of Funds.

Unit-IV (11 Hrs.)

Long Term Sources of Funds: Equity share, Preference shares, Debentures, Bonds, Warrants, Venture capital and Ploughing back of profits. Short Term Sources of Funds: Commercial Paper, Certificate of Deposit, Treasury Bills.

Recommended Books

1. Brigham, "Financial Management: Text & Cases", Cengage Learning.
2. Brealy & Myres, "Principles of Corporate Finance", Tata McGraw Hill.
3. Ambrish Gupta, "Financial Accounting for Management", 2nd Edn., Pearson Education.
4. I.M. Pandey, "Financial Management", Vikas Publishers.
5. S.P. Jain and K.L. Narang, Principles of Accounting", Kalyani Publishers, New Delhi, 2004.

**6th
SEMESTER**

SOFTWARE ENGINEERING

Subject Code: BCSES2-601

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

To enable the students to learn the principles and methodologies followed to develop good software.

COURSE OUTCOMES:

1. To study how software engineering principles evolve and to analyze the various software models that can be followed to develop software.
2. To understand the software analysis and design step of software development.
3. To study coding, testing and reliability of a software.
4. To highlight the various management activities and related terms of a software.

UNIT-I (10 Hrs)

Introduction: Evolution and impact of Software engineering, Software crisis, Principles of Software Engineering, Feasibility study

Software Life Cycle Models: Waterfall, prototyping, Evolutionary, and Spiral models, Comparison of software models.

UNIT-II (11 Hrs)

Scheduling and Planning: Management Activities, Project planning and control, cost estimation, project scheduling using PERT and GANTT charts.

Requirement Analysis: Functional and Non-functional requirements, Requirements gathering, Requirements analysis and specification.

UNIT-III (14 Hrs)

Software Design: Basic principles of software design, modularity, cohesion, coupling and layering, function-oriented software design: DFD and Structure chart, object modeling using UML, Object-oriented software development, Design specifications, Design metrics, Verification and validation, User Interface design.

Coding: Coding standards and Code review techniques, Coding styles, Coding metrics. **Software Testing:** Fundamentals of testing, Types of software testing, White-box, and black-box testing, test case design techniques, mutation testing and Testing metrics.

UNIT-IV (10 Hrs)

Reliability: Software reliability metrics, reliability growth modelling.

Software Quality Management: Risk Management, Quality management, ISO and SEI CMMI, Six Sigma, Computer aided software engineering, Software maintenance, Software Configuration Management, Component-based software developments

RECOMMENDED BOOKS:

1. Pressman, „Software Engineering: A Practitioner’s Approach“, 3rd Edn., TMH, 2004
2. Flecher and Hunt, „Software Engineering and CASE: Bridging and Culture Gap“, 2000.
3. Shepperd, „Software Engineering, Metrics“, Vol.-1 (EN), McMillan, 1999.
4. Robert S. Arnold, „Software Re-engineering“, IEEE Computer Society, 1994.
5. Pankaj Jalote, „An Integrated Approach to Software Engineering“, 3rd Edn., Narosa Publishers, 2006.
6. Ghezzi, Cario, Fundamentals of Software Engineering“, 2nd Edn., PHI, 2002.

DEEP LEARNING

Subject Code: BCSES2-602

L T P C

Duration: 60 Hrs.

3 1 0 4

Course Objectives: After completion of course, students would be able to Understand the fundamentals of deep learning and the main research activities in this field.

Course Outcomes: After completion of course, students would be able to:

1. Understand the fundamentals of deep learning and the main research activities in this field
2. Remember architectures and optimization methods for deep neural network training
3. Implement, apply and test relevant learning algorithms in Tensor Flow
4. Critically evaluate the method's applicability in new contexts and construct new applications

Detailed Contents:

Module 1: Introduction (15 Hours)

History of Deep Learning, McCulloch Pitts Neuron, Multilayer Perceptrons (MLPs), Representation Power of MLPs, Sigmoid Neurons, Feed Forward Neural Networks, Back propagation

Module 2: Activation functions and parameters (15 Hours)

Gradient Descent (GD), Momentum Based GD, Nesterov Accelerated GD, Stochastic GD, Principal Component Analysis and its interpretations, Singular Value Decomposition, Parameters v/s Hyper-parameters

Module 3: Auto-encoders & Regularization (15 Hours)

Auto encoders , Regularization in auto encoders, Denoising auto encoders, Sparse auto encoders, Regularization: Bias Variance Tradeoff, L2 regularization, Early stopping, Dataset augmentation, Encoder Decoder Models, Batch Normalization

Module 4: Deep Learning Models (15 Hours)

Introduction to CNNs, Architecture, Convolution/pooling layers, CNN Applications, LeNet, AlexNet, ZF-Net, VGGNet, GoogLeNet, ResNet. Introduction to RNNs, Back propagation through time (BPTT), Vanishing and Exploding Gradients, Truncated BPTT, GRU, LSTMs. Deep Learning Applications: Image Processing, Natural Language Processing, Speech recognition, Video Analytics.

Text Books/Suggested References:

1. Ian Good fellow, Yoshua Bengio, Aaron Courville. Deep Learning, the MIT press, 2016 Bengio, Yoshua. " Learning deep architectures for AI." Foundations and trends in Machine Learning 2.1, Now Publishers, 2009
2. Deep Learning, Rajiv Chopra, Khanna Book Publishing, Delhi 2020. <https://nptel.ac.in/courses/106/106/106106184/>
3. <https://www.coursera.org/specializations/deep-learning>

DEEP LEARNING LABORATORY

Subject Code: BCSES2-603

L T P C

0 0 2 1

Course Outcomes: After completion of course, students would be able to:

1. Understand the fundamentals of deep learning and the main research activities in this field.
2. Remember architectures and optimization methods for deep neural network training.
3. Implement, apply and test relevant learning algorithms in Tensor Flow.
4. Critically evaluate the method's applicability in new contexts and construct new applications.

Laboratory/ Practicals (if any): Mention list of Practicals

1. Implementation of following deep learning algorithms in Python using Tensor Flow: ConvolutionNeural Network.
2. Implementation of following deep learning algorithms in Python using Tensor Flow: Recurrent NeuralNetwork.
3. Project work involving application of Deep Learning

MOBILE APPLICATION DEVELOPMENT

Subject Code: BCSED2-611

**L T P C
3 0 0 3**

Duration: 45 Hrs.

COURSE OBJECTIVE:

This course will help to manage mobile application data by integrating them with cloud services. This course also helps to understand different testing methodologies for mobile application.

COURSE OUTCOMES:

1. To learn application models of mobile application frameworks.
2. To learn Mobile OS architectures.
3. To be database access in different mobile OS.
4. To learn testing methodologies for mobile applications.

UNIT I (11Hrs)

Introduction to mobile devices: Introduction to Mobile Computing, Introduction to Android Development Environment, Mobile devices vs. desktop devices, ARM and intel architectures, Power management, screen resolution, Touch interfaces, Application deployment, App Store, Google play, Windows Store.

UNIT II (11 Hrs)

Mobile OS Architectures: Comparing and contrasting architectures of all three- Android, iOS and Windows, Underlying OS, Kernel structure and native level programming. Approaches to power management, Security.

UNIT III (12 Hrs)

Android/iOS/Win8 Apps: DB Access, network access, contacts/ photos/ etc. Underneath the frameworks: Native level programming on Android, Low Level programming on iOS, Windows low level APIs

Intents and services: Android intents and services, characteristics of mobile applications, Successful mobile development.

UNIT IV (11 Hrs)

Storing and Retrieving data: Synchronization and replication of mobile data, Android storing and retrieving data, working with content provider, Putting it all together: packaging and deploying, Performance best practices, Android field service app.

RECOMMENDED BOOKS:

1. Bill Philips, Chris Stewart, Brian Hardy, "Android Programming".
2. Brian Fling, "Mobile Design and Development".
3. Valentino Lee, Heather Schneidar, "Mobile applications: Architecture, Design, Development".

COMPUTER GRAPHICS

Subject Code: BCSED2-612

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

1. Understanding the fundamental graphical operations and the implementation on computer,
2. To get a glimpse of recent advances in computer graphics.
3. Understanding user interface issues that make the computer easy for the novice to use.

COURSE OUTCOME:

1. Able to learn about the basics of graphics, its applications, uses and Knowledge to draw different shapes in graphics on computer.
2. Ability to apply different 2-D and 3-D transformations on an object.
3. Learn clipping operations and various object filling techniques, different projections techniques. Various hidden surface removal.
4. Knowledge of Rendering techniques, Fractals and different colour models.

UNIT I (12 Hrs)

Introduction: Computer Graphics and its applications, Elements of a Graphics, Graphics Systems: Video Display Devices, Raster Scan Systems, Random Scan Systems, Input devices. **Basic Raster Graphics:** Scan conversion- Point plot technique, Line drawing, Circle generating and Ellipse generating algorithms.

UNIT II (11 Hrs)

Two-dimensional Geometric Transformations: Basic Transformations-Translation, Rotation and Scaling, Matrix Representation and Homogeneous Coordinates, Composite Transformations, Reflection and Shearing transformations.

Elementary 3D Graphics: Matrix Representation of 3D transformations, Plane projections and its types, Vanishing points, Specification of a 3D view.

UNIT III (11 Hrs)

Clipping: Window to viewport transformation, Clipping Operations- Point Clipping, Line Clipping, Polygon Clipping and Text Clipping.

Filling Techniques: Scan line algorithms, Boundary-fill algorithm, Flood-fill algorithm.

Visibility: Image and object precision, Hidden edge/surface removal or visible edge/surface determination techniques; z buffer algorithms, Depth sort algorithm, Scan line algorithm and Floating horizon technique.

UNIT IV (11 Hrs)

Color Models: Properties of Light, Intuitive Color Concepts, RGB Color Model, CMY Color Model, HLS and HSV Color Models, Conversion between RGB and CMY color Models, Conversion between HSV and RGB color models, Color Selection and Applications.

Advance Topics: Introduction of Rendering, Fractals, Gourard and Phong shading.

RECOMMENDED BOOKS:

1. Donald Hearn and M. Pauline Baker, 'Computer Graphics', 4th Edn., PHI/Pearson Education, **2010**.
2. Zhigand Xiang, Roy Plastock, Schaum's Outlines, 'Computer Graphics', 2nd Edn., Tata McGraw Hill, **2001**.
3. C. Foley, Van Dam, Feiner and Hughes, 'Computer Graphics Principles & Practice', 3rd Edn., Pearson Education, **2013**.
4. Roy A. Plastock, Gordon Kalley, 'Computer Graphics', 1st Edn., Schaum's Outline Series, **1986**.

NATURAL LANGUAGE PROCESSING

Subject Code: BCSED2-613

L T P C

Duration: 45 Hrs.

3 0 0 3

Course Objective:

The students should be able to study language and the tools that are available to efficiently study and analyze large collections of text. They should learn about and discuss the effects of electronic communication on our language.

Course Outcomes: After completion of course, students would be able to:

1. Understand language and the tools that are available to efficiently study and analyse large collections of text.
2. Analyze and discuss the effects of electronic communication on our language
3. Learn natural language processing with manual and automated approaches.
4. Learn computational frameworks for natural language processing.

Module 1: Introduction (10 hours)

A computational framework for natural language, description of English or an Indian language in the frame work, lexicon, algorithms and data structures for implementation of the framework, Finite state automata, the different analysis levels used for NLP (morphological, syntactic, semantic, pragmatic, Recursive and augmented transition networks. Applications like machine translations.

Module 2: Word level Semantic and syntactic analysis (10 hours)

Word Level Analysis: Semantic Analysis: Meaning Representation, Lexical Semantics, Ambiguity, Word Sense Disambiguation. Discourse Processing: cohesion, Reference Resolution, Discourse Coherence and Structure. Knowledge Representation, reasoning. Regular Expressions, Finite-State Automata, Morphological Parsing, Spelling Error Detection and correction, Words and Word classes, Part-of Speech Tagging. Syntactic Analysis: Context-free Grammar.

Module 3: Natural language generation (15 hours)

Natural Language Generation (NLG): Architecture of NLG Systems, Generation Tasks and Representations, Application of NLG. Machine Translation: Problems in Machine Translation, Characteristics of Indian Languages, Machine Translation Approaches, Translation involving Indian Languages.

Module 4: Information retrieval and lexical resources (10 hours)

Information Retrieval: Design features of Information Retrieval Systems, Classical, Non-classical, Alternative Models of Information Retrieval, valuation Lexical Resources: World Net, Frame Net, Stemmers, POS Tagger.

Text Books/Suggested References:

1. Natural Language understanding by James Allen, Pearson Education, 2002.
2. NLP: A Paninian Perspective by Akshar Bharati, Vineet Chaitanya, and Rajeev Sangal, Prentice Hall, 2016.
3. Meaning and Grammar by G. Chirchia and S. McConnell Ginet, MIT Press, 1990.
4. An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition by Daniel Jurafsky and James H. Martin, Pearson Education, 2006.
5. Natural language processing in Prolog by Gazdar, & Mellish, Addison-Wesley
6. <https://www.coursera.org/specializations/natural-language-processing>

COMPUTER NETWORKS

Subject Code: BCSED2-614

**L T P C
3 0 0 3**

Duration: 45 Hrs.

COURSE OBJECTIVE:

1. To develop an understanding of modern network architectures from a design and performance perspective.
2. To provide an opportunity to do network programming
3. To provide a WLAN measurement ideas.

COURSE OUTCOMES:

1. Explain the functions of the different layer of the OSI Protocol.
2. Draw the functional block diagram of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) describe the function of each block.
3. For a given problem related TCP/IP protocol developed the network programming.
4. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

UNIT I (10 Hrs)

Data communication Components: Representation of data and its flow Networks, Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum.

UNIT II (10 Hrs)

Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA

UNIT III (15 Hrs)

Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping –ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.

Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.

UNIT IV (10 Hrs)

Application Layer: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography.

RECOMMENDED BOOKS

1. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGraw-Hill.
2. Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall India.
3. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.
4. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.

DATA MINING

Subject Code: BCSED2-621

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

1. To cover powerful data mining techniques including clustering, association rules, and classification.
2. Web mining is also introduced.

COURSE OUTCOMES:

1. To introduce the basic concepts of Data Mining techniques.
2. To have knowledge of decision trees and algorithms used for it.
3. To learn the concept of search engines.
4. To understand web mining.

UNIT-I (12 Hrs)

Data Mining: Introduction to data mining, introduction to data warehousing, architecture of data warehouse, association rules in mining, Naive algorithm, Apriori algorithm, direct hashing and pruning (DHP), Dynamic Item set counting (DIC), Mining frequent pattern without candidate generation (FP, growth), performance evaluation of algorithms.

UNIT-II (11 Hrs)

Classification: Introduction, decision tree, tree induction algorithms – split algorithm based on information theory, split algorithm based on Gini index; naïve Bayes method; estimating predictive accuracy of classification method

UNIT-III (11 Hrs)

Cluster Analysis: Introduction, partitional methods, hierarchical methods, density based methods, dealing with large databases, cluster software; Search engines: Characteristics of Search engines, Search Engine Functionality, Search Engine Architecture, Ranking of web pages, The search engine history, Enterprise Search, Enterprise Search Engine Software.

UNIT IV (11 Hrs)

Web Data Mining: Web Terminology and Characteristics, Locality and Hierarchy in the web, Web Content Mining, Web Usage Mining, Web Structure Mining, Web mining Software.

RECOMMENDED BOOKS:

1. Carlo Verrellis, „Business Intelligence: Data Mining and Optimization for Decision Making“, 1st Edn., WILEY, 2009.
2. J. Han, M. Kamber and J. Pei, „Data Mining Concepts and Techniques“, 3rd Edn., Morgan Kaufmann Publishers, 2011.
3. V. Pudi, P.R. Krishana, „Data Mining“, 1st Edn., Oxford University Press, 2009.
4. P. Adriaans, D. Zantinge, „Data Mining“, 1st Edn., Pearson Education Press, 1996.
5. P. Pooniah, „Data Warehousing Fundamentals“, 1st Edn., Willey Interscience Publication, 2001.

DATA AND VISUAL ANALYTICS IN AI

Subject Code: BCSED2-622

L T P C

Duration: 45 Hrs.

3 0 0 3

Course Objective:

The student will be able to understand techniques and algorithms for creating effective visualizations based on principles from graphic design. They will also be introduced to several industry-standard software tools to create a compelling and interactive visualization of various types of data.

Course Outcomes: After completion of course, students would be able to:

1. Understand the key techniques and theory used in visualization, including data models, graphical perception, and techniques for visual encoding and interaction.
2. Apply knowledge to a number of common data domains and corresponding analysis tasks, including multivariate data, networks, text, and cartography.
3. Describe big data and use cases from selected business domains.
4. Explain No SQL big data management and other technologies such as Hadoop and HDFS

Module 1: Introduction (11 hours)

Data for Graphics, Design principles, Value for visualization, Categorical, time series, and statistical data graphics, Introduction to Visualization Tools

Module 2: Graphics Pipeline and Aesthetics and Perception (11 hours)

Introduction, Primitives: vertices, edges, triangles, Model transforms: translations, rotations, scaling, View transform, Perspective transform, window transform, Graphical Perception Theory, Experimentation, and the Application, Graphical Integrity, Layering and Separation, Color and Information, Using Space

Module 3: Visualization Design (12 hours)

Visual Display of Quantitative Information, Data-Ink Maximization, Graphical Design, Exploratory Data Analysis, Heat Map. Multidimensional Data and Interaction: Query, Analysis and Visualization of Multi-Dimensional Relational Databases, Interactive Exploration, Tsne , Interactive Dynamics for Visual Analysis, Visual Queries, Finding Patterns in Time Series Data, Trend visualization, Animation, Dashboard, Visual Storytelling

Module 4: Collaboration (11 hours)

Graph Visualization and Navigation, Online Social Networks, Social Data Analysis, Collaborative Visual Analytics, Text, Map, Geospatial data

Text Books/Suggested References:

1. The Visual Display of Quantitative Information by E. Tufte, Graphics Press, 2nd Edition, 2001
2. Beginner's Guide for Data Analysis using R Programming, Jeeva Jose, Khanna Publishing 2019.
3. Data Visualization Handbook by J. Koponen, J. Hildén, CRC Press, 2019.
4. The Book of Trees: Visualizing Branches of Knowledge by M. Lima, Princeton Architectural Press, 2014.
5. Handbook of Graph Drawing and Visualization by R. Tamassia, CRC Press, 2013
6. Interactive Data Visualization for the Web by S. Murray O'Reilly Press, 2nd Edition, 2017.

HUMAN COMPUTER INTERACTION

Subject Code: BCSED2-623

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

1. Describe and apply core theories, models and methodologies from the field of HCI
2. Discuss current research in the field of HCI

COURSE OUTCOMES:

1. To have knowledge of task centred systems design.
2. Understand the fundamental aspects of designing and evaluating interfaces
3. To understand different design principles.
4. To learn different HCI design standards.

Unit-I (11 Hrs)

Introduction, Task-centred system design, User-centred design and prototyping: Human-Computer Interaction. Task-centred system design: Task-centered process, development of task examples, evaluation of designs through a task-centered walk-through.

User-centred design and prototyping: Assumptions, participatory design, methods for involving the user, prototyping, low fidelity prototypes, medium fidelity

UNIT- II (12 Hrs)

Methods for evaluation of interfaces with users and Psychology of everyday things: Goals of evaluation, approaches, ethics, introspection, extracting the conceptual model, direct observation, constructive interaction, interviews and questionnaires, continuous evaluation via user feedback and field studies, choosing an evaluation method.

Psychology of everyday things: Psychopathology of everyday things, examples, concepts for designing everyday things. Beyond screen design: characteristics of good representations, information visualization, Tufte's guidelines, visual variables, metaphors, direct manipulation.

UNIT III (11 Hrs)

Graphical screen design, Design principles and usability heuristics: Graphical design concepts, components of visible language, graphical design by grids. Design principles and usability heuristics: Design principles, principles to support usability, golden rules and heuristics, HCI patterns

UNIT IV (11 Hrs)

HCI design standards, Past and future of HCI: Process-oriented standards, product-oriented standards, strengths and limitations of HCI Standards. Past and future of HCI: The past, present and future, perceptual interfaces, context-awareness and perception

Recommended Books

1. Dix A., Finlay J., Abowd G. D. and Beale R., Human Computer Interaction, Pearson Education, 3rd edition, 2005.
2. Preece J., Rogers Y., Sharp H., Baniyon D., Holland S. and Carey T. Human Computer Interaction, Addison Wesley, 1st edition, 1994.

EMBEDDED SYSTEMS

Subject Code: BCSED2-624

**L T P C
3 0 0 3**

Duration: 45 Hrs.

COURSE OBJECTIVE:

This course helps to understand the basic concepts of embedded systems.

COURSE OUTCOMES:

1. To learn specifications and analysis of embedded systems.
2. To estimate hardware and software costs.
3. To learn arm programming instruction set.
4. To learn IDE.

Unit-I (11 Hrs)

Introduction: Specifications and analysis of embedded systems, interface to the real time operating systems, verification of embedded systems like formal verification, co simulation

Unit-II (11 Hrs)

Estimation of hardware and software costs, partitioning, synthesis (hardware, software, memory, bus), retargetable usage of the software, specification and verification of the OS schedules, hard and soft realtime operating systems, and fault tolerant systems.

Unit-III (11 Hrs)

Arm Programming Instructions Instruction Set: Data processing instructions, Addressing modes, Load Store Instructions, PSR (Program Status Register) Instructions, Conditional Instructions, Interrupt Instructions

Unit-IV (12 Hrs)

C Programming Integrated Development Environment (IDE) for C/C++ Programming, C/C++ Programs using Function Calls, Pointers, Structures, Integers & Floating Point Arithmetic, Assembly Code using Instruction Scheduling, Register Allocation, Conditional Execution & Loops

Recommended Books:

1. Andrew N. Sloss, Dominic Symes, Chris Wright, John Rayfield, —ARM System Developer's Guide Designing and Optimizing System Software, Elsevier 2008.
2. Brooks, Cole, —Embedded Microcontroller Systems, Real Time Interfacing, Thomson Learning 1999
3. Steve Furber, —ARM system on Chip Architecture, Addison Wesley
4. Trevor Martin, —The Insider's Guide to The Philips ARM7 - Based Microcontrollers, An Engineer's Introduction To The LPC2100 Series, Hitex Ltd.

7th
SEMESTER

ADVANCED MACHINE LEARNING

Subject Code: BCSED2-711

L T P C

Duration: 45 Hrs.

3 0 0 3

Course Objective:

To introduce advanced concepts and methods of machine learning and to develop an understanding of the role of machine learning in massive scale automation. To design and implement various machine learning algorithms in a range of real-world applications.

Course Outcomes: After completion of course, students would be able to:

1. Understand advanced concepts and methods of machine learning and to develop an understanding of the role of machine learning in massive scale automation.
2. Apply various machine learning algorithms in a range of real-world applications.
3. Integrate and apply their expertise to produce solutions for real-world problems.
4. Interpret and Analyze results with reasoning using different ML techniques

Unit I (13 Hrs)

Artificial Neural Network

Introduction to ANN, Perceptron, Cost Function, Gradient Checking, multi-layer perceptron and back propagation algorithm that is used to help learn parameters for a neural network, Random Initialization

UNIT II (12 Hrs)

Bayesian Learning and Decision Trees

Probability theory and Bayes rule, Naive Bayes learning algorithm, Bayes nets.

Representing concepts as decision trees, Recursive induction of decision trees, best splitting attribute: entropy and information gain. Searching for simple trees and computational complexity, Over fitting, noisy data, and pruning.

UNIT III (15 Hrs)

Reinforcement Learning

Reinforcement learning through feedback network, function approximation.

UNIT IV (15 Hrs)

Ensemble Methods

Bagging, boosting, stacking and learning with ensembles. Random Forest

Text Books/Suggested References:

1. Tom Mitchell, Machine Learning, McGraw Hill, 1997.
2. Jeeva Jose, Introduction to Machine Learning, Khanna Book Publishing 2020.
3. Rajiv Chopra, Machine Learning, Khanna Book Publishing 2021
4. Ethem Apaydin, Introduction to Machine Learning, 2e. The MIT Press, 2010.
5. Kevin P. Murphy, Machine Learning: a Probabilistic Perspective, The MIT Press, 2012.
6. <https://www.coursera.org/learn/bayesian-methods-in-machine-learning?specialization=aml>

SOFT COMPUTING

Subject Code: BCSED2-712

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

1. To introduce soft computing concepts and techniques and foster their abilities in designing appropriate technique for a given scenario.
2. To implement soft computing based solutions for real-world problems.

COURSE OUTCOMES:

1. Identify and describe soft computing techniques and their roles in building intelligent machines
2. To have knowledge of neural networks-I
3. To have knowledge of neural networks-II.
4. To learn the concepts of genetic algorithms.

UNIT-I (12 Hrs.)

Introduction to Soft Computing and Neural Networks: Introduction to soft computing, soft computing constituents, difference between soft computing and hard computing, Applications of Soft Computing.

Fuzzy Logic: Basic Concepts, Fuzzy Sets and Operations, Properties of Fuzzy Sets, Fuzzy Relations, Membership Functions, Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Defuzzification methods, Industrial applications.

UNIT-II (10 Hrs.)

Neural Networks-I: (Introduction & Architecture): Biological Neuron, Machine Learning Using Neural Network, Artificial Neuron and its model, activation functions, Supervised, unsupervised and reinforcement Learning, feed forward networks and feedback networks, learning rules – Hebbian, Delta, Perceptron learning and Windrow-Hoff, winner-take-all.

UNIT-III (12 Hrs.)

Neural Networks-II: Supervised learning- Perceptron learning, single layer/multilayer perceptron, linear separability, hidden layers, back propagation algorithm, Radial Basis Function network; Unsupervised learning - Kohonen, SOM, k-means clustering, Adaptive Resonance Theory (ART), Application of neural networks.

UNIT-IV (11 Hrs.)

Genetic Algorithms: Concept of Introduction to Genetic Algorithms (GA), GA operators: Encoding, Crossover, Selection, Mutation, Fitness function, population, Simple GA (SGA), other types of GA, Applications of GA.

Recommended Books:

1. Jyh: Shing Roger Jang, Chuen:Tsai Sun, EijiMizutani, „Neuro: Fuzzy and Soft Computing17“, Prentice-Hall of India, 2003.
2. George J. Klir and Bo Yuan, „Fuzzy Sets and Fuzzy Logic: Theory and Applications 17“, Prentice Hall, 1995.
3. MATLAB Toolkit Manual

PARALLEL PROCESSING

Subject Code: BCSED2-713

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

Students will have skills in RISC as well as CISC architectures and can design or analyses different problems associated with this domain.

COURSE OUTCOMES:

1. Design and analyze the parallel algorithms for real world problems and implement them on available parallel computer systems.
2. To implement basic communication operations.
3. To implement various threads.
4. To learn different sorting algorithms.

Unit-I (12 Hrs.)

Introduction: Implicit parallelism, Limitations of memory system performance, control structure, communication model, physical organization, and communication costs of parallel platforms, Routing mechanisms for interconnection networks, Mapping techniques.

Parallel algorithm design: Preliminaries, decomposition techniques, tasks and interactions, mapping techniques for load balancing, methods for reducing interaction overheads, parallel algorithm models.

UNIT- II (11 Hrs.)

Basic communication operations: Meaning of all-to-all, all-reduce, scatter, gather, circular shift and splitting routing messages in parts.

Analytical modeling of parallel programs: sources of overhead, performance metrics, the effect of granularity on performance, scalability of parallel systems, minimum execution time, minimum cost-optimal execution time, asymptotic analysis of parallel programs.

UNIT III (11 Hrs.)

Programming using message passing paradigm: Principles, building blocks, MPI, Topologies and embedding, Overlapping communication and computation, collective communication operations, Groups and communicators

Programming shared address space platforms: Threads, POSIX threads, Synchronization primitives, attributes of threads, mutex and condition variables, Composite synchronization constructs, Open MP Threading Building blocks; An Overview of Memory Allocators, An overview of Intel Threading building blocks.

UNIT IV (11 Hrs.)

Dense Matrix Algorithms: matrix vector multiplication, matrix-matrix multiplication, solving system of linear equations.

Sorting: Sorting networks, Bubble sort, Quick sort, Bucket sort and other sorting algorithms
Graph algorithms: Minimum spanning tree, single source shortest paths, all-pairs shortest paths, Transitive closure, connected components, algorithms for sparse graphs.

Recommended Books

1. Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar: Introduction to Parallel Computing, Second Edition Pearson Education – 2007
2. Michael J. Quinn (2004), Parallel Programming in C with MPI and Open MP McGraw-Hill International Editions, Computer Science Series.

AD-HOC & SENSOR NETWORKS

Subject Code: BCSED2-714

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

This course will help to learn the concepts of ad-hoc and sensor networks.

COURSE OUTCOMES:

1. To be able to learn wireless technologies.
2. To be able to learn different protocols for ad-hoc networks.
3. To learn different routing algorithms used for ad-hoc networks.
4. To learn how to synchronize network nodes.

COURSE CONTENTS:

UNIT I (12 Hrs)

Introduction: Elements of Ad hoc Wireless Networks, Issues in Ad hoc wireless networks, Example commercial applications of Ad hoc networking. Cellular architecture, co-channel interference, frequency reuse, capacity increase by cell splitting, handoff, types of handoffs, Mobile IP, Cellular IP.

Introduction to Wireless sensor networks, Single-sink single-hop WSN, Single-sink multi-hop WSN, Multi-sink multi-hop WSN, Advantages of ad-hoc/sensor networks, Node and Network Architectures of WSN.

UNIT-II (12 Hrs)

MAC protocols for Ad hoc Networks: Design issues, Classifications, Contention based protocols, MACAW, FAMA, BTMA, DBTMA, MACABI, Real-Time MAC protocol, Multichannel protocols, Power aware MAC

MAC protocols in WSN: Scheduled protocols, LEACH IEEE 802.15.4 MAC protocol, Guo protocol, TRAMA protocol, Contention-based protocols, Zhong protocol, DMAC protocol, PAMAS protocol, SMAC protocol.

UNIT-III (09 Hrs)

Routing protocols in Ad hoc Networks: Design issues, Table-driven protocols - DSDV, WRP, CGSR, On-Demand protocols - DSR, AODV, TORA, LAR, ABR, Zone Routing Protocol, ZRP, ZHLS, Power Aware Routing protocols.

UNIT-IV (12 Hrs)

Routing protocols in WSN: Issues in designing routing protocols, Classification of routing protocols, Flat routing, Flooding and gossiping, SPIN protocol, PEGASIS protocol, TEEN protocol, MECN protocol, SPAN protocol, Location-based routing protocols, GAF protocol, GEAR protocol,

Introduction to Technologies for WSNs: ZigBee technology, Ultrawide bandwidth technology, Bluetooth technology, Comparison among technologies.

RECOMMENDED BOOKS:

1. Roberto Verdone, Davide Dardari, Gianluca Mazzini and Andrea Conti, "Wireless Sensor and Actuator Networks: Technologies, Analysis and Design", Academic Press, 2008.
2. Miguel A. Labrador and Pedro M. Wightman, "Topology Control in Wireless Sensor Networks- with a companion simulation tool for teaching and research", Springer Science, 2009.

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3. Edgar H. Callaway, “Wireless Sensor Networks: Architectures and Protocols”, CRC Press, 2004.
4. Xian-Yang Li, “Wireless Ad Hoc and Sensor Networks: Theory and Applications”, Cambridge University Press 2008.
5. Feng Zhao and Leonidas J. Guibas, “Wireless Sensor Networks: An Information Processing Approach”, Morgan Kaufmann Publishers, 2008.
6. C. Siva Ram Murthy and B. S. Manoj, Ad Hoc Wireless Networks: Architectures and Protocols”, Pearson Education, 2007.
7. C.K. Toh, Ad Hoc Mobile Wireless Networks: Protocols and Systems”, Pearson Education, 2007.

MRSPTU

BIOINFORMATICS

Subject Code: BCSED2-721

**L T P C
3 0 0 3**

Duration: 45 Hrs.

COURSE OBJECTIVE:

The main objective of this course is to make student able to understand the basic concepts of bioinformatics and also give knowledge about the algorithms used in bioinformatics.

COURSE OUTCOMES:

1. To learn basic concepts of bioinformatics.
2. To learn different motif models.
3. To learn the concept of genomics.
4. To analyse DNA data.

COURSE CONTENTS:

UNIT- I (12 Hrs.)

Introduction: Sequence similarity, homology, and alignment.

Pairwise alignment: scoring model, dynamic programming algorithms, heuristic alignment, and pairwise alignment using Hidden Markov Models.

UNIT – II (12 Hrs.)

Multiple alignment: scoring model, local alignment gapped and ungapped global alignment.

Motif finding: motif models, finding occurrence of known sites, discovering new sites.

UNIT – III (09 Hrs.)

Genomics and Structural Genomics: Genes, genomes, Gene cloning, mapping and DNA sequencing.

UNIT – IV (12 Hrs.)

Analysis of DNA microarray data: using hierarchical clustering, model-based clustering, expectation-maximization clustering, Bayesian model selection.

RECOMMENDED BOOKS:

1. Matthias Dehmer, Frank Emmert-Streib, Analysis of Microarray Data: A Network-Based Approach.
2. JinXiong, Essential Bioinformatics.
3. Teresa Attwood, David Parry-Smith, Introduction to Bioinformatics.
4. Pierre Baldi, G. Wesley Hatfield, DNA Microarrays and Gene Expression: From Experiments to Data Analysis and Modelling.

IMAGE PROCESSING

Subject Code: BCSED2-722

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

This course will help to understand the different techniques used for image processing.

COURSE OUTCOMES:

1. To give introduction of image processing.
2. To understand image enhancement.
3. To have knowledge of image Compression Redundancy models
4. To have knowledge of Image Segmentation.

Unit-I (14 Hrs.)

Digital Image Fundamentals: Simple image model, sampling and quantization, imaging geometry, digital geometry, different types of digital images, image formation, Elements of Storage, Relationships between pixels-neighbours of pixel, application of image Processing.

Bilevel Image Processing: Digital distance, distance transform, medial axis transform, component labeling, thinning, morphological processing, extension to grey scale morphology.

Unit-II (12 Hrs.)

Image Enhancement: Point processing, spatial filtering, frequency domain methods, multi-spectral image enhancement, image restoration.

Color Image Processing: Color representation, laws of color matching, chromaticity diagram, color enhancement, color image segmentation, color edge detection.

Unit-III (09 Hrs.)

Image Compression Redundancy models, error free compression, Lossy compression, Image compression standards.

Unit-IV (10 Hrs.)

Image Segmentation Detection of Discontinuity, Edge detection, Boundary detection, Thresholding, Regional oriented segmentation, use of motion in segmentation.

RECOMMENDED BOOKS:

1. Digital Image Processing - by Rafael Gonzalez and Richard E. Woods, Pearson Education Society.
2. Digital Image Processing - by Kenneth R Castleman, Pearson Education Society.
3. A. K. Jain, —Fundamental of Digital Image Processing, PHI

CRYPTOGRAPHY & NETWORK SECURITY

Subject Code: BCSED2-723

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

The main objective of this course is to make student able to understand the basic concepts, services, threats and principles in network security, various security services and mechanisms in the network protocol stack.

COURSE OUTCOMES:

1. To understand security trends.
2. To implement various cryptographic algorithms.
3. To implement public key cryptography.
4. To implement IP Security.

COURSE CONTENTS:

UNIT-I (12 Hrs.)

Security trends, Attacks and services, Classical crypto systems, Different types of ciphers, LFSR sequences, Basic Number theory, Congruence, Chinese Remainder theorem, Modular exponentiation, Fermat and Euler's theorem, Legendre and Jacobi symbols, Finite fields, continued fractions.

UNIT-II (09 Hrs.)

Simple DES, Differential crypto analysis, DES – Modes of operation, Triple DES, AES, RC4, RSA, Attacks – Primality test – factoring.

UNIT-III (12 Hrs.)

Discrete Logarithms, Computing discrete logs, Diffie-Hellman key exchange, El Gamal Public key cryptosystems, Hash functions, Secure Hash, Birthday attacks, MD5, Digital signatures, RSA, ElGamal DSA.

UNIT-IV (12 Hrs.)

Authentication applications – Kerberos, X.509, PKI – Electronic Mail security – PGP, S/MIME – IP security – Web Security – SSL, TLS, SET. Intruders, Malicious software, viruses and related threats, Firewalls, Security Standards.

RECOMMENDED BOOKS:

1. Wade Trappe, Lawrence C Washington, „Introduction to Cryptography with Coding Theory“, 2nd Edn., Pearson, 2007.
2. William Stallings, „Cryptography and Network Security Principles and Practices“, 4th Edn., Pearson/PHI, 2006.
3. W. Mao, „Modern Cryptography – Theory and Practice“, 2nd Edn., Pearson Education, 2007.
4. Charles P. Pfleeger, Shari Lawrence Pfleeger, „Security in Computing“, 3rd Edn., Prentice Hall of India, 2006.
5. Behrouz Forouzan, „Cryptography & Network Security“, 2nd Edn., McGraw-Hill, 2011.

OPTIMIZATION TECHNIQUES IN MACHINE LEARNING

Subject Code: BCSED2-724

L T P C

Duration: 45 Hrs.

3 0 0 3

Course Objective:

The students will be able to understand and analyze how to deal with changing data. They will also be able to identify and interpret potential unintended effects in your project. They will understand and define procedures to operationalize and maintain your applied machine learning model.

Course Outcomes: After completion of course, students would be able to:

1. Understand and analyze how to deal with changing data.
2. Understand and interpret potential unintended effects in their project.
3. Understand and define procedures to operationalize and maintain the applied machine learning model.
4. Understand how to optimize the use of Machine Learning in real-life problems.

Unit 1: Introduction (12 Hrs.)

What is optimization, Formulation of LPP, Solution of LPP: Simplex method, Basic Calculus for optimization: Limits and multivariate functions, Derivatives and linear approximations: Single variate functions and multivariate functions.

Unit 2: Machine Learning Strategy (09 Hrs.)

ML readiness, Risk mitigation, Experimental mindset, Build/buy/partner, setting up a team, Understanding and communicating change.

Unit 3: Responsible Machine Learning (12 Hrs.)

AI for good and all, Positive feedback loops and negative feedback loops, Metric design and observing behaviours, Secondary effects of optimization, Regulatory concerns.

Unit 4: Machine Learning in production and planning (12 Hrs.)

Integrating info systems, users break things, time and space complexity in production, when to retain the model? Logging ML model versioning, Knowledge transfer, Reporting performance to stakeholders.

Care and feeding of your machine learning model: MLPL Recap, Post deployment challenges, QUAM monitoring and logging, QUAM Testing, QUAM maintenance, QUAM updating, Separating Data stack from Production, Dashboard Essentials and Metrics monitoring.

Text Books/Suggested References:

1. Jeeva Jose, Introduction to Machine Learning, Khanna Book Publishing 2020.
2. Rajiv Chopra, Machine Learning, Khanna Book Publishing 2021
3. Optimization for Machine Learning, Suvrit Sra, Sebastian Nowozin and Stephen J. Wright, MIT Press, 2011.
4. Optimization in Machine Learning and Applications, Suresh Chandra Satapathy, Anand J.Kulkarni, Springer, 2019.
5. Algorithms for Optimization by Mykel J. Kochenderfer and Tim A. Wheeler, MIT Press, 2019.
6. Accelerated Optimization for Machine Learning: First-Order Algorithms by Cong Fang, Huan Li, and Zhouchen Lin, Springer, 2020.
7. <https://www.coursera.org/learn/optimize-machine-learning-model-performance>

ENVIRONMENTAL SCIENCES

Subject Code: BMNCC0-002

**L T P C
2 0 0 0**

Duration: 30 Hrs.

COURSE OBJECTIVES:

1. To identify global environmental problems arising due to various engineering/industrial and technological activities and the science behind these problems.
2. To identify the major pollutants and abatement devices for environmental management and sustainable development.
3. To estimate the current world population scenario and calculating the economic growth, energy requirement, demand and also their related problems and plausible solutions.

COURSE OUTCOMES:

1. Students are able to identify global environmental problems arising due to various engineering/industrial and technological activities and the science behind these problems.
2. Students are able to classify the major pollutants and abatement devices for environmental management and sustainable development.
3. Students can evaluate the current world population scenario and calculating the economic growth, energy requirement, demand and also their related problems and plausible solutions.

UNIT-I

1. The Multidisciplinary Nature of Environmental Studies:
Definition, scope and importance, Need for public awareness.
2. **Natural Resources**
Renewable and Non-renewable Resources: Natural resources and associated problems.
 - (a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
 - (b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
 - (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
 - (d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
 - (e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

UNIT-II

Environmental Pollution: Definition

- (a) Causes, effects and control measures of:
 - i) Air pollution
 - ii) Water pollution
 - iii) Soil pollution
 - iv) Marine pollution
 - v) Noise pollution
 - vi) Thermal pollution
 - vii) Nuclear pollution

- (b) **Solid Waste Management:** Causes, effects and control measures of urban and industrial wastes.
- (c) Role of an individual in prevention of pollution.
- (d) Pollution Case Studies.
- (e) Disaster management: floods, earthquake, cyclone and landslides.

UNIT-III

Social Issues and the Environment

- (a) From unsustainable to sustainable development
- (b) Urban problems and related to energy
- (c) Water conservation, rain water harvesting, Watershed Management
- (d) Resettlement and rehabilitation of people; its problems and concerns, Case studies.
- (e) Environmental ethics: Issues and possible solutions
- (f) Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies.
- (g) Issues involved in enforcement of environmental legislation

UNIT-IV

Human Population and the Environment

- (a) Population growth, variation among nations
- (b) Population explosion – Family Welfare Programmes
- (c) Environment and human health
- (d) Human Rights
- (e) Value Education
- (f) Women and Child Welfare
- (g) Role of Information Technology in Environment and Human Health
- (h) Case Studies.

Environmental Science related activities:

We as human being are not an entity separate from the environment around us rather we are a constituent seamlessly integrated and co-exist with the environment around US. We are not an entity so separate from the environment that we can think of mastering and controlling it rather we must understand that each and every action of ours reflects on the environment and vice versa. Ancient wisdom drawn from Vedas about environment and its sustenance reflects these ethos. There is a direct application of this wisdom even in modern times. Idea of an activity based course on environment protection is to sensitize the students on the above issues through following two types of activities.

(a) Awareness Activities:

- i) Small group meetings about water management, promotion of recycle use, generation of less waste, avoiding electricity waste.
- ii) Slogan making event
- iii) Poster making event
- iv) Cycle rally
- v) Lectures from experts.

(b) Actual Activities:

- i) Plantation

- ii) Gifting a tree to see its full growth
- iii) Cleanliness drive
- iv) Drive for segregation of waste
- v) To live some big environmentalist for a week or so to understand his work
- vi) To work in kitchen garden for mess
- vii) To know about the different varieties of plants
- viii) Shutting down the fans and ACs of the campus for an hour or so

Recommended Books

1. Agarwal, K. C. 2001 Environment Biology, Nidi Publ. Ltd. Bikaner.
2. Jadhav, H & Bhosale, V.M. 1995. Environment Protection and Laws. Himalaya Pub House, Delhi 284p.
3. Rao M. N. & Datta A.K. 1987. Waste Water Treatment. Oxford & IBH Publ.Co. Pvt. Ltd. 345 p.
4. Principle of Environment Science by Cunningham, W.P.
5. Essentials of Environment Science by Joseph.

CONSTITUTION OF INDIA

Subject Code: BMNCC0-001

L T P C

2 0 0 0

COURSE OBJECTIVE:

The student will be able to learn different perspectives of constitution of India.

COURSE OUTCOMES:

1. To learn the meaning and historical perspective of law.
2. To have deep knowledge of fundamental rights.
3. To learn different policies implemented by Constitution of India.
4. To learn Article 19 and 21.

COURSE CONTENTS:

1. Meaning of the constitution law constitutionalism.
2. Historical perspective of the Constitution of India.
3. Salient features and characteristics of the Constitution of India.
4. Scheme of the fundamental rights.
5. The scheme of fundamental duties and its legal status.
6. The Directive principles of State Policy – Its importance and implementation.
7. Federal structure and distribution of legislative and financial powers between the Union and states.
8. Parliamentary form of Government of India- The Constitution powers and status of the President of India.
9. Amendment of Constitutional Powers and Procedure.
10. The historical perspectives of constitutional amendments in India.
11. Emergency Provisions: National Emergency, President Rule, financial emergency.
12. Local Self Government- Constitutional Scheme in India.
13. Scheme of Fundamental Right to Equality.
14. Scheme of the Fundamental Right to certain Freedom under Article 19
15. Scope of the Right to Life and Personal Liberty under Article 21

ESSENCE OF INDIAN KNOWLEDGE TRADITION

Subject Code: BMNCC0-006

L T P C

2 0 0 0

COURSE OBJECTIVE:

The course is introduced

1. To get a knowledge in Indian Philosophical Foundations.
2. To Know Indian Languages and Literature and the fine arts in India & Their Philosophy.
3. To explore the Science and Scientists of Medieval and Modern India

COURSE OUTCOMES:

After successful completion of the course the students will be able to

1. Understand philosophy of Indian culture.
2. Distinguish the Indian languages and literature among difference traditions.
3. Learn the philosophy of ancient, medieval and modern India.
4. Acquire the information about the fine arts in India.
5. Know the contribution of scientists of different eras.
6. The essence of Yogic Science for Inclusiveness of society.

COURSE CONTENTS:

UNIT – I

Introduction to Indian Philosophy: Basics of Indian Philosophy, culture, civilization, culture and heritage, general characteristics of culture, importance of culture in human literature, Indian culture, Ancient Indian, Medieval India, Modern India.

Indian Philosophy & Literature: Vedas Upanishads, schools of Vedanta, and other religion Philosophical Literature. Philosophical Ideas the role of Sanskrit, significance of scriptures to current society, Indian Philosophies, literature of south India.

UNIT – II

Religion and Philosophy: Religion and Philosophy in ancient India, Religion and Philosophy in Medieval India, Religious Reform Movements in Modern India (selected movements only)

UNIT – III

Indian Fine Arts & Its Philosophy (Art, Technology & Engineering): Indian Painting, Indian handicrafts, Music, divisions of Indian classic music, modern Indian music, Dance and Drama, Indian Architecture (ancient, medieval and modern), Science and Technology in Indian, development of science in ancient, medieval and modern Indian.

UNIT – IV

Education System in India: Education in ancient, medieval and modern India, aims of education, subjects, languages, Science and Scientists of Ancient India, Scientists of

Medieval India, Scientists of Modern India. The role Gurukulas in Education System, Valuebased Education.

RECOMMENDED BOOKS:

1. Kapil Kapoor, "Text and Interpretation: The India Tradition", ISBN: 81246033375, 2005
2. "Science in Samskrit", Samskrita Bharti Publisher, ISBN-13:978-8187276333,2007
3. NCERT, "Position paper on Arts, Music, Dance and Theatre", ISBN 81-7450-494-X, 2006

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4. S. Narain, "Examination in Ancient India", Arya Book Depot, 1993
5. Satya Prakash, "Founders of Sciences in Ancient India", Vijay Kumar Publisher, 1989
6. M.Hiriyanna, "Essentials of Indian Philosophy", Motilal Banarsidass Publishers, ISBN-13: 978- 8120810990,2014
7. Chatterjee. S & Dutta "An Introduction to Indian Philosophy".

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY

**8th
SEMESTER**

ENTERPRISE RESOURCE PLANNING

Subject Code: BCSED2-811

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

The course has all the required contents that are necessary for a graduate to understand the different strategies of an organization.

COURSE OUTCOMES:

1. To understand the concepts of ERP and its related technologies.
2. To understand the implementation of ERP in an organization.
3. To have a deep understanding of different business modules of an organization.
4. To have a basic understanding of applications of ERP and various ERP software's.

COURSE CONTENTS:

UNIT-I (12 Hrs)

ERP AND TECHNOLOGY: Introduction, Related Technologies, Business Intelligence, E-Commerce and E-Business, Business Process Reengineering, Data Warehousing, Data Mining, OLAP, Product life Cycle management, SCM, CRM

UNIT II (12 Hrs)

ERP IMPLEMENTATION: Implementation Challenges, Strategies, Life Cycle, Methodologies Package selection, Project Teams, Vendors and Consultants, Data Migration, Project management

UNIT-III (12 Hrs)

ERP IN ACTION & BUSINESS MODULES: Operation and Maintenance, Business Modules, Finance, Manufacturing, Human Resources, Plant maintenance, Materials Management, Quality management, Marketing, Sales, Distribution and service.

UNIT-IV (09 Hrs)

ERP Application: Enterprise Application Integration, ERP II, Total quality management

ERP CASE STUDY: SAP AG, JD Edwards.

RECOMMENDED BOOKS:

1. Alexis Leon, „ERP DEMYSTIFIED“, 2nd Edn., Tata McGraw Hill, **2008**.
2. Mary Sumner, „Enterprise Resource Planning“, Pearson Education, **2007**.
3. Jim Mazzullo, „SAP R/3 for Everyone“, 2nd Edn., Pearson, **2007**.
4. Jose Antonio Fernandz, „The SAP R /3 Handbook“, Tata McGraw Hill, **2000**.
5. Biao Fu, „SAP BW: A Step-by-Step Guide“, 1st Edn., Pearson Education, **2003**.

INTERNET OF THINGS

Subject Code: BCSED2-812

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

The purpose of this course is to impart knowledge on IoT Architecture and various protocols, study their implementations

COURSE OUTCOMES:

1. To Understand the Architectural Overview of IoT
2. To Understand Raspberry.
3. To Understand the various IoT Protocols (Data link, Network)
4. To understand sensor applications.

COURSE CONTENTS:

UNIT I (12 hours)

OVERVIEW: Introduction to IOT, how does it work? Difference between Embedded device and IoT device, Properties of IoT device, IoT Ecosystem, IoT Decision Framework, IoT Solution Architecture Models, Major IoT Boards in Market, Privacy issues in IOT

UNIT II (11 hours)

Setting Up Raspberry Pi/Arduino to Create Solutions Explore Raspberry Pi, setting up Raspberry Pi, showing working of Raspberry Pi using Secure Shell (SSH) Client and Team Viewer, Understand Sensing actions, Understand Actuators and Micro electromechanical Systems (MEMS).

UNIT III (12 hours)

IOT DATA LINK LAYER & NETWORK LAYER PROTOCOLS: Communication Protocols used in IoT Types of wireless communication, Major wireless Short-range communication devices, properties, comparison of these devices (Bluetooth, Wireless Fidelity(WiFi), ZigBee, Low-power Wireless Personal Area Network(6LoWPAN)), Major wireless Long-range communication devices, properties, comparison of these devices (Cellular IoT, Low-Power Wide-Area Network(LPWAN))

UNIT IV (10 hours)

Sensors Applications of various sensors: Google Maps, Waze, WhatsApp, Ola Positioning sensors: encoders and accelerometers, Image sensors: cameras Global positioning sensors: Global Positioning System (GPS), Global Navigation Satellite System (GLONASS), Indian Regional Navigation Satellite System (IRNSS).

RECOMMENDED BOOKS:

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-onApproach)", 1 st Edition, VPT, 2014.
2. Peter Waher, "Learning Internet of Things", PACKT publishing, BIRMINGHAM – MUMBAI
3. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
4. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications.

CLOUD COMPUTING

Subject Code: BCSED2-813

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

1. To understand what is cloud storage, characteristics of cloud computing,
2. To know about cloud computing services and cloud hosting, cloud data storage and deployment models.
3. To learn cloud computing companies and cloud service providers, cloud infrastructure.
4. To learn advantages of cloud computing and issues with cloud computing.

COURSE OUTCOMES:

1. To learn basic terms used in cloud computing and its benefits.
2. To learn architecture of Hadoop.
3. To implement cloud security.
4. To manage services provided by cloud.

COURSE CONTENTS:

UNIT-I (12 Hrs.)

Cloud Computing Fundamentals: Introduction to Cloud Computing, private, public and hybrid cloud. Cloud types: IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, Role of virtualization in enabling the cloud; Benefits and challenges to Cloud architecture.

UNIT-II (12 Hrs.)

Hadoop - Apache Hadoop Architecture, Hadoop YARN, Comparison of Traditional system & Hadoop Ecosystem, Installation steps of Hadoop (1.x), Moving Data in and out of Hadoop, need for Record Reader and Record writer, understanding inputs and outputs file format of Map Reduce.

UNIT-III (10 Hrs.)

Cloud Security and Trust Management, Open Source Clouds -BaaDaaS, Open Stack, CloudStack

UNIT-IV (11 Hrs.)

Cloud Applications, Cloud Services Management: Reliability, availability and security of services deployed from the cloud. Performance and scalability of services, tools and technologies used to manage cloud services deployment, computing infrastructures available for implementing cloud based services.

RECOMMENDED BOOKS:

1. Chris Eaton, Dirk deRoos et al., „Understanding Big data“, 1st Edn., McGraw Hill, **2015**.
2. Tom White, „HADOOP: The definitive Guide“, 4th Edn., O Reilly, **2015**.
3. Gautam Shroff, „Enterprise Cloud Computing Technology Architecture Applications“, 1st Edn., Cambridge University Press, **2010**.
4. Toby Velt, Anthony Velt, Robert Elsenpeter, „Cloud Computing, A Practical Approach“, 1st Edn., McGraw Hill Education, **2009**.
5. Thomas Erl, ' Big Data Fundamentals', 1st Edn., Pearson Education, **2016**
6. Srinivasan, ' Cloud Computing', 1st Edn., Pearson Education, **2016**.

SOFTWARE PROJECT MANAGEMENT

Subject Code: BCSED2-814

L T P C

Duration: 45 Hrs.

3 0 0 3

COURSE OBJECTIVE:

It gives an in depth knowledge of software project management and project planning. It also covers the Step Wise framework in project planning

COURSE OUTCOMES:

1. Apply the basics of Software Project Management in order to manage and deliver qualified product and plan the activities within time schedules with CPM and PERT Analysis.
2. For managing the quality of product and managing the risk involved
3. Managing team and measuring and tracking the planning
4. To learn Configuration management and project monitoring and control

UNIT-I (12 Hrs.)

Project Planning: Characteristics of a software project, Software scope and feasibility, resources, the SPM plan.

Software Project Estimation: Size/scope estimation, Decomposition techniques, WBS. Effort estimation: Sizing, Function point, LOC, FP vs LOC. Schedule estimation: GANTT Charts, Activity networks, PERT/CPM networks. Cost estimation: Models: COCOMO-I, COCOMO-II.

UNIT-II (12 Hrs.)

Quality Planning: Quality control, Quality assurance, Formal Technical Reviews, The SQAPlan, ISO and CMM standards.

Risk Management: Reactive vs proactive Risk strategies, Risk projection, Risk Refinement, Risk Monitoring, Monitoring and management, RMMM plan.

UNIT-III (12 Hrs.)

Measurement and Tracking Planning: Earned Value Analysis.

Team Management: Team structures: hierarchical, Egoless, chief programmer, mixed; Team software Process; Resource levelling, Building a team: Skill sets.

UNIT-IV (09 Hrs.)

Configuration Management: Baselines, Configurable items, SCM repository, SCM process, version control change control, configuration audit.

Project Monitoring and Control: Audits and Reviews.

RECOMMENDED BOOKS:

1. Bob Hughes and Mike Cotterell, „Software Project Management“, 5th Edn., Tata McGrawHill, **2009**.
2. Roger Pressman, „A Practitioner“s Guide to Software Engineering“, 8th Edn., Tata McGraw Hill, **2014**.
3. Head First PMP: A Brain Friendly Guide to Passing the Project Management Professional Exam“, **2013**.

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS

FOR

**B.TECH. COMPUTER SCIENCE & ENGINEERING
(IOT AND CYBER SECURITY INCLUDING BLOCK CHAIN TECHNOLOGY)**

(4 YEARS PROGRAMME)

2023 BATCH ONWARDS

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**B.TECH. CSE (IOT AND CYBER SECURITY INCLUDING BLOCK CHAIN TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

**GROUP-A
1ST SEMESTER**

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BPHYS1-101	Physics (Semiconductor Physics)	3	1	0	40	60	100	4
BMATH1-101	Mathematics-I (Calculus, Linear Algebra)	3	1	0	40	60	100	4
BMECE0-101	Engineering Graphics & Design	2	0	0	40	60	100	2
BELEE0-101	Basics Electrical Engineering	3	1	0	40	60	100	4
BPHYS1-102	Physics (Semiconductor Physics) Lab.	0	0	2	60	40	100	1
BMECE0-102	Engineering Graphics & Design Lab.	0	0	6	60	40	100	3
BELEE0-102	Basics Electrical Engineering Lab.	0	0	2	60	40	100	1
BMNCC0-004	Drug Abuse: Problem, Management and Prevention	2	0	0	100	0	100	0
BMNCC0-010	Universal Human values – I	22 hrs (to be completed during 21 days SIP)*			Satisfactory/ Unsatisfactory			0
ZZZZZ	Introduction to Concerned Branch of Engineering	2	0	0	100	0	100	0
Total		15	3	10	540	360	900	19

Note:

- There will be Induction Programme of 3 weeks before start of normal classes.
- Drug Abuse: Problem, Management and Prevention and Introduction to Concerned Branch of Engineering are non-credit Courses; however, it is necessary to secure atleast E grade in each of them.

* As per AICTE SIP Manual Hour Plan available at <http://fdp-si.aicte-india.org>

2ND SEMESTER

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Internal	External	Total	
BCHEM0-101	Chemistry-I	3	1	0	40	60	100	4
BMATH1-201	Mathematics-II (Probability and Statistics)	3	1	0	40	60	100	4
BHUMA0-101	English	2	0	0	40	60	100	2
BCSCE0-101	Programming for Problem Solving	3	0	0	40	60	100	3
BCHEM0-102	Chemistry-I Lab.	0	0	2	60	40	100	1
BHUMA0-102	English Lab.	0	0	2	60	40	100	1
BCSCE0-102	Programming for Problem Solving Lab.	0	0	4	60	40	100	2
BMFPR0-101	Manufacturing Practices	1	0	4	60	40	100	3
Total		12	2	12	400	400	800	20

Note:

- Marks of 4 Week Manufacturing Practices Training during Summer Vacation will be included in 3rd Semester

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(3rd SEMESTER)

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
BMATH1-301	Calculus and Ordinary Differential Equation	3	0	0	40	60	100	3
BCSES2-301	Introduction to IoT	3	0	0	40	60	100	3
BCSES1-302	Data structure & Algorithms	3	1	0	40	60	100	4
BCSES1-303	Digital Electronics	3	1	0	40	60	100	4
BCSES1-304	Data structure & Algorithms Laboratory	0	0	4	60	40	100	2
BCSES1-305	Digital Electronics Laboratory	0	0	2	60	40	100	1
BCSES1-306	IT Workshop (SciLab / MATLAB) Laboratory	0	0	4	60	40	100	2
BCSES1-307	Institution Training-I*(4 Weeks) done after 2 nd semester	-	-	-	60	40	100	3
BHSMC0-007	Development of Societies	3	0	0	40	60	100	3
BMNCC0-052	The Maharaja of People	2	0	0	100	-	100	0
Total 6 Theory & 3 Lab. Courses		17	2	10	540	460	1000	25

(4th SEMESTER)

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
BCSES2-401	Introduction to Cyber Security	3	1	0	40	60	100	4
BCSES1-401	Computer Organization & Architecture	3	0	0	40	60	100	3
BCSES1-402	Operating Systems	3	1	0	40	60	100	4
BCSES1-403	Object Oriented Programming	3	1	0	40	60	100	4
BCSES1-404	Operating Systems Laboratory	0	0	2	60	40	100	1
BCSES1-405	Object Oriented Programming Laboratory	0	0	4	60	40	100	2
BHSMC0-016	Organizational Behaviour	3	0	0	40	60	100	3
BHSMC0-026	Universal Human values – II Understanding Harmony	2	1	0	40	60	100	3
Total 6 Theory & 2 Lab. Courses		17	4	06	360	440	800	24

PHYSICS (SEMICONDUCTOR PHYSICS)

Subject Code: BPHYS1-101

**L T PC
3 1 0 4**

Duration: 38Hrs.

Course Outcomes

1. Understanding of Quantum theory, Electronic Material, Semiconductors and Light-Semiconductor Interactions and Fiber Optics Communication.
2. Skill enhancement to solve numerical problems related with Quantum theory, Electronic Material, Semiconductors and Light- Semiconductor Interactions and Fiber Optics Communication.
3. Apply knowledge of Quantum theory, Electronic Material, Semiconductors and Light-Semiconductor Interactions and Fiber Optics Communication to go for higher studies in diverse fields.
4. To inculcate and develop the ability to think abstractly.

UNIT-I

Quantum Theory: (10 Hrs.)

Need and origin of Quantum Concept, Wave-particle duality, Matter waves, Group and Phase velocities, Concept of Uncertainty Principle and its application: nonexistence of electron in the nucleus, wave function & its significance, normalization of wave function, Schrodinger wave equation: time independent and dependent, Eigen functions & Eigen values, particle in a box in 1-D. Concept of scattering from a potential barrier and tunneling.

UNIT-II

Electronic Materials: (8 Hrs.)

Free electron theory, Density of states and energy band diagrams, Introduction to bandgap theory, Direct and indirect gaps. Types of electronic materials: metals, semiconductors and insulators, Occupation probability, Fermi level, Effective mass, phonons.

UNIT-III

Semiconductors and Light- Semiconductor Interactions: (12 Hrs.)

Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier- concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal-semiconductor junction (Ohmic and Schottky), Semiconductor materials of interest for optoelectronic devices. Optical transitions in bulk semiconductors: absorption, spontaneous emission, and stimulated emission; Lasers: principles and working of laser: population inversion, pumping, types of lasers with emphasis on the semiconductor Lasers.

UNIT-IV

Fibre Optics Communication: (8 Hrs.)

Introduction and importance of use of optical fibres in data transmission, optical fibre as a dielectric wave guide: total internal reflection, numerical aperture and various fibre parameters, losses associated with optical fibres, step and graded index fibres, applications of optical fibres.

Recommended Books:

1. Satyaparkash, 'Quantum Mechanics'.
2. A. Ghatak and Lokanathan, 'Quantum Mechanics'.
3. J. Singh, 'Semiconductor Optoelectronics: Physics and Technology', McGraw Hill Inc., 1995.
4. S.M. Sze, 'Semiconductor Devices: Physics and Technology', Wiley, 2008.
5. A. Yariv and P. Yeh, 'Photonics: Optical Electronics in Modern Communications', Oxford University Press, New York, 2007.
6. P. Bhattacharya, 'Semiconductor Optoelectronic Devices', Prentice Hall of India, 1997.
7. M R Shenoy, 'Online Course: Semiconductor Optoelectronics', NPTEL.
8. Monica Katiyar and Deepak Gupta, 'Online Course: Optoelectronic Materials and

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- Devices', NPTEL.
9. Ben. G. Streetman, 'Solid State Electronics Devices', Pearson PrenticeHall.

MATHEMATICS-I (CALCULUS, LINEARALGEBRA)

Subject Code: BMATH1-101

**L T P C
3 1 0 4**

Duration: 46Hrs.

Course Outcomes:

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

The students will learn:

1. To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.
2. The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
3. The tool of power series and Fourier series for learning advanced Engineering Mathematics.
4. To deal with functions of several variables that are essential in most branches of engineering.
5. The essential tool of matrices and linear algebra in a comprehensive manner.

UNIT-I

Calculus: (12 Hrs.)

Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminate forms and L' Hospital's rule; Maxima and minima. Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

UNIT -II

Sequences and Series: (10 Hrs.)

Convergence of sequence and series, tests for convergence (Comparison test, Ratio test, Raabe's test, Logarithmic test, Cauchy's root test, Cauchy's Integral test, series of positive and negative terms); Power series, Taylor's series, series for exponential, trigonometric and logarithm functions.

UNIT -III

Multivariable Calculus: (12 Hrs.)

Limit, continuity and partial derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence: Geometrical interpretation and basic properties, Directional derivative.

UNIT -IV

Linear Algebra: (12 Hrs.)

Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

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Recommended Books:

1. G.B. Thomas and R.L. Finney, 'Calculus and Analytic Geometry', 9thEdn., Pearson, Reprint, **2002**.
2. Erwin Kreyszig, 'Advanced Engineering Mathematics', 9thEdn, John Wiley & Sons,**2006**.
3. T.Veerarajan, 'Engineering Mathematics for First Year', Tata McGraw Hill, New Delhi, **2008**.
4. B.V. Ramana, 'Higher Engineering Mathematics', 11thReprint, Tata McGraw Hill, New Delhi,**2010**.
5. D. Poole, 'Linear Algebra: A Modern Introduction', 2ndEdn., Brooks/Cole,**2005**.
6. B.S. Grewal, 'Higher Engineering Mathematics', 36thEdn., Khanna Publishers, **2010**.

ENGINEERING GRAPHICS & DESIGN

Subject Code: BMECE0-101

**L T P C
2 0 0 2**

Duration: 30 Hrs.

Course Objective

- 1 To understand the concept of Engineering drawing, Drawing instruments, Graphic standards and its application in Engineering.
- 2 To develop Skills in Preparation of Basic Drawings.
- 3 To develop Skills in Reading and Interpretation of Engineering Drawings.
- 4 Understand the concept of projection and acquire visualization skills
- 5 To prepare the student to communicate effectively.
- 6 To understand the concept of 2D and 3D drawings

Course Outcomes

- 1 Knowledge of Engineering drawing, drawing instruments and application .
- 2 Exposure to preparation of simple drawings
- 3 Inculcate the Concept of 2D and 3D and the related drawings
- 4 Exposure to creating working drawings
- 5 Exposure to improved communication and ability to visualize objects

1. Introduction

Engineering Drawing/Engineering Graphics/Technical Drawing - a Visual Science. Types of Engineering Drawing, Introduction to drawing equipment and use of instruments. Symbols and conventions in drawing Practice. Types of lines and their use, BIS codes for lines, Technical lettering as per BIS codes, Introduction to Dimensioning, Concepts of scale in drawing, Types of scales. Basic Definition of geometrical objects: Points, lines, planes and solids.

2. Theory of Projections - Relevance of projection, Type of projections, Perspective, Orthographic, Axonometric and their basic principles, System of orthographic projection: in reference to quadrants and octants, illustration through simple problems of projection.
3. Projection of Points- Projection of points in quadrants and octants. Projection of point on Auxiliary planes.
4. Projection of Lines -Parallel to both H P and V P, Parallel to one and inclined to other, and inclined to both, contained in profile plane. True length and angle orientation of straight line: rotation method and auxiliary plane method. Distance between two nonintersecting lines, and trace of line.
5. Projection of Planes- Difference between plane and lamina. Projection of lamina Parallel to one and perpendicular to other, Perpendicular to one and inclined to other, Inclined to both reference planes, and Lamina oblique to three reference planes. Application of auxiliary planes, and trace of planes.
6. Projection of Solids- Definition of solids, types of solids, and elements of solids. Projection of solids in first or third quadrant, with axis parallel to one and perpendicular to other, axis parallel to one inclined to other, axis inclined to both the principle plane, axis perpendicular to profile plane and parallel to both H P and V P. Visible and invisible details in the projection. Use rotation and auxiliary plane method to draw the projections.

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7. Section of Solids Definition of Sectioning and its purpose. Procedure of Sectioning, Types of sectional planes. Illustration through examples.
8. Development of Surface Purpose of development, Parallel line, radial line and triangulation method. Development of prism, cylinder, cone and pyramid surface for both right angled and oblique solids, and development of surface of sphere.
9. Isometric Projection Classification of pictorial views, Basic Principle of Isometric projection, Difference between isometric projection and isometric drawing. Isometric projection of solids such as cube, prism, pyramid and cylinder, and assignments on isometric projection of simple machine parts.
10. Orthographic Projection Review of principle of Orthographic Projection, Sketch/drawing of blocks, and of simple machine parts.

Recommended Text/Reference Books

1. N.D. Bhatt, V.M. Panchal & P.R. Ingle, 'Engineering Drawing', Charotar Publishing House, 2014.
2. M.B. Shah & B.C. Rana, 'Engineering Drawing and Computer Graphics', Pearson Education, 2008.
3. B. Agrawal & C.M. Agrawal, 'Engineering Graphics', TMH Publication, 2012.
4. K.L. Narayana & P. Kannaiah, 'Text book on Engineering Drawing', Scitech Publishers, 2008.

BASIC ELECTRICAL ENGINEERING

Subject Code: BELEE0-101

L T PC

Duration: 42Hrs.

3 1 0 4

Course Outcomes:

1. To understand and analyze basic DC and AC circuits.
2. To study the use and working principle of single phase transformers.
3. To study the application and working principles of three phase and single phase induction motors.
4. To introduce to the components of low voltage electrical installations.

UNIT-1

DC Circuits: (8 Hrs.)

Electrical circuit elements (R, L and C), voltage and current sources, Ohm's law, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation Superposition, Thevenin and Norton Theorems. Step response of RL, RC circuits.

UNIT-2

AC Circuits: (12 Hrs.)

Representation of sinusoidal waveforms, average, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC series and parallel combinations, series and parallel resonance. Three phase voltage source, phase sequence, three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-3

Transformers: (10 Hrs.)

Magnetic materials, BH characteristics, Single-phase Transformer, no load and full load

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SYLLABUS 2023 BATCH ONWARDS**

18. Measurement of susceptibility of a liquid or a solution by Quincke's method:
19. AFM experiment to study the sample with the nano-scale objects and measure surface topography with different scales, width and height of nano objects, and force-distance curves.
20. To study the temperature coefficient of Resistance of copper.

Physics Virtual Lab. Experiments:

21. To plot the characteristics of thermistor and hence find the temperature coefficient of resistance.
22. To determine the resistivity of semiconductors by Four Probe Method.
23. To study the forward and reverse biased characteristics of PNP and NPN transistors.
24. To study the B-H Curve.
25. To study the Hall effect experiment to determine the charge carrier density.
26. To determine the magnetic susceptibilities of paramagnetic liquids by Quincke's Method.
27. To study the phenomena of magnetic hysteresis and calculate the retentivity, coercivity and saturation magnetization of a material using a hysteresis loop tracer.
28. Verification and design of combinational logic using AND, OR, NOT, NAND and XOR gates.

Note: Any other experiment based on the above mentioned topics may be included.

ENGINEERING GRAPHICS & DESIGNLAB.

Subject Code: BMECE0-102

**L T P C
0 0 6* 3**

Duration: 45 Hrs.

Course Objective

1. To have an overview of interactive computer graphics.
2. To learn the various 2D and 3D draw commands for drawing preparation
3. To understand the use of modify commands for making of drawings
4. To learn the dimensioning of drawings
5. To understand the use of the software in different Engineering applications

Course Outcomes

- 1 Understand the basics of computer graphics
- 2 Expertise to draw 2D and 3D drawings
- 3 Ability to do editing and dimensioning of drawings
- 4 Exposure to solid modeling

1. Overview of Computer Graphics

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids];

2. Customization & CAD Drawing

Consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerance; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

3. Annotations, Layering & other Functions

Applying dimensions to objects, applying annotations to drawings; Setting up and use of

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Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques.

*Lab work will be performed in two parts:

- (i) **Computer Lab (2 hours)** Computer Graphics, CAD Drawing etc.
- (ii) **Drawing Hall (04 hours)** Manual practice on drawing sheets of theory content the relevant theory part of Engineering Graphics & Design may also be covered in Lab work.

MRSPTEU

BASIC ELECTRICAL ENGINEERING LAB

Subject Code: BELEE0-102

L T P C

0 0 2 1

Course Outcomes:

1. Get an exposure to common electrical components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the usage of common electrical measuring instruments.
4. Understand the basic characteristics of transformers and electrical induction motors.

EXPERIMENTS/DEMONSTRATIONS

1. To study basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. real-life resistors, capacitors and inductors.
2. To verify Ohm's law.
3. To verify Kirchhoff's voltage and current laws.
4. To verify Superposition Theorem.
5. To verify Thevenin Theorem.
6. To obtain the sinusoidal steady state response of R-L circuit – impedance calculation and verification. Observation of phase differences between current and voltage.
7. To obtain the sinusoidal steady state response of R-C circuit – impedance calculation and verification. Observation of phase differences between current and voltage.
8. To study resonance phenomenon in R-L-C series circuits.
9. To perform open circuit and short circuit test on a single phase transformer and calculate the efficiency.
10. Demonstration of cut-out sections of machines: Induction machine (squirrel cage rotor and slipring arrangement) and single-phase induction machines.
11. To connect, start and reverse the direction of rotation by change of phase-sequence of connections of three phase induction motor.
12. To connect, start and reverse the direction of rotation of single-phase induction motor.
13. To demonstrate working of DOL starter for three-phase induction motor.
14. To demonstrate working of star-delta starter for three-phase induction motor.
15. To demonstrate the components of LT switchgear.

DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION

Subject Code: BMNCC0-004

L T P C

Duration: 30 Hrs.

2 0 0 0

Course Outcomes:

1. Differentiate between physical and psychological dependence of drug abuse.
2. Understanding the consequences of drug abuse.
3. Explain prevention of drug abuse.
4. Identify treatments and management of drug abuse.

UNIT-I

Meaning of Drug Abuse:

Meaning: Drug abuse, Drug dependence and Drug addiction. Nature and extent of drug abuse in India and Punjab.

UNIT-II

Consequences of Drug Abuse:

Individual: Education, Employment, Income.

Family: Violence.

Society: Crime.

Nation: Law and Order problem.

UNIT-III

Prevention of Drug Abuse:

Role of Family: Parent-child relationship, Family support, supervision, shipping values, active scrutiny.

School: Counselling, Teacher as role-model, Parent-teacher-health professional coordination, Random testing on students.

UNIT-IV

Treatment and Control of Drug Abuse:

Medical Management: Medication for treatment and to reduce withdrawal effects.

Psychological Management: Counselling, Behavioural and Cognitive therapy.

Social Management: Family, Group therapy and Environmental intervention.

Treatment: Medical, Psychological and Social Management.

Control: Role of Media and Legislation.

Recommended Books:

1. Ram Ahuja, 'Social Problems in India', Rawat Publications, Jaipur, 2003.
2. 'Extent, Pattern and Trend of Drug Use in India', Ministry of Social Justice and Empowerment, Govt. of India, 2004.
3. J.A. Inciardi, 'The Drug Crime Connection', Sage Publications, Beverly Hills, 1981.
4. T. Kapoor, 'Drug Epidemic among Indian Youth', Mittal Publications, New Delhi, 1985.
5. Kessel, Neil and Henry Walton, 'Alcoholism, Harmond Worth', Penguin Books, 1982.
6. Ishwar Modi and Shalini Modi, 'Addiction and Prevention', Rawat Publications, Jaipur, 1997.
7. 'National Household Survey of Alcohol and Drug Abuse', Clinical Epidemiological Unit, All India Institute of Medical Sciences, New Delhi, 2003 & 2004.
8. Ross Coomber and Others, 'Key Concept in Drugs and Society', Sage Publications, New Delhi, 2013.
9. BhimSain, 'Drug Addiction Alcoholism, Smoking Obscenity', Mittal Publications, New Delhi, 1991.
10. Ranvinder Singh Sandhu, 'Drug Addiction in Punjab: A Sociological Study', Guru Nanak Dev University, Amritsar, 2009.
11. Chandra Paul Singh, 'Alcohol and Dependence among Industrial Workers', Shipra, Delhi, 2000.
12. S. Sussman and S.L. Ames, 'Drug Abuse: Concepts, Prevention and Cessation', Cambridge University Press, 2008.
13. P.S. Verma, 'Punjab's Drug Problem: Contours and Characteristics', Vol. LII, No. 3, P.P. 40-43, Economic and Political Weekly, 2017.
14. 'World Drug Report', United Nations Office of Drug and Crime, 2016.
15. 'World Drug Report', United Nations Office of Drug and Crime, 2017.

CHEMISTRY-I

Subject Code: BCHEM0-101

**L T PC
3 1 0 4**

Duration: 42Hrs.

Course Objectives:

1. To understand the atomic and & molecular nature of various molecules
2. To understand the band structures
3. To elaborate the applications of spectroscopic techniques
4. To understand the thermodynamic functions and their applications
5. To rationalize periodic properties
6. To understand the concepts of stereochemistry and preparation of organic molecules

Course Outcomes:

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.

Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

1. Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
2. Rationalize bulk properties and processes using thermodynamic considerations.
3. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
4. Rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
5. List major chemical reactions that are used in the synthesis of molecules.

UNIT-I

1. Atomic and Molecular Structure: (12 Hrs.)

Bohr Theory of Hydrogen atom, Spectrum of H atom, Sommerfeld extension of Bohr Theory, Particle and wave nature of electron, De-Broglie equation, Aufbau principle, Compton effect, Schrodinger wave equation, Laplacian and Hamiltonian operator, Linear Combination of atomic orbitals. Molecular orbitals of diatomic molecules and Energy level diagrams of homo nuclear and hetero nuclear diatomics. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

UNIT-II

2 Spectroscopic Techniques and Applications: (8 Hrs.) Principles and selection rules of Electronic spectroscopy and Fluorescence spectroscopy along with their applications. Principles and selection rules of Vibrational and rotational spectroscopy of diatomic molecules and their Applications. Nuclear magnetic resonance up to spin-spin coupling and magnetic resonance imaging.

3. Intermolecular Forces and Potential Energy Surfaces: (4 Hrs.)

Ideal gas equation, Ionic, dipolar and van Der Waals interactions. Real gas equation. Equations of state of real gases and critical phenomena. Potential energy surfaces of H₃, and HCN

UNIT-III

4 Use of Free Energy in Chemical Equilibria: (6 Hrs.)

Ideal Solution, Non Ideal Solutions, Thermodynamic functions: energy, entropy and free energy. Numerical problems based on entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria. Thermodynamic properties of ideal solutions. Introduction to Electrochemical Corrosion and its mechanism. Use of free energy considerations in metallurgy through Ellingham diagrams.

5. Periodic Properties: (4 Hrs.)

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases principle

UNIT-IV

6 Stereochemistry: (4 Hrs.)

Representations of 3-dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis of butane. Isomerism in transitional metal compounds.

7. Organic Reactions and Synthesis of a Drug Molecule: (4 Hrs.)

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule – β lactum, Paracetamol, Chloroquine and Aspirin

Recommended Books:

1. B.H. Mahan, 'University Chemistry'.
2. M.J. Sienko and R.A. Plane 'Chemistry: Principles and Applications'.
3. C.N. Banwell, 'Fundamentals of Molecular Spectroscopy'.
4. B.L. Tembe, Kamaluddin and M.S. Krishnan, 'Engineering Chemistry (NPTEL Web-book)
5. P.W. Atkins, 'Physical Chemistry'.
6. K.P.C. Vollhardt and N.E. Schore 'Organic Chemistry: Structure and Function', 5th Edn., <http://bcs.whfreeman.com/vollhardtschore5e/default.asp>

MATHEMATICS-II (PROBABILITY AND STATISTICS)

Subject Code: BMATH1-201

L T PC

Duration: 40Hrs.

3 1 0 4

COURSE OBJECTIVE

Students will learn

1. Understanding Probability theory.
2. Probability distribution, bivariate distribution, conditional densities
3. Statistical analysis, correlation and regression, moment, skewness and kurtosis.
4. Statistical hypothesis about real world problem, curve fitting, small samples.

Course Outcomes (CO)

Students will be able

1. To express the concept of basic probability and its features, expected values and moments.
2. To explain the concept of continuous probability distribution and bivariate distribution
3. To describe basic statistics (moments, skewness, kurtosis, correlation and regression).
4. To explain about applied statistics and small samples.

UNIT-I

Basic Probability: (12 Hrs.)

Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Chebyshev's Inequality.

UNIT -II

Continuous Probability Distributions: (6 Hrs.)

Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities.

Bivariate Distributions: (6 Hrs.) Bivariate distributions and their properties, distribution of sums and quotients, conditional densities, Bayes' rule.

UNIT -III

Basic Statistics: (10 Hrs.)

Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation.

UNIT -IV

Applied Statistics: (8 Hrs.)

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

Small Samples: (4 Hrs.)

Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

Recommended Books:

1. E. Kreyszig, 'Advanced Engineering Mathematics', John Wiley & Sons, 2006

**B.TECH. CSE (IOT AND CYBER SECURITY INCLUDING BLOCK CHAIN TECHNOLOGY)
SYLLABUS 2023 BATCH ONWARDS**

2. P.G. Hoel, S.C. Port and C.J. Stone, 'Introduction to Probability Theory', Universal Book Stall, **2003**.
3. S. Ross, 'A First Course in Probability', Pearson Education India, **2002**.
4. W. Feller, 'An Introduction to Probability Theory and its Applications', Vol.-1, Wiley, **1968**.
5. B.S. Grewal, 'Higher Engineering Mathematics', Khanna Publishers, **2000**.
6. T. Veerarajan, 'Engineering Mathematics', Tata McGraw Hill, New Delhi, **2010**.

ENGLISH

Subject Code: BHUMA0-101

**L T PC
2 0 0 2**

Duration: 25Hrs.

Course Objectives:

1. Students should be able to enhance language proficiency, critical thinking and analytical skills
2. To expose the students to various spoken skills
3. To strength their professional skills
4. To maintain good linguistic competency and accuracy in grammar

Course Outcomes:

1. The students will be able to understand specific piece of information
2. Be able to express themselves in writing for social occasions
3. Be able to identify the language functions in the spoken discourse
4. Improvement of technical communication skills , such as writing reports giving presentations and effectively communicating ideas related to respective field

UNIT-I

1. Vocabulary Building:

The concept of Word Formation

Root words from foreign languages and their use in English

Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives. Synonyms, antonyms, and standard abbreviations.

UNIT-II

2. Basic Writing Skills:

Sentence Structures

Use of phrases and clauses in

sentences Importance of proper

punctuation Creating coherence

Organizing principles of paragraphs in

documents Techniques for writing precisely

UNIT-III

3. Identifying Common Errors in Writing:

Subject-verb

agreement Noun-

pronoun agreement

Misplaced modifiers

Articles

Prepositions

Redundancies

Clichés

UNIT-IV

4. Nature and Style of sensible Writing:

- Describing
- Defining
- Classifying
- Providing examples or evidence
- Writing introduction and conclusion

5. Writing

Practices:

- Comprehension
- Précis Writing
- Essay Writing

Recommended Books:

1. Michael Swan, 'Practical English Usage', OUP, 1995.
2. F.T. Wood, 'Remedial English Grammar', Macmillan, 2007.
3. William Zinsser, 'On Writing Well', Harper Resource Book, 2001.
4. Liz Hamp-Lyons and Ben Heasley, 'Study Writing', Cambridge University Press, 2006.
5. Sanjay Kumar and Pushp Lata, 'Communication Skills', Oxford University Press, 2011.
6. 'Exercises in Spoken English', Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

PROGRAMMING FOR PROBLEMSOLVING

Subject Code: BCSCE0-101

L T PC

Duration: 41Hrs.

3 0 0 3

Course Objectives:

1. To be familiarize with flow of algorithm to solve simple problems
2. To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
3. To develop modular, reusable and readable C Programs using the concepts like functions, arrays, strings, pointers and structures.

Course Outcomes:

The student will learn

1. To learn the basic terms related to programming and understand arithmetic expressions.
2. To understand the concept of arrays.
3. To implement functions and recursion.
4. To learn structure, pointers and file handling

UNIT-I

1. Introduction to Programming: (6 Hrs.)

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.). Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

2 Arithmetic Expressions and Precedence: (12Hrs.)

Conditional Branching and Loops. Writing and evaluation of conditionals and consequent branching. Iteration and loops.

UNIT-II

3 Arrays: (5 Hrs.)

Arrays (1-D, 2-D), Character arrays and Strings

4 Basic Algorithms: (5 Hrs.)

Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

UNIT-III

5. Function: (4Hrs.)

Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference

6 Recursion: (4Hrs.)

Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

UNIT-IV

7. Structure: (3 Hrs.)

Structures, Defining structures and Array of Structures. Pointers: (2Hrs.)

Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

8 File Handling: (only if time is available, otherwise should be done as part of the lab)

Recommended Text Books:

1. Byron Gottfried, 'Schaum's Outline of Programming with C', McGraw Hill.
2. E. Balaguruswamy, 'Programming in ANSI C', Tata McGraw Hill.

Recommended Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, 'The C Programming Language', Prentice Hall of India.

CHEMISTRY-I LAB

Subject Code: BCHEM0-101

L T P C

0 0 2 1

Course Objectives:

1. To learn the preparation and standardization of solutions
2. To learn the estimation of various physical properties of given liquid samples
3. To estimate various crucial parameters for water sample
4. To learn the preparation of various molecules and detection of functional groups.

Course Outcomes:

The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:

1. Estimate rate constants of reactions from concentration of reactants/products as a function of time
2. Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
3. Synthesize a small drug molecule and analyze a salt sample

Choice of 10-12 experiments from the following:

1. Preparation of a standard solution
2. Determination of surface tension and viscosity
3. Thin layer chromatography
4. Determination of total Alkalinity/ Acidity of a water sample.
5. Determination of residual chlorine in water sample
6. Estimation of total, temporary and permanent hardness of water
7. Determination of the rate constant of a reaction
8. Determination of strength of an acid conductometrically
9. Potentiometry - determination of redox potentials and emfs
10. Synthesis of apolymer
11. Saponification /acid value of anoil
12. Detection and confirmation of organic functional groups.
13. Models of spatialorientation
14. Totestthe validity of Lambert Beerlaw/ Determinationof λ_{\max} / Determination of unknown concentration of a solution.
15. Determination of the partition coefficient of a substance between two immiscible liquids
16. Adsorption of acetic acid bycharcoal
17. Synthesis of a drug – Acetaminophen, Aspirin

ENGLISH LAB.

Subject Code: BHUMA0-102

L T P C

0 0 2 1

Course Objectives:

1. To enhance LSRW Skills
2. To improve the fluency in spoken English
3. To familiarize students with the use of English in everyday situations
4. To maintain good linguistic competency and accuracy in grammar

Course Outcomes:

1. Identify common errors in spoken and written communication
2. List familiarized with English vocabulary and language proficiency
3. Improve nature and style of sensible writing.
4. Improve acquire employment and work place communication skills.

Oral Communication

(This unit involves interactive practice sessions in Language Lab.)

1. Listening Comprehension
2. Pronunciation, Intonation, Stress and Rhythm
3. Common Everyday Situations: Conversations and Dialogues
4. Communication at Workplace
5. Interviews
6. Formal Presentations

PROGRAMMING FOR PROBLEM SOLVING LAB.

Subject Code: BCSCE0-102

L T P C

0 0 4 2

Course objectives:

1. To be familiarize with flow of algorithm to solve simple problems
2. To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
3. To develop modular, reusable and readable C Programs using the concepts like functions, arrays, strings, pointers and structures.

Course Outcomes:

1. Correct syntax errors as reported by the compilers and logical errors encountered at run time
2. Develop programs by using decision making and looping constructs.
3. Implement real time applications using the concept of array, pointers, functions and structures.
4. Solve real world problems using matrices, searching and sorting

NOTE: The laboratory should be preceded or followed by a tutorial to explain the approach algorithm to be implemented for the problem given.

Tutorial 1: Problem solving using computers:

Lab1: Familiarization with programming environment

Tutorial 2: Variable types and type conversions:

Lab 2: Simple computational problems using arithmetic expressions

Tutorial 3: Branching and logical expressions:

Lab 3: Problems involving if-then-else structures

Tutorial 4: Loops, while and for loops:

Lab 4: Iterative problems e.g., sum of series

Tutorial 5: 1D Arrays: searching, sorting:

Lab 5: 1D Array manipulation

Tutorial 6: 2D arrays and Strings

Lab 6: Matrix problems, String operations

Tutorial 7: Functions, call by value:

Lab 7: Simple functions

Tutorial 8 & 9: Numerical methods (Root finding, numerical differentiation, numerical integration):

Lab 8 and 9: Programming for solving Numerical methods problems

Tutorial 10: Recursion, structure of recursive calls

Lab 10: Recursive functions

Tutorial 11: Pointers, structures and dynamic memory allocation

Lab 11: Pointers and structures

Tutorial 12: File handling:

Lab 12: File operations

MANUFACTURING PRACTICES (THEORY & LAB)

Subject Code: BMFPR0-101

**L T PC
1 0 4 3**

Duration: 80 Hrs.

Course objectives.

- 1 Understand the operations of manufacturing methods and processes.
- 2 Perform the various manufacturing operations.
- 3 Understand the basics of advanced manufacturing methods.
4. Understanding the basics of computer numerical control machines.

Course outcomes:

After the completion of this course students will be able:-

1. To perform various metal forming operations.
2. To perform various metal cutting operations.
3. To perform various metal joining operations.
4. To write simple CNC part programming.

Lectures & Videos: (10 Hrs.)

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturingMethods.
2. CNC machining, Additive manufacturing.
3. Fitting operations & power tools.
4. Sheet Metal Operations.
5. Electrical &Electronics.
6. Carpentry.
7. Plastic moulding (injection moulding, blow moulding, extrusion moulding), glasscutting.
8. Metalcasting.
9. Welding (arc welding & gas welding), brazing.

Recommended Text/Reference Books:

1. S.K. Hajra Choudhury, A.K. Hajra Choudhury and S.K. Nirjhar Roy, 'Elements of Workshop Technology', Vol.-I, **2008** and Vol.-II **2010**, Media Promoters and Publishers Pvt. Ltd., Mumbai.
2. S. Kalpakjian, Steven S. Schmid, 'Manufacturing Engineering and Technology', 4th Edn., Pearson Education India Edn.,2002.
3. Gowri P. Hariharan and A. Suresh Babu, 'Manufacturing Technology – I', Pearson,2008.
4. Roy A. Lindberg, 'Processes and Materials of Manufacture', 4th Edn., Prentice Hall India, 1998.
5. P.N. Rao, 'Manufacturing Technology', Vol.-I and Vol.-II, Tata McGraw Hill House, 2017.

Workshop Practice: (70 Hrs.)

1. Machine shop (10Hrs.)
2. Fitting shop (8Hrs.)
3. Carpentry (6Hrs.)
4. Electrical & Electronics (8 Hrs.)
5. Welding shop (8 Hrs. (Arc welding 4 Hrs. + Gas welding 4Hrs.))
6. Casting (8Hrs.)
7. Sheet Metal Operations (10 Hrs.)
8. Smithy (6Hrs.)
9. Plastic moulding& Glass Cutting (6Hrs.)
10. Examinations could involve the actual fabrication of simple components, utilizing one ormore of the techniques covered above.

INTRODUCTION TO COMPUTER SCIENCE & ENGINEERING

Subject Code: BMNCC0-014

**L T PC
2 0 0 0**

Duration: 24Hrs.

Course Outcomes:

1. Basic knowledge of Computer Science and Engineering
2. Exploring Computer Science Fields and Opportunities
3. Understanding Computer Hardware and Software
4. Software Types and Operating Systems

UNIT-I

Introduction to Computer Science & Engineering, Difference between science & engineering, Applications of Computer Science & engineering.

UNIT-II

Different branches/fields of Computer Science, Scope of Computer Science in industry, self-employment etc.

UNIT-III

Introduction to Computer, parts of computer system. Difference between Hardware & software, Configuration of computer systems, Types of memory-RAM, ROM, Introduction to UPS-Online and Offline, printers etc.

UNIT-IV

Different types of Software- Application software and System Software, Types of Languages-High level and low level languages, Introduction to Operating System.

Calculus and Ordinary Differential Equation

Subject Code- BMATH1- 301

L T P C
3 0 0 3

Duration – 45hrs

Course Objectives:

Students will learn

1. Basics of sequence and series and their results to check convergence.
2. Multivariable concepts and their real life problems.
3. Green's theorem, Stokes theorem, and Gauss theorem and their applications.
4. Linear, non-linear ordinary differential equations of first and higher order.

Course Outcomes (CO)

Students will be able

1. To apply concepts of convergence of sequence and series.
2. To apply Green's theorem, Stokes's theorem and Gauss's theorem in real life situations.
3. To solve linear and non-linear ordinary differential equations.
4. To solve second and higher order linear, non-linear differential equation.

COURSE CONTENT

UNIT-I (12 Hrs)

Sequences and Series: Basic concept of Convergence, tests for convergence, power series, Taylor's series, Series for exponential, trigonometric and logarithmic functions.

Multivariable Calculus: Partial derivatives, directional derivatives, total derivative, Tangent plane and normal line, Maxima, minima and saddle points, Method of Lagrange multipliers.

UNIT-II (11 Hrs)

Multiple Integration: double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables, Theorems of Green, Gauss and Stokes (without proof), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds.

UNIT-III (11 Hrs)

First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT-IV (11 Hrs)

Ordinary differential equations of higher orders: Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

RECOMMENDED BOOKS

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
4. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
5. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India, 2009.
6. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
7. Earl A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.

INTRODUCTION TO INTERNET OF THINGS

Subject Code- BCSES2-301

**L T P C
3 0 0 3**

Duration – 45 hrs.

COURSE OBJECTIVE

The objective of this course is to impart necessary and practical knowledge of components of Internet of Things and develop skills required to build real-life IoT based projects.

COURSE OUTCOMES

CO1: Understand internet of Things and its hardware and software components

CO2: Interface I/O devices, sensors & communication modules.

CO3: Remotely monitor data and control devices

CO4: Develop real life IoT based projects

Unit 1(10 Hours)

Introduction to IoT :Architectural Overview, Design principles and needed capabilities, IoT Applications, Sensing, Actuation, Basics of Networking, M2M and IoT Technology Fundamentals- Devices and gateways, Data management, Business processes in IoT, Everything as a Service(XaaS), Role of Cloud in IoT, Security aspects in IoT.

Unit II (10 Hours)

Elements of IoT: Hardware Components- Computing (Arduino, Raspberry Pi), Communication, Sensing, Actuation, I/O interfaces. Software Components- Programming API's (using Python/Node.js/Arduino) for Communication Protocols-MQTT, ZigBee, Bluetooth, CoAP, UDP, TCP.

Unit III (15 Hours)

IoT Application Development : Solution framework for IoT applications- Implementation of Device integration, Data acquisition and integration, Device data storage- Unstructured data storage on cloud/local server, Authentication, authorization of devices.

Unit IV (10 Hours)

IoT Case Studies: IoT case studies and mini projects based on Industrial automation, Transportation, Agriculture, Healthcare, Home Automation

LIST OF SUGGESTED BOOKS

1. Vijay Madiseti, Arshdeep Bahga, "Internet of Things, "A Hands on Approach", University Press
2. Dr. SRN Reddy, Rachit Thukral and Manasi Mishra, "Introduction to Internet of Things: A practical Approach", ETI Labs
3. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press
4. Jeeva Jose, "Internet of Things", Khanna Publishing House, Delhi
5. Adrian McEwen, "Designing the Internet of Things", Wiley
6. Raj Kamal, "Internet of Things: Architecture and Design", McGraw Hill
7. Cuno Pfister, "Getting Started with the Internet of Things", O Reilly Media

DATA STRUCTURE & ALGORITHMS

Subject Code- BCSES1-302

L T P C

Duration – 60 hrs.

3 1 0 4

COURSE OBJECTIVE

1. To impart the basic concepts of data structures, algorithms and time complexity.
2. To understand concepts about stacks and queues.
3. To understand concepts about linked lists and trees.
4. To enable them to learn and write algorithms for hashing, sorting and graphs.

COURSE OUTCOMES

1. To impart the basic concepts of data structures, algorithms and time complexity.
2. To understand concepts about stacks and queues
3. To understand concepts about linked lists and trees
4. To enable them to learn and write algorithms for hashing, sorting and graphs

COURSE CONTENT

UNIT-I (15 Hrs)

Introduction: Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. Searching: Linear Search and Binary Search Techniques and their complexity analysis.

UNIT-II (15 Hrs)

Stacks and Queues: ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation –corresponding algorithms and complexity analysis. ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.

UNIT-III (15 Hrs)

Linked Lists: Singly linked lists: Representation in memory, Algorithms of several Operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: all operations their algorithms and the complexity analysis.

Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Binary Search trees,

Binary Search Tree, Tree operations on each of the trees and their algorithms with complexity analysis. Introduction to B Tree, B+ Tree and AVL Tree

UNIT-IV (15 Hrs)

Sorting and Hashing: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and comparison among all the methods, Hashing.

Graph: Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.

RECOMMENDED BOOKS:

1. "Fundamentals of Data Structures", Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer Science Press.

SUGGESTED REFERENCE BOOKS:

2. Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
3. "How to Solve it by Computer", 2nd Impression by R.G. Dromey, Pearson Education.

Digital Electronics

Subject Code- BCSES1-303

**L T P C
3 1 0 4**

Duration – 60 Hrs

COURSE OBJECTIVE

To learn the basic methods for the design of digital circuits and provide the fundamental concepts used in the design of digital systems.

COURSE OUTCOMES: At the end of this course, students will demonstrate the ability to

1. Understand working of logic families and logic gates.
2. Design and implement Combinational and Sequential logic circuits.
3. Understand the process of Analog to Digital conversion and Digital to Analog conversion.
4. Be able to use PLDs to implement the given logical problem.

COURSE CONTENT

UNIT-I (15hrs)

Fundamentals of Digital Systems and logic families: Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one's and two's complements arithmetic, codes, error detecting and correcting codes, characteristics of digital ICs, digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-state logic.

Combinational Digital Circuits: Standard representation for logic functions, K-map representation, simplification of logic functions using K-map, minimization of logical functions. Don't care conditions, Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serial adder, ALU, elementary ALU design, popular MSI chips, digital comparator, parity checker/generator, code converters, priority encoders, decoders/drivers for display devices, Q-M method of function realization.

UNIT-II (15hrs)

Sequential circuits and systems: A 1-bit memory, the circuit properties of Bistable latch, the clocked SR flip flop, J- K-T and D types flip flops, applications of flip flops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple (Asynchronous) counters, synchronous counters, counters design using flip flops, special counter IC's, asynchronous sequential counters, applications of counters.

UNIT-III (15hrs)

A/D and D/A Converters: Digital to analog converters: weighted resistor/converter, R-2R Ladder D/A converter, specifications for D/A converters, examples of D/A converter ICs, sample and hold circuit, analog to digital converters: quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, A/D converter using Voltage to frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs

UNIT-IV (15hrs)

Semiconductor memories and Programmable logic devices: Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory (RAM), content addressable memory (CAM), charge de coupled device memory (CCD), commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDs), Field Programmable Gate Array (FPGA).

RECOMMENDED BOOKS

1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.
3. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.

DATA STRUCTURE & ALGORITHMS LABORATORY

Subject Code- BCSES1-304

L T P C

0 0 4 2

COURSE OUTCOMES

1. To implementing searching algorithms and operations on stacks.
2. To enable the students to learn and implement sorting algorithms.
3. To implement operations for different types of queues.
4. To implement programs related to various types of Linked Lists.

PRACTICALS

1. Write a program for Linear search methods.
2. Write a program for Binary search methods.
3. Write a program for insertion sort, selection sort and bubble sort.
4. Write a program to implement Stack and its operation.
5. Write a program for quick sort.
6. Write a program for merge sort.
7. Write a program to implement Queue and its operation.
8. Write a program to implement Circular Queue and its operation.
9. Write a program to implement singly linked list for the following operations: Create, Display, searching, traversing and deletion.
10. Write a program to implement doubly linked list for the following operations: Create, Display, inserting, counting, searching, traversing and deletion.
11. Write a program to implement circular linked list for the following operations: Create, Display, inserting, counting, searching, traversing and deletion.

DIGITAL ELECTRONICS LABORATORY

Subject Code- BCSES1-305

L T P C

0 0 2 1

COURSE OUTCOMES

- 1 To Familiarization with Digital Trainer Kit and associated equipment.
- 2 To Study and design of TTL gates
- 3 To learn the formal procedures for the analysis and design of combinational circuits.
- 4 To learn the formal procedures for the analysis and design of sequential circuits

PRACTICALS: Implementation all experiments with help of Bread- Board.

1. Study of Logic Gates: Truth-table verification of OR, AND, NOT, XOR, NAND and NOR gates; Realization of OR, AND, NOT and XOR functions using universal gates.
2. Half Adder / Full Adder: Realization using basic and XOR gates. 13 13 Punjab Technical University B.Tech. Computer Science Engineering (CSE)
3. Half Subtractor / Full Subtractor: Realization using NAND gates.
4. 4-Bit Binary-to-Gray & Gray-to-Binary Code Converter: Realization using XOR gates.
5. 4-Bit and 8-Bit Comparator: Implementation using IC7485 magnitude comparator chips.

6. Multiplexer: Truth-table verification and realization of Half adder and Full adder using IC74153 chip.
7. Demultiplexer: Truth-table verification and realization of Half subtractor and Full subtractor using IC74139 chip.
8. Flip Flops: Truth-table verification of JK Master Slave FF, T-type and D-type FF using IC7476 chip.
9. Asynchronous Counter: Realization of 4-bit up counter and Mod-N counter using IC7490 & IC7493 chip.
10. Synchronous Counter: Realization of 4-bit up/down counter and Mod-N counter using IC74192 & IC74193 chip.
11. Shift Register: Study of shift right, SIPO, SISO, PIPO, PISO & Shift left operations using IC7495 chip.
12. DAC Operation: Study of 8-bit DAC (IC 08/0800 chip), obtain staircase waveform using IC7493 chip.
13. ADC Operations: Study of 8-bit ADC.

IT WORKSHOP (SciLab / MATLAB) LABORATORY

Subject Code- BCSES1-306

**L T P C
0 0 4 2**

COURSE OUTCOMES

1. Introduction to Sci Labs / MATLAB environment and types of Sci Labs / MATLAB files.
2. To be able to write programs for Matrix manipulations.
3. MATLAB code for computing factorial of a number
4. To be able to write programs using functions and plotting results

Following experiments to be conducted using Sci Labs / MATLAB

1. Introduction to Sci Labs / MATLAB environment and types of Sci Labs / MATLAB files.
2. Use of help command to get help about different inbuilt functions.
3. Write a program to show the output of various unary and binary operators.
4. Write programs for Matrix Manipulations, (reshaping matrices, expanding matrix size, appending or deleting a row/column to a matrix, concatenation of matrices).
5. Write programs which demonstrate the use special matrices.
6. Write programs to show output for various matrix and array operations.
7. Write programs for demonstrating the use for various control statements.
8. Write a MATLAB code for computing factorial of a number n. Assume n is already defined. The code should return a scalar, not a vector.
9. Write programs using functions and plot results.

*other programs related to some application area may also be done

INSTITUTION TRAINING-I*(4 WEEKS)

Subject Code- BCSES1-307

**L T P C
0 0 0 3**

Duration – 4 WEEKS

Training after the 2nd Semester, students are required to be involved in Inter/ Intra Institutional Activities viz; Training with higher Institutions; Soft skill training organized by Training and Placement Cell of the respective institutions; contribution at incubation/ innovation /entrepreneurship cell of the institute; participation in conferences/ workshops/ competitions etc.; Learning at Departmental Lab/Tinkering Lab/ Institutional workshop; Working for consultancy/ research project within the institutes and Participation in all the activities of Institute's Innovation Council for eg: IPR workshop/Leadership Talks/ Idea/Design/ Innovation/ Business Completion/ Technical Expos etc.

DEVELOPMENT OF SOCIETIES

Subject Code- BHSMC0-007

**L T P C
3 0 0 3**

Duration – 45hrs

Course Outcomes

Students will be able to

- 1 Become familiar with development of different social systems, connectedness of human being with society and able to evaluate different models of social development.
- 2 Develop ideas about political system and identify discriminating features of various governing systems.
- 3 Build up knowledge about different economic systems and evaluate various ideas of economic developmental ideologies.
- 4 Understand the relationship between human and society both historically and analytically

Course objectives

To make the students

1. To Understand societal development and various societal models
2. To understand and analyze different political systems
3. To develop knowledge about economic systems and ideologies
- 4 To understand the economic development in different periods of history.

UNIT-I (15 hrs)

Social Development: Concepts behind the origin of Family, Clan and Society, Different Social Systems, Relation between Human being and Society, Comparative studies on different models of Social Structures and their evolution

UNIT-II (15 hrs)

Political Development: Ideas of Political Systems as learnt from History, Different models of Governing system and their comparative study

UNIT-III (15 hrs)

Economic Development: Birth of Capitalism, Socialism, Marxism, Concept of development in pre-British, British and post British period- Barter, Jajmani, Idea of development in current context., E. F. Schumacher's idea of development, Buddhist economics. Gandhian idea of development. Swaraj and Decentralization.

RECOMMENDED BOOKS:

TEXT BOOK:

1. 'Indian Society' by Dr S.K Jena & B.N Mohanty
2. 'Indian Society' by C.N Shankar Rao
3. 'Foundations of Political Science, Indian Constitution & Government' by Gulshan Rai, SomNathVerma& Suresh Kumar

***REFERENCE BOOKS:**

1. 'The Interpretation of Cultures: Selected Essays' by Geertz & Clifford. 1973, New York
2. 'Dictionary of Modern Sociology Houlst' by Thomas Ford, ed. 1969) Totowa, New Jersey, United States: Littlefield, Adams & Co.
3. 'Sociology –In a Changing Society' by William Korblum
4. 'The Origin of Humankind' by Leakey, Richard 1996, New York Basic Books

4. OTHER SESSIONS

***TUTORIALS:**

***LABORATORY:**

***PROJECT:** Possible projects in this course could be

- a) Interact with local communities and understand their issues.
- b) Study local cottage industry and agricultural practices. Role of engineering and specialized knowledge.
- c) Evaluation of technology in the context of its application. Social impact of technology. Environmental impact of technology. Evaluation from a holistic perspective.

THE MAHARAJA OF PEOPLE

Subject Code: BMNCC0-052

**L T P C
2 0 0 0**

Duration: 30 Hrs.

UNIT-I (8 Hrs)

The Early Life: Early life of Maharaja Ranjit Singh, First battle, Death of Father, Act of bravery, Unifying Punjab, Coronation

UNIT-II (8 Hrs)

Conquests: Jhang, Kasoor, Multan, Peshawar, Naushehra, Annexation of Peshawar into Sikh Kingdom, Jamraudh, Kashmir, Ladakh, Tibbet, Formation of State of J & K

UNIT-III (8 Hrs)

Administrative Capabilities

Administration: Central Govt., Provincial & local Govt., Financial Administration, Judicial systems, Secular State, Military System, Creation of a regular force, Organization of Army, Recruitment & Payment, Education System, Pattern of the arts, a unique portrait, Touchstone, The court of Maharaja Ranjit Singh, Europeans at Sikh Court

UNIT-IV (6 Hrs)

The Legacy: Diamond Kohinoor, Love for common Folk, A ruler much ahead of his times, Graciousness of Maharaja, True Nationalist, Maharaja's Notion of Nationalism & Secularism, the last journey, The enduring legacy of Maharaja, Secrets of popularity of Maharaja, Nature of Maharaja's polity.

Recommended Books:

1. Rajmohan Gandhi: Punjab: A History from Aurangzeb to Mountbatten, 2013.
2. Grewal, J.S.: The Sikhs of the Punjab, Cambridge University Press, 1968.
3. Khushwant Singh: A History of the Sikhs Vol. 1 1469-1839, Oxford University Press, 1963.
4. Untold story of Maharaja Ranjit Singh

INTRODUCTION TO CYBER SECURITY

Subject Code- BCSES2-401

**L T P C
3 1 0 4**

Duration – 60 hrs.

COURSE OBJECTIVES

The course has been designed to give students an extensive overview of cyber security issues, tools and techniques that are critical in solving problems in cyber security domains. The course aims at providing students with concepts of computer security, cryptography, digital money, secure protocols, detection and other security techniques.

COURSE OUTCOMES

1. Understand, appreciate, employ, design and implement appropriate security technologies and policies to protect computers and digital information.
2. Identify & Evaluate Information Security threats and vulnerabilities in Information Systems and apply security measures to real time scenarios
3. Identify common trade-offs and compromises that are made in the design and development process of Information System
4. Demonstrate the use of standards and cyber laws to enhance information security in the development process and infrastructure protection

UNIT 1 (15 Hours)

Data communication Components: Representation of data and its flow Networks, Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum.

Unit II (15 Hours)

Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols.

Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping –ARP, RARP. Forwarding and Unicast Routing protocols.

Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control.

Application Layer: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP

Unit III (15 Hours)

Cyber Security: Essential Terminologies: CIA, Risks, Breaches, Threats, Attacks, Exploits. Information Gathering (Social Engineering, Foot Printing & Scanning).

Cryptography and Cryptanalysis: Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security, Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec.

Unit IV (15 Hours)

Infrastructure and Network Security: Introduction to System Security, Server Security, OS Security, Physical Security, Introduction to Networks, Network packet Sniffing, Network Design Simulation. DOS/ DDOS attacks. Asset Management and Audits, Vulnerabilities and Attacks. Intrusion detection and Prevention Techniques, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation. Open Source/ Free/ Trial Tools: DOS Attacks, DDOS attacks, Wireshark, Cain & abel, iptables/ Windows Firewall, snort, suricata, fail2ban

LIST OF SUGGESTED BOOKS

1. William Stallings, "Cryptography and Network Security", Pearson Education/PHI
2. V.K. Jain, "Cryptography and Network Security", Khanna Publishing House.
3. Gupta Sarika, "Information and Cyber Security", Khanna Publishing House, Delhi.
4. Atul Kahate, "Cryptography and Network Security", McGraw Hill.
5. V.K. Pachghare, "Cryptography and Information Security", PHI Learning
6. Nina Godbole, "Information System Security", Wiley
7. Bothra Harsh, "Hacking", Khanna Publishing House, Delhi.
8. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGraw-Hill.
9. Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice HallIndia.
10. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.

COMPUTER ORGANIZATION & ARCHITECTURE

Subject Code- BCSES1-401

**L T P C
3 0 0 3**

Duration – 45hrs

COURSE OBJECTIVE

To expose the students to the following:

1. How Computer Systems work & the basic principles
2. Instruction Level Architecture and Instruction Execution
3. The current state of art in memory system design
4. How I/O devices are accessed and its principles.
5. To provide the knowledge on Instruction Level Parallelism
6. To impart the knowledge on micro programming
7. Concepts of advanced pipelining techniques.

COURSE OUTCOMES

1. Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
2. Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
3. Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
4. Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU.
5. Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology

COURSE CONTENT

UNIT-I (11 hrs)

Functional blocks of a computer: CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU—registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction sets of some common CPUs.

Data representation: signed number representation, fixed and floating pointer presentations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look ahead adder etc. multiplication shift and add.

UNIT-II (12 hrs)

Introduction to x86 architecture.

CPU control unit design: hardwired and micro-programmed design approaches.

Memory system design: semiconductor memory technologies, memory organization.

UNIT-III (11 hrs)

Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers—program controlled, interrupt driven and DMA, software interrupts and exceptions. Programs and processes—role of interrupts in process state transitions.

UNIT-IV (11 hrs)

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards.

Parallel Processors: Introduction to parallel processors.

Memory organization: Memory interleaving, concept of hierarchical memory

organization, cache memory, cache size vs. block size, mapping, replacement algorithms.

RECOMMENDED BOOKS:

1. “Computer Organization and Design: The Hardware/Software Interface”, 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
2. “Computer Organization and Embedded Systems”, 6th Edition by Carl Hamacher, McGraw Hill Higher Education.

SUGGESTED REFERENCE BOOKS:

1. “Computer Architecture and Organization”, 3rd Edition by John P. Hayes, WCB/McGraw-Hill
2. “Computer Organization and Architecture: Designing for Performance”, 10th Edition by William Stallings, Pearson Education.
3. “Computer System Design and Architecture”, 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

OPERATING SYSTEMS

Subject Code- BCSES1-402

**L T P C
3 1 0 4**

Duration – 60hrs

COURSE OBJECTIVE

To learn the fundamentals of Operating Systems.

1. To learn the mechanisms of OS to handle processes and threads and their communication
2. To learn the mechanisms involved in memory management in contemporary OS
3. To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
4. To know the components and management aspects of concurrency management
5. To learn to implement simple OS mechanisms

COURSE OUTCOMES

At the end of this course, students will demonstrate the ability to1.

Create processes and threads.

2. Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
3. For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4. Design and implement file management system and For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

COURSE CONTENT

UNIT-I (15hrs)

Introduction: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS-Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System.

UNIT-II (16hrs)

Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching

Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, **Scheduling criteria:** CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time;

Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF.

Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer\ Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dining Philosopher Problem etc.

UNIT-III (15hrs)

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation -Hardware support for paging, Protection and sharing, Disadvantages of paging.

Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

UNIT-IV (14hrs)

File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation(linear list, hashtable), efficiency and performance.

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks

RECOMMENDED BOOKS

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.

SUGGESTED REFERENCE BOOKS:

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

OBJECT ORIENTED PROGRAMMING

Subject Code- BCSES1-403

L T P C

Duration – 60 hrs

3 1 0 4

COURSE OBJECTIVE

To introduce the principles and paradigms of Object Oriented Programming Language for design and implement the Object Oriented System

COURSE OUTCOME

1. To introduce the basic concepts of object oriented programming language and its representation
2. To allocate dynamic memory, access private members of class and the behavior of inheritance and its implementation.
3. To introduce polymorphism, interface design and overloading of operator.
4. To handle backup system using file, general purpose template and handling of raised exception during programming

UNIT-I (15hrs)

Introduction to C++, C++ Standard Library, Illustrative Simple C++ Programs. Header Files, Namespaces, Application of object oriented programming.

Object Oriented Concepts, Introduction to Objects and Object Oriented Programming, Encapsulation, Polymorphism, Overloading, Inheritance, Abstract Classes, Accessifier (public/protected/ private), Class Scope and Accessing Class Members, Controlling Access Function, Constant, Class Member, Structure and Class

UNIT-II (15hrs)

This Pointer, Dynamic Memory Allocation and Deallocation (New and Delete), Static Class Members, Constructors, parameter Constructors and Copy Constructors, Deconstructors, Introduction of inheritance, Types of Inheritance, Overriding Base Class Members in aDerived Class, Public, Protected and Private Inheritance

UNIT-III (15hrs)

Polymorphism, Pointer to Derived class, Virtual Functions, Pure Virtual Function, Abstract Base Classes, Static and Dynamic Binding

Fundamentals of Operator Overloading, Rules for Operators Overloading, Implementation of Operator Overloading Like <<, >> Unary Operators, Binary Operators.

Basics of C++ Exception Handling, Try, Throw, Catch, multiple catch, Re-throwing an Exception.

UNIT-IV (15hrs)

Text Streams and binary stream, Sequential and Random Access File, Stream Input/ Output Classes, Stream Manipulators.

Templates: Function Templates, Overloading Template Functions, Class Template, Class Templates

Introduction: design patterns, Classifications

Introduction: model- view- controller pattern

RECOMMENDED BOOKS:

1. Robert Lafore, 'Object Oriented Programming in Turbo C++', 2nd Ed., The WAITE Group Press, 1994.
2. Herbert shield, 'The complete reference C ++', 4th Ed., Tata McGraw Hill, 2003.
3. Shukla, 'Object Oriented Programming in C++', Wiley India, 2008.
4. H M Deitel and P J Deitel, 'C++ How to Program', 2nd Ed., Prentice Hall, 1998.
5. D Ravichandran, 'Programming with C++', 3rd Ed., Tata McGraw Hill, 2003.
6. Bjarne Stroustrup, 'The C++ Programming Language', 4th Ed., Addison Wesley, 2013.
7. R. S. Salaria, 'Mastering Object-Oriented Programming with C++', Salaria Publishing

House, 2016.

OPERATING SYSTEMS LABORATORY

Subject Code- -BCSES1-404

L T P C

0 0 2 1

COURSE OUTCOMES

1. To be able to install various operating systems
 2. To learn commands for files and directories.
 3. To learn about background processes and commands to print something.
 4. To be able to learn shell programming.
-
1. Installation Process of various operating systems
 2. Virtualization, Installation of Virtual Machine Software and installation of Operating System on Virtual Machine
 3. Commands for files & directories: cd, ls, cp, md, rm, mkdir, rmdir. Creating and viewing files using cat. File comparisons. Disk related commands: checking disk free spaces. Processes in linux, connecting processes with pipes, background processing, managing multiple processes. Manual help. Background process: changing process priority, scheduling of processes at command, batch commands, kill, ps, who, sleep. Printing commands, grep, fgrep, find, sort, cal, banner, touch, file. File related commands ws, sat, cut, grep.
 4. Shell Programming: Basic of shell programming, various types of shell, ShellProgramming in bash, conditional & looping statement, case statements, parameter passing and arguments, shell variables, shell keywords, creating shell programs for automate system tasks, report printing.

OBJECT ORIENTED PROGRAMMING USING C++ LABORATORY

Subject Code- BCSES1-405

L T P C

0 0 4 2

COURSE OUTCOMES

1. To learn the concept of classes and objects.
2. To be able to implement constructors and destructors.
3. To implement initializer list and operator overloading
4. To learn type casting and inheritance.

PRACTICALS

1. Classes and Objects- Write a program that uses a class where the member functions are defined inside a class.
2. Classes and Objects- Write a program that uses a class where the member functions are defined outside a class.
3. Classes and Objects- Write a program to demonstrate the use of static data members.
4. Classes and Objects- Write a program to demonstrate the use of const data members.
5. Constructors and Destructors- Write a program to demonstrate the use of zero argument and parameterized constructors.
6. Constructors and Destructors- Write a program to demonstrate the use of explicit constructor.
7. Initializer Lists- Write a program to demonstrate the use of initializer list.
8. Operator Overloading- Write a program to demonstrate the overloading of increment and decrement operators.
9. Operator Overloading- Write a program to demonstrate the overloading of binary

arithmetic operators.

10. Typecasting- Write a program to demonstrate the typecasting of basic type to class type.
11. Typecasting- Write a program to demonstrate the typecasting of class type to basic type.
12. Typecasting- Write a program to demonstrate the typecasting of class type to class type.
13. Inheritance- Write a program to demonstrate the multilevel inheritance

ORGANIZATIONAL BEHAVIOR

Subject Code- BHSMC0-016

**L T P C
3 0 0 3**

Duration – 45hrs

Course Objectives: The course aims to provide an understanding of basic concepts, theories and techniques in the field of human behavior at the individual, group and organizational levels in the changing global scenario. The course must be taught using case study method.

Course Outcomes:-

1. After Studying this course the students will equip with ability to identify, explore and examine factors
2. Impinge on Individual and group behavior in organizations in the new millennium
3. Explain the terminology associated with organizational behavior
4. Incorporate and apply the predominate organization behavior theories to gain
5. knowledge of contemporary issues in organizational behavior
6. Frameworks to work with real life organizational issues concerned with human behavior at work place

UNIT-I (12Hrs)

Organizational Behaviour: Concepts, Theories and organization aspects of OB, Contributing Disciplines to OB, challenges and opportunities for OB. Foundations of Individual Behaviour: Biographical Characteristics, Course, Theories of Course, Attitudes, Attitude Change, Values & Believes, Prejudices Personality: Determinants of Personality, Perception, Attribution Theory, Person's Perception.

UNIT-II (11Hrs)

Motivation: Definition & Process, Early Theories of Motivation, Contemporary Theories of Motivation, Nature and process of Motivation, Application of Motivation Concept. Job Satisfaction: Nature & Significance of Job satisfaction. Leadership: Nature Significance & Theories; Leadership Effectiveness Model; Leadership Traits & Skills; Behavioural Styles in Leadership. Transactional Analysis, Life Position, Johari Window Model.

UNIT-III (11Hrs)

Foundations of Group Behaviour: Nature & Concept of Group Formation, Stages of Group Formation, Theories of Group Formation. Teams, Difference between Group and Team Group Decision Making: Meaning & Nature, Decision Making Process; Decision Making Styles; Advantages & disadvantages of Decision Making; Techniques of Decision Making; Group Size & Decision Making.

UNIT-IV (11Hrs)

Organizational Change & Development: Meaning & Definition, Change Agents, Change Models, Resistance to Change. Power and Politics in Organization: Nature & Concepts, Sources & Types of Power, Techniques of Politics. Stress Management: Meaning and Concept of Stress,

Stress in Organizations

Recommended Books

1. Robbins, 'Organization Behavior', Pearson Education.
2. Luthans, 'Organization Behavior', Tata McGraw Hill.
3. Hersey, 'Management of Organizational Behavior', Prentice Hall India.
4. Aswathappa, 'Organization Behavior', Himalaya Publications.
5. L.M. Prasad, 'Organization Behavior', Sultan Chand & Sons
6. Parikh, Gupta, 'Organizational Behavior', Tata McGraw Hill

MRSPTU

UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY

Subject Code: BHSMC0-026

**L T P C
2 1 0 3**

Duration: 45Hrs

Course Objectives

This course is intended to provide a much needed orientational input in value education to the young enquiring minds.

Course Outcomes

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

UNIT I (09 Hrs.)

Introduction to Value Education Lecture: Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity – the Basic Human Aspirations, Right Understanding, Relationship and Physical Facility, Happiness and Prosperity – Current Scenario, Method to Fulfill the Basic Human Aspirations

UNIT II (12 Hrs.)

Harmony in the Human Being: Understanding Human being as the Co-existence of the Self and the Body Lecture 8: Distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health

UNIT III (09 Hrs.)

Harmony in the Family and Society : Harmony in the Family – the Basic Unit of Human Interaction, Values in Human-to-Human Relationship, 'Trust' – the Foundational Value in Relationship, 'Respect' – as the Right Evaluation, Exploring the Feeling of Respect, Understanding Harmony in the Society, Vision for the Universal Human Order

UNIT IV (15 Hrs.)

Harmony in the Nature/Existence: Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature, Realizing Existence as Co-existence at All Levels, The Holistic Perception of Harmony in Existence

Implications of the Holistic Understanding – a Look at Professional Ethics: Natural Acceptance of Human Values, Definitiveness of (Ethical) Human Conduct, A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics, Holistic Technologies, Production Systems and Management Models- Typical Case Studies, Strategies for Transition towards Value-based Life and Profession

Suggested Readings:

Text Book and Teachers Manual

- a. The Textbook A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
- b. The Teacher's Manual Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978- 93-87034-53-2 3.2

Recommended Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff(Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J CKumarappa
8. Bharat Mein Angreji Raj - PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

DIET AND NUTRITION: BEGINNER TO ADVANCED

COURSE CODE: MOOCFOT-A01

DURATION: 1 Week/ Module

Course Prerequisites:

Willingness to help and motivate others to eat health & diet correctly

What you will learn?

1. Design weight loss & muscle growth diets
2. Help other lose fat & build muscle
3. Assess clients and determine fitness levels
4. Understand the fundamentals of proper nutrition
5. Build and grow a coaching business

Course Description:

You will learn everything you need to know about the fundamentals of good meal.

Plans and how to design your very own for you or your clients. This course enables you to learn the appropriate diet for health and losing weight but gaining muscle.

COURSE DETAILS

MODULE 1: Nutrition Theory

TOPIC 1: Introduction Nutrition Theory

Lecture 1.1: Everything You Need to Know About Calories, Protein, Carbs & Fat

Lecture 1.2: How to Determine Your Optimal Calorie Intake

Lecture 1.3: Protein, Carb & Fat Digestion

MODULE 2: Helping Clients Lose Weight

TOPIC 1: Helping Clients Lose Weight

Lecture 1.1: How to Create Diets for Weight Loss

Lecture 1.2: Meal Planning

Lecture 1.3: How to Break Through Weight Loss Plateaus?

MODULE 3: Helping Clients Build Muscle

TOPIC 1: Helping Clients Build Muscle

Lecture 1.1: How to Create Diets for Muscle Gains?

Lecture 1.2: When to Eat for Optimal Results? Pre- & Post-Workout Meals

MODULE 4: Diet Trends Explained:

TOPIC 1: Diet Trends Explained:

Lecture 1.1: Gluten Free and Low Carb Diet

Lecture 1.2: Paleo Dieting, Intermittent Fasting, Vegan Diet, Ketogenic Diets

MODULE 5: Vitamins & Minerals:

TOPIC 1: Vitamins & Minerals:

Lecture 1.1: Vitamins, Minerals, their role and deficiency

Lecture 1.2: Role of Water and its Intake

MODULE 6: Supplements (If You Really Need them):

TOPIC 1: Supplements (If You Really Need them):

Lecture 1.1: Whey Proteins, WPI, WPC

Lecture 1.2: Creatine

SQL-MySQL for Data Analytics

COURSE CODE: MOOCCAP-A12

DURATION: 1 Week/ Module

Course Prerequisites:

No prior experience, only basic computer knowledge is required.

What you will learn?

1. What is relational Database management.
2. How to create database with SQL.
3. Learn how to code in SQL.
4. Handle SQL joins.
5. Learn to insert, update and delete records from the database.

Course Description:

Managing databases is the most crucial step while working with data. Database management and extracting the correct data is the foundation for any analysis and smart decision making. The course will cover the basics of database management and the relations between the data. What is SQL and why we learn MySQL. We will learn to write queries in SQL and extract data to solve real-world business problems.

COURSE DETAILS

MODULE 1: Introduction

TOPIC 1: Get started with database, SQL and MySQL

- Lecture 1.1: What is database?
- Lecture 1.2: Why use SQL?
- Lecture 1.3: Importance of MySQL

MODULE 2: SQL SERVER LANGUAGES AND RELATIONAL DATABASES

TOPIC 1: SQL language statements

- Lecture 1.1: DDL
- Lecture 1.2: DCL
- Lecture 1.3: DML
- Lecture 1.4: TCL

TOPIC 2: Relational Database Terminology

- Lecture 1.1: Relational Database essentials
- Lecture 1.2: Primary key
- Lecture 1.3: Foreign key
- Lecture 1.4: Unique key and null values

TOPIC 3: Installing MySQL

Lecture 1.1: Get acquainted with the interface

MODULE 3: BASICS OF SQL

TOPIC 1: First Steps in SQL

Lecture 1.1: Creating a database

Lecture 1.2: Introduction to datatypes

Lecture 1.3: Creating a table

MODULE 4: CONSTRAINTS OF MYSQL

TOPIC 1: Different constraints in MySQL

Lecture 1.1: Primary key constraint

Lecture 1.2: Foreign key constraint

Lecture 1.3: Unique constraint

Lecture 1.4: Default constraint

Lecture 1.5: Not null

MODULE 5: THE SELECT STATEMENT

TOPIC 1: Load the database

Lecture 1.1: Loading employees' database

TOPIC 2: Starting with SELECT statement

Lecture 1.1: Select-From

Lecture 1.2: Where

Lecture 1.3: And-Or

Lecture 1.4: In-not in

Lecture 1.5: Like-not like

Lecture 1.6: Wildcard characters

Lecture 1.7: Between-and

Lecture 1.8: Is not null-is null

Lecture 1.9: Select distinct

Lecture 1.10: Aggregate statement

Lecture 1.11: Order by-Group by

Lecture 1.12: Using Aliases

Lecture 1.13: Having and Limit

MODULE 6: THE SQL STATEMENT

TOPIC 1: Insert statement

Lecture 1.1: Inserting data INTO table

TOPIC 2: Update statement

Lecture 1.1: Commit and rollback

TOPIC 3: Delete statement

Lecture 1.1: Drop vs Truncate

MODULE 7: AGGREGATE FUNCTIONS

TOPIC 1: Functions

Lecture 1.1: Count ()

Lecture 1.2: Sum ()

Lecture 1.3: Min and Max ()

Lecture 1.4: Avg ()

Lecture 1.5: Round ()

MODULE 8: SQL JOINS

TOPIC 1: Introduction to Joins

Lecture 1.1: Joins

Lecture 1.2: Left join

Lecture 1.3: Right join

Lecture 1.4: Cross join

Lecture 1.5: Union and Union all

MODULE 9: SUBQUERIES

TOPIC 1: Working with Subqueries

Lecture 1.1: IN nested inside Where

Lecture 1.2: EXISTS nested inside Where

MODULE 10: STORED ROUTINES

TOPIC 1: Introduction to Stored Procedures

Lecture 1.1: With input parameter

Lecture 1.2: With output parameter

Lecture 1.3: Variables

Lecture 1.4: User defined functions

ADOBE PREMIER PRO 2021: VIDEO EDITING FOR BEGINNERS

COURSE CODE: MOOCCAP-A10

DURATION: 1 Week/ Module

Course Prerequisites:

Basic Knowledge of Computer

What you will learn?

1. Learn how to edit a video
2. How to speed up Premiere Pro so it doesn't run slow while editing.
3. How to add import video your Premiere Pro Project
4. How to organize your video editing footage like a Pro
5. Color grading video using
6. Adding text in videos
7. How to export video in best settings
8. How to speed up the your Clips

Course Description:

Adobe Premiere Pro and to show you the tools you need to become a successful video editor.

Premiere Pro is the industry standard used by professional designers to create stunning, high class videos and, after completing this course, you too can become a confident, skilful and efficient creator of stunning videos.

This course is aimed at people who are completely new to Premiere Pro.

COURSE DETAILS

MODULE 1 Introduction to Course & Getting Started

Topic 1: Introduction

Lecture 1.1: Welcome to Our Course

Lecture 1.2: Introduction

Lecture 1.3: How to optimize the Premiere Pro

Topic 2: Getting Started

Lecture 1.1: Starting a New Project

Lecture 1.2: Cutting the Footage

Lecture 1.3: Rearranging the Flow

Lecture 1.4: Ripple tool

MODULE 2 Speed, Keyframing, Color Corrections

Topic 1: Speed

Lecture 1.1: Speed Ramping

Lecture 1.2: Wrap Stabilization

Lecture 1.3: Speed Duration

Topic 2: Keyframing

Lecture 1.1: Keyframing

Topic 3: Color Corrections

- Lecture 1.1: Color Corrections
- Lecture 1.2: Color Grading

MODULE 3 Sound, Effects & Transitions

Topic 1: Sound Design

- Lecture 1.1: Introduction to Sound Design
- Lecture 1.2: Sound Design – SFX
- Lecture 1.3: Music

Topic 2: Effects

- Lecture 1.1: Effects on videos part 1
- Lecture 1.2: Effects on Videos Part 2

Topic 3: Motions and Transitions

- Lecture 1.1: Motion and transitions part 1
- Lecture 1.2: Motion and transitions Part 2

MODULE 4 Working with Text & Export

Topic 1: Working with Text

- Lecture 1.1: Text in Videos
- Lecture 1.2: Rolling Credits
- Lecture 1.3: Crawling text
- Lecture 1.4: Legacy Titles

Topic 2: Export

- Lecture 1.1: Best export Settings
- Lecture 1.2: How to Compress your Video

AUTODESK MAYA2018: 3D MODELING FOR BEGINNERS

COURSE CODE: MOOCCAP-A09

DURATION: 1 Week/Module

Course Prerequisites:

Autodesk provides a free 1-year educational version and 30-day free trial of Maya from their website (Basic computer knowledge)

What you will learn?

1. Learn how to edit a making model
2. How to speed up maya so it doesn't run slow while modelling or rendering.
3. How to add import object and texture and light your maya project
4. Adding mapping and texture in modelling
5. How to characters modelling in easily way

Course Description:

I am here to help you learn Autodesk Maya 2018 and to show you the tools you need to become a successful 3d modelling and animation.

Maya is the industry standard used by professional designers to create stunning, high class 3d modelling, animation and, after completing this course you can make different types of models or characters

COURSE DETAILS

MODULE 1: Introduction, tool & command

Topic 1: Introduction, tool & command

- Lecture 1: Introduction
- Lecture 2: Learn the interface of maya
- Lecture 3: Starting some edge and vertex
- Lecture 4: Change interactive creation, Shap tool, Aline tool

MODULE 2: Modeling coffee mug, cup, Dining table, Chair, Lighting

TOPIC 1: Introduction of Modeling coffee mug, cup, Dining table, Chair, Lighting

- Lecture 1: Coffee cup modeling
- Lecture 2: Table modeling
- Lecture 3: Chair modeling
- Lecture 4: Lighting part 1

MODULE 3: Basic render, UV editor, Shapes command, Deform tool bar

TOPIC 1: Introduction of Basic render, UV editor, Shapes command, Deform tool bar

- Lecture 1: Basic texture & Render

Lecture 2: UV editor Part 1
Lecture 3: UV editor Part 2
Lecture 4: UV editor Part 3
Lecture 5: Bend, Flare, shine, Squash, twist, wave Command

MODULE 4: Calico character modelling

TOPIC 1: Introduction of Calico character modelling

Lecture 1: Modelling leg part 1
Lecture 2: Modelling leg part 2
Lecture 3: Modelling Chest and arms part 1
Lecture 4: Modelling Chest and arms part 2

MODULE 5: Character modelling (HUMAN BODY)

TOPIC 1: Introduction of Character modelling (HUMAN BODY)

Lecture 1: Modelling Chest part 1
Lecture 2: Modelling Chest and arms part 2
Lecture 3: Modelling Chest and arms part 3
Lecture 4: Modelling hand and fingers
Lecture 5: Modelling arms and hand fix
Lecture 6: Modelling leg: part 1
Lecture 7: Modelling leg: part 2
Lecture 8: Modelling head

ADOBE PHOTOSHOP 2021 FOR BEGINNERS

COURSE CODE: MOOCCAP-A08

DURATION: 1 Week/ Module

Course Prerequisites:

You should have Adobe Premiere Pro installed on your computer to follow along.

What you will learn?

1. Resize Images
2. Layer Masking
3. Retouch distorted images
4. Banner Design
5. Website Design Basics

Course Description:

I am here to help you learn Adobe Photoshop and to show you the tools you need to become a successful designer.

Adobe Photoshop is a **raster graphics editor** developed and published by Adobe Inc. for Windows and macOS. It was originally created in 1988 by Thomas and John Knoll. Since then, the software has become the industry standard not only in raster graphics editing, but in digital art as a whole.

This course is aimed at people who are completely new to Adobe Photoshop.

COURSE DETAILS

MODULE 1: Introduction to Course & Getting Started

Topic 1: Introduction

Lecture 1.1: Introduction to Adobe Photoshop 2021

Topic 2: Basics & Shape tools

Lecture 2.1: Basic of Adobe Photoshop

Lecture 2.2: All shape tools

MODULE 2: Layers, Marquee, Lasso tool

TOPIC 1: Introduction of Layers, Marquee, Lasso tool

Lecture 1.1: How to move a layer

Lecture 1.2: Using of Marquee tool

Lecture 1.3: Using of Lasso tool

MODULE 3: Selection, Text, Gradient tools

TOPIC 1: Introduction of Selection, Text, Gradient tools

Lecture 1.1: Quick selection tool and Magic wand Tool

Lecture 1.2: Using of Text Tool

Lecture 1.3: Using of Gradient tool

MODULE 4: Color picker tool, hand tool and cartoon banner

TOPIC 1: Introduction of Color picker tool, hand tool and cartoon banner

Lecture 1.1: Colour picker and eye dropper

Lecture 1.2: Cartoon Banner
Lecture 1.3: Using of Hand tool

MODULE 5: Clipping mask, Crop tool, pen tool

TOPIC 1: Introduction of Clipping mask, Crop tool, pen tool

Lecture 1.1: Banner design and clipping mask
Lecture 1.2: Crop tool and slice tool
Lecture 1.3: Using of Pen tool

MODULE 6: Website design, Brush, Healing, Eraser, Blur Tool

TOPIC 1: Introduction of Website design, Brush, Healing, Eraser, Blur Tool

Lecture 1.1: Website design basics
Lecture 1.2: Using of Brush Tool
Lecture 1.3: Using of Healing tool
Lecture 1.4: Using of Eraser tool
Lecture 1.5: Using of Blur Tool

MODULE 7: Layer Masking, History, Dodge, Burn tool

TOPIC 1: Introduction of Layer Masking, History, Dodge, Burn tool

Lecture 1.1: Layer masking
Lecture 1.2: History and history brush tool
Lecture 1.3: Dodge, Burn, Sponge
Lecture 1.4: Inheritance in OOPS

BLENDER FOR BEGINNERS

COURSE CODE: MOOCCAP-A11

DURATION: 1 Week/ Module

Course Prerequisites:

Basic Knowledge of Computer

What you will learn?

1. Learn what is 3D
2. Principals of 3D
3. Modelling in 3D
4. Texturing & Materials in Blender
5. Different lights used in 3D
6. Creating 3D scene from Modelling to render
7. How to render best quality in minimum time
8. Using different Render engines in Blender.

Course Description:

I am here to help you learn Blender and to show you the tools you need to become a successful 3D Artist.

Blender is the industry standard used by professional 3D Artists to create stunning, 3D imagery after completing this course, you too can become a confident, skilful and efficient creator of stunning CGI (Computer Generated Imagery).

This course is aimed at people who are completely new to Blender & 3D.

COURSE DETAILS

MODULE 1: Introduction to Course & Getting Started

Topic 1: Introduction

- Lecture 1: Understanding what is 3D
- Lecture 2: Learning Blender UI
- Lecture 3: How to optimize Blender

Topic 2: Getting Started

- Lecture 1: Starting a New Project
- Lecture 2: Blender Tools
- Lecture 3: Research & Collecting References
- Lecture 4: Creating Composition

MODULE 2: Modelling

TOPIC 1: Introduction of Modelling

- Lecture 1: Basic principle of Modelling
- Lecture 2: Learning Modelling tools
- Lecture 3: Learning about 3D mesh flow
- Lecture 4: Creating a Room in 3D

Lecture 5: Part 1

Lecture 6: Part 2

MODULE 3: Texturing

TOPIC 1: Introduction of Texturing

Lecture 1: Understanding how 3D texturing works

Lecture 2: Learning About UV mapping

Lecture 3: Part 1

Lecture 4: Part 2

Lecture 5: Texturing a 3D room

Lecture 6: Part 1

Lecture 7: Part 2

MODULE 4: Lighting in Blender

TOPIC 1: Introduction of Lighting in Blender

Lecture 1: Understanding about different lights in Blender

Lecture 2: Working with HDRI's

Lecture 3: Lighting a Room scene

Lecture 4: Part 1

Lecture 5: Part 2

MODULE 5: Rendering

TOPIC 1: Introduction of Rendering

Lecture 1: Understanding Blenders different render engines

Lecture 2: Part 1

Lecture 3: Part 2

Lecture 4: Rendering a 3D room scene

CERTIFICATE COURSE IN CPMPUTER APPLICATIONMNS

COURSE CODE: MOOCCSE-A12

DURATION: 120 HOURS

(To be covered in: 1 Week/ Module)

What you will learn?

- Office Automation Concepts
- Microsoft Word
- Microsoft PowerPoint
- Basics of Microsoft Excel
- Internet Basics

Course Description:

The Certificate Course in Computer Applications is an advanced online certification course that focuses on the practical application of computers and other IT related applications. Students interested in the field of computers can opt for technical education with this course. The online certificate course in Computer Applications will help you gain vocational skills that enhance your marketable skill set to make you job-ready.

COURSE DETAILS

Module 1 Microsoft Word

▪ **Topic 1: MS Word Home Tab**

- Introduction
- Fact about Microsoft Word-
- Elements of MS Word -I
- Elements of MS Word -II
- Elements of MS Word -III
- Explaining the Ribbons-I
- Explaining the Ribbons-II
- Explaining the Ribbons-III
- Explaining the Ribbons-IV
- Most frequently asked questions-I
- Keywords Part 1
- Overview

▪ **Topic 2: MS Word Insert Tab**

- Insert, Pages,Table
- Illustrations
- Links-I
- Links-II
- Links-III
- Comment, Headers-Footers.

- Draw-I
- Draw-II
- Draw-III
- Design-I
- Design-II
- Text Group
- Symbols
- Most frequently asked questions-II
- Shortcut Keys-II (I)
- Shortcut Keys-II
- Overview-I
- Overview-II
- Overview-III

▪ **Topic 3: MS Word Mailing**

- Start Mail Merge-I
- Start Mail Merge-II
- Start Mail Merge-III
- Start Mail Merge-IV
- Most frequently asked questions-III
- Shortcut Keys- III
- Shortcut Keys- III (I)
- Overview

▪ **Topic 4: MS Word References**

- Layout-I
- Layout-II
- Layout-III
- Page setup
- Paragraph
- Arrange
- Most frequently asked questions-IV-1
- Most frequently asked questions-IV-2
- Shortcut Keys-IV
- Overview IV

▪ **Topic 5: MS Word Review**

- Comments
- Speech and Accessibility
- Proving-I
- Language
- Tracking and Changes
- Compare and Protect
- Most frequently asked questions-V

- Shortcut Keys- V

▪ **Topic 6: MS Word Views**

- Page Movement
- View-I
- Zoom
- Window
- Most frequently asked questions I
- Most frequently asked questions II
- Shortcut Keys- VI
- Shortcut Keys- VI-I

MODULE 2: Microsoft Excel Introduction

▪ **Topic 1 :- Fundamentals**

- The Microsoft Excel interface
- Numeric data and date values
- Cell references (Relative vs Absolute)
- Create basic formulas
- The order of Operation

▪ **Topic 2:- Working with basic excel functions**

- The SUM() function
- MIN() AND MAX() function
- AVERAGE() and COUNT() function
- AUTOSUM and AUTOFILL command

▪ **Topic 3:- Modify the Excel sheet**

- Move and copy data
- Insert and delete rows/columns
- Modify cells
- Hide and unhide rows/columns
- Rename and delete excel worksheet

▪ **Topic 4 Getting started with formatting**

- Font formatting command
- Format cells and data
- Conditional Formatting

▪ **Topic 5:- Working with Excel SmartArt**

- Insert images
- Insert shapes
- Excel SmartArt

▪ **Topic 6:- Working with charts and templates**

- Create a pie chart
- Create and format a Column chart
- Excel templates

▪ **Topic 7:- Working with an excel list**

- Sort lists
- Create subtotals
- Conditional formatting for duplicates

▪ **Topic 8:- Understanding Pivot Tables**

- Create a Pivot Table
- Modify Pivot Table calculations
- Create pivot charts

▪ **Topic 9:- Conditional Functions**

- Excel Name Ranges
- IF() function
- Nesting function
- COUNTIF() and SUMIF()

▪ **Topic 10:- Excel's lookup functions**

- VLOOKUP() function
- HLOOKUP() function
- INDEX() function
- MATCH() function
- INDEX() and MATCH() function

▪ **Topic 11:- Excel's Text based functions**

- Left(), Right() and Mid() function
- Len() function
- Search() function
- Concatenate() function
- Protecting the workbook

▪ **Topic 12: Repetitive tasks with Macros**

- Excel macros
- Create a macro
- Run macros

▪ **Topic 13: Excel What If? Tools**

- Goal Seek
- Solver Tool
- Creating Scenarios
- Data Table

▪ **Topic 14: VBA Concepts**

- Visual Basic Editor (VBA)
- Immediate Window
- VBA Modules
- Creating Procedures
- MsgBox Function

▪ **Topic 15: Projects of MS Excel**

- Project 1 – MS Excel (Creating database)
- Project 2 – MS Excel (Functions)

Module 3 Microsoft PowerPoint

▪ **Topic 1:- Power Point: Home**

- Starting MS PowerPoint
- Clipboard
- Slides
- Font Group-I
- Font Group-II
- Font Group-III
- Paragraph-I
- Paragraph-II
- Drawing Groups-I
- Drawing Groups-II
- Overview-I
- Overview-II

▪ **Topic 2:- PowerPoint: Insert**

- Insert: Introduction
- Images and Illustrations Group-I
- Images and Illustrations Group-II
- Images and Illustrations Group-III
- Images and Illustrations Group-IV
- Add-Ins and link-I
- Add-Ins and link-II
- Add-Ins and link-III
- Comment

- Text Group-I
- Text Group-II
- Symbols Group
- Overview-I
- Overview-II
- Overview-III

▪ **Topic 3:- PowerPoint: Design**

- Design page setup
- Themes & Variants- I
- Themes & Variants- II
- Transitions-I
- Transitions-II
- Transitions-III
- Background
- Overview

▪ **Topic 4:- PowerPoint: Animation**

- Animations-I
- Animations-II
- Animations-III
- Timing-I
- Overview

▪ **Topic 5:- PowerPoint: Slide Show**

- SlideShow-I
- Setup group-I
- Setup Group-II
- Setup Group-III
- Overview

▪ **Topic 6:- PowerPoint: Review**

- Record
- Proofing
- Language
- Comment
- Overview

▪ **Topic 7:- PowerPoint: View**

- Presentation -I
- Comment
- Color Tab-I
- Color Tab-II
- Overview

MODULE 4: FUNDAMENTALS OF COMPUTER

▪ **Topic 1:- Introduction of Fundamentals Computers**

- Overview Fundamentals of computers
- Block diagram of a computer
- Characteristics of computers
- Detail Generations of computers 1
- Generations of computers 2
- Fundamental for better Communication through Computer

▪ **Topic 2:- Number System**

- Bit, byte, binary,
- Decimal, hexadecimal, and octal systems
- Conversion from one system to the other
- Conversion from one system to the other
- Representation of characters

▪ **Topic 3:- Computer Codes**

- BCD, EBCDIC, ASCII, Unicode
- Weighted and non-weighted code
- Input Devices
- Output Devices
- Computer Memories
- Computer Hardware, Software
- Basic Computer Hardware and Software

MODULE 5: INTERNET AND NETWORKING

▪ **Topic 1:- Internet**

- Basic Internet terms, Web Page, Website, Home Page, Browser, URL, Hypertext, web Server, Applications: WWW, E-mail, Instant Messaging, Video conferencing

▪ **Topic 2:- Introduction of Assembling and Networking of Computer**

- Introduction of Hardware and Software/components of the computer.
- Mother boards, Chipsets & Microprocessor concept & latest available in market.
- Basics &Types of Floppy drive/HDD/DVD/RAM /SMPS//BIOS.
- Assembling of different parts of computers.
- Knowing ports, and wires attached in the computer.



Dean Academic Affairs MRSPTU <daa@mrsptu.ac.in>

Regarding information of courses

University Business School <mgthod@mrsptu.ac.in>
To: Dean Academic Affairs MRSPTU <daa@mrsptu.ac.in>

Mon, Mar 4, 2024 at 11:17 AM

Respected Sir

As per the letter no. (Ref. No. BFCET/Acad./2024/628) the following decisions are taken

S.NO.	NAME OF COURSE	Eligibility	AICTE/UGC	Remarks
1	Bachelor of Commerce (B.com)	10+2 in any stream with 50% marks from any recognized Board	NA	Allowed
2	Diploma in Advertising and Public Relations		AICTE/UGC	Ask the college to submit detail of the colleges where this course is running after 10+2 with approval of UGC/AICTE. AICTE gives approval to Post graduate diploma in Advertising & Public Relations
3	Post Graduate Diploma In Digital Marketing	Minimum three Years graduation (any Stream) with 50% marks from UGC/AICTE recognized institution	AICTE	

--
Dr. Veerpaul Kaur Maan
Head
University Business School,
MRSPTU, Bathinda.
Mob. 87250-72428

University Business School

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY
(Estb. By Govt. of Punjab Vide Act No. 5[2015] and u/s 2(F) and 12 B of UGC Act, 1956)

Dabwali Road, Bathinda-151001

www.mrsptu.ac.in

Ref. No. UBS/24/2177



ਯੂਨੀਵਰਸਿਟੀ ਬਿਜਨੈਸ ਸਕੂਲ

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ
(ਯੂ.ਜੀ.ਸੀ. ਏਕਟ 2(ਫੀ) ਅਤੇ 12(ਬੀ) ਅਧੀਨ ਮਨਤਾ ਪ੍ਰਾਪਤ)

ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ-151001

mgthod@mrsptu.ac.in

Date: 13/09/24

Minutes of Meeting

A meeting of Faculty of Commerce and Business Management was held on 10/09/2024.

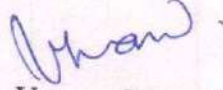
The following members were present

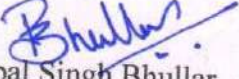
1. Dr. A.S. Chawla (Chairperson)
2. Dr. Veerpaul Kaur Maan (Member)
3. Dr. Pritpal Singh Bhullar (Member)
4. Dr Damanpreet Kaur (Member)
5. Dr. Davinderpal Singh Sidhu (Member)
6. Dr. Monika Sharma (Member)

The following decisions were taken in the meeting of Faculty of Commerce and Business Management:

1. The duration of the course of BMS will be 3 Years/ 6 Semesters and the following qualifications should be considered for taking admission in BMS from academic session 2024-25.
 - a) Passed 10+2 or its equivalent examination in any stream conducted by Board recognized or established by Central/State Government through a legislation. OR
 - b) Those candidates who have passed their Matriculation examination AND have also passed three year Diploma in any Trade from Punjab State Board of Technical Education & Industrial Training, Chandigarh or such Examination from any other recognized State Board of Technical Education, or Sant Longowal Institute of Engg.& Tech., Longowal
2. The scheme and syllabus of MBA (Aviation Management) has been approved.

Dr. A.S. Chawla
(Chairperson, Present Online)


Dr. Veerpaul Kaur Maan
(Member)


Dr. Pritpal Singh Bhullar
(Member)

Dr. Damanpreet Kaur
(Member, Present Online)

Dr. Davinderpal Singh Sidhu
(Member, Present Online)

Dr. Monika Sharma
(Member, Present Online)



MRSPTU
Bathinda

University Business School <mgthod@mrsptu.ac.in>

Regarding Approval of Syllabus of various courses

Arvinder S Chawla <aschawla@mrsptu.ac.in>

Tue, Sep 10, 2024 at 3:08 PM

To: University Business School <mgthod@mrsptu.ac.in>

Cc: "Dr. Veerpaul Kaur Maan" <mgtveerpaul@mrsptu.ac.in>, Pritpal Management <mgtpritpal@mrsptu.ac.in>, daman_preet802003@yahoo.com, Monika Sharma <monika1980leo@gmail.com>, sidhups@gmail.com

Approved.

[Quoted text hidden]



MRSPTU
Bathinda

Dean Academic Affairs MRSPTU <daa@mrsptu.ac.in>

Course objective M.Sc. Forensic science course from session 2024-25

Head of Department Chemistry <hodchemistry@mrsptu.ac.in>
To: Dean Academic Affairs MRSPTU <daa@mrsptu.ac.in>

Wed, Feb 21, 2024 at 5:07 AM

As the college mentioned in the trailing email (Dolphin PG College) is already offering B.Sc. in forensic science, so M.Sc. in Forensic Science can be offered at above college under M.R.S.P.T.U.
Eligibility M.Sc. Forensic Science: B.Sc./ B.Sc. Honours degree in Forensic Science or any other graduation degree 3/4/5 Year duration in the Faculty of Science , Engineering, Medical / Dental and Pharmaceutical Science of any University recognized by UGC with minimum 50% marks (5% relaxation in case of SC/ST).
Fee structure for M.Sc. Forensic Science may be kept at par with the fee structure of M.Sc. Chemistry for affiliated colleges under MRSPTU. However, a fee structure fixation committee may be constituted to finalise the same.

Dr. Seema Sharma
Professor & Head
Department of Chemistry
MAHARAJA RANJIT SINGH
PUNJAB TECHNICAL UNIVERSITY, BATHINDA
Mob: +91-8725072411

On Mon, Feb 19, 2024 at 3:04 AM Dean Academic Affairs MRSPTU <daa@mrsptu.ac.in> wrote:

Madam,

In reference to the trailing email regarding the mentioned subject, you are requested to please give your comments regarding the programme **M.Sc Forensic Science** (2 Year Course) can be offered by MRSPTU.
Moreover, you are requested that if University can offer this programme then please also send the **Eligibility Criteria & the proposed fee structure** for this programme on an urgent basis for further approval.

----- Forwarded message -----

From: **Dolphin PG College** <rgm119698@gmail.com>

Date: Mon, Feb 19, 2024 at 3:53 PM

Subject: Course objective M.Sc. Forensic science course from session 2024-25

To: Dean Academics, MRSPTU <daa@mrsptu.ac.in>, Director College Development Council <dir.cdc@mrsptu.ac.in>

TTTo

The Dean Academic Affairs

MRSPTU BATHINDA,

Sub: Regarding proposal of new courses starting from session 2024-25

Respected Sir,

This is for your kind information that the college wants to start the following courses from the academic session 2024-25 The Syllabus, Scheme, Eligibility and other details have been attached.

These courses are already being run by different universities like Rajiv Gandhi paramedical institute , IES university Bhopal, Assam downtown university, Desh Bhagat University, Gurukashi University Punjabi University Patiala, Sant Baba Badbhag Singh University, LPU Jalandhar and many more.

1. **M.Sc Forensic Science** (2 Year Course): 30 Seats

You are therefore, humbly requested to allow this college to start these Non-AICTE courses from 2024-25 session.

With Thanks & Regards,

Dr. Vinod Kumar Mittal

Chairman

Dolphin PG College

8427244882

CC: 1. Hon'ble Vice-Chancellor MRSPTU Bathinda for kind information
2. Hon'ble Director CDC MRSPTU Bathinda for kind information

Regards

--

Prof. (Dr.) Kawaljit Singh Sandhu

Associate Dean (Academic Affairs),

Maharaja Ranjit Singh Punjab Technical University,

Bathinda-151001 (Punjab)

Mob.: 70157-09403



MRSPTU
Bathinda

Dean Academic Affairs MRSPTU <daa@mrsptu.ac.in>

Regarding proposal of new courses starting from session 2024-25

HoD Pharmacy <hodpharmacy@mrsptu.ac.in>
To: Dean Academic Affairs MRSPTU <daa@mrsptu.ac.in>
Cc: Dr Amit Bhatia <dramitbhatia@mrsptu.ac.in>

Fri, Apr 19, 2024 at 3:51 PM

Dear Sir
Greetings!
Please find the following, required detail:

Course Name	Duration (Year)	Eligibility Criteria
Diploma in Radio Medical Imaging Technology	2	10+2 (Medical) passed with Physics, Chemistry and Biology or any other equivalent examination from a recognized Board/University as a regular student.
Diploma in Medical Lab Technology	2	

Note: Fee same as that of Diploma in Nursing Assistant.

There is no need of any statutory body

Thanks
Sincerely
Amit Bhatia

CDEO for FN.A
Sat
21/04/24



Professor (Dr.) Amit Bhatia
Head
Department of Pharmaceutical Sciences and Technology
Maharaja Ranjit Singh Punjab Technical University
Badal Road, Bathinda - 151001, Punjab (INDIA)
Phone: 0091-9216411442. Email: dramitbhatia@mrsptu.ac.in
Website: <https://mrsptu.ac.in/department.php?did=17>

[A State Technical University established by Government of Punjab]

[Quoted text hidden]



(ਪੰਜਾਬ ਸਰਕਾਰ ਦੁਆਰਾ ਐਕਟ ਨੰ. 5 ਆਫ 2015 ਅਤੇ ਯੂ.ਜੀ.ਸੀ. ਐਕਟ 1956 ਦੇ ਮਦ 2(ਐਫ) ਅਤੇ 12ਬੀ. ਰਾਹੀਂ ਸਥਾਪਤ)

(ਫਾਰਮੇਸੀ ਐਕਟ, 1948 ਦੇ 12 ਦੇ ਤਹਿਤ ਫਾਰਮੇਸੀ ਕਾਊਂਸਿਲ ਆਫ ਇੰਡੀਆ ਦੁਆਰਾ ਪ੍ਰਵਾਨਿਤ; PCI - 500)

(Estb. by Govt. of Punjab vide Act No. 5 [2015] and u/s 2(f) and 12 B of UGC Act, 1956)

(Approved by Pharmacy Council of India u/s 12 of Pharmacy Act, 1948; PCI - 500)



ਰਵਾਲਾ ਨੰ: ਮ:ਰ:ਸ:ਪੀ:ਟੀ:ਯੂ: ਫਾਰਮਾ
Ref. No: MRSPTU/PHARM

900

ਮਿਤੀ 27-9-24
Date

FACULTY OF PHARMACY Minutes of Meeting

With reference to the email notification date 02-09-2024, an online meeting was held on 06-09-2024 at 10.30 am in HoD Office and online through google link: <https://meet.google.com/iae-ccsi-pmx>.

Following members were present in the meeting:

- | | | |
|-----|--------------------------|-------------|
| 1. | Dr. Amit Bhatia | Chairperson |
| 2. | Dr. Ashish Baldi | Member |
| 3. | Dr. Raj Kumar | Member |
| 4. | Dr. Rakesh Garg | Member |
| 5. | Dr. Balbir Singh | Member |
| 6. | Dr. HC Patil | Member |
| 7. | Dr. Harmail Singh Chahal | Member |
| 8. | Dr. Anu Goyal | Member |
| 9. | Dr. Varinder Singh | Member |
| 10. | Dr. Shruti Chopra | Member |

Chairman Faculty of Pharmacy welcomed all the member of FoP and appreciating their contribution and timely support. Following agenda points were discussed and were unanimously approved by all members:

- Issue was discussed regarding total years for different B.Sc. programme running under Faculty of Pharmacy, whether to keep 3 years or 4 years. The matter was discussed and it was concluded that: B.Sc. programme may be offered for 4 years with an exit option at 3rd year with B.Sc. degree and on completion of 4 years with B.Sc. (Hons). (Page no. 6)
- Approval of eligibility of two diploma programme was discussed i.e., Diploma in Radio Medical Imaging Technology and Diploma in Medical Lab Technology. All the members approved the eligibility the same is attached as annexure 1.
- Scheme and syllabi for PG Diploma in Intellectual Property Rights was approved. The approved document is attached as annexure 2. This important to mention that this has already been approved by Academic Council of Central University of Punjab.
- All the members of Faculty of Pharmacy has unanimously appreciate and approved the start of two new M.Pharm. Programme (in Pharmacognosy and Pharmaceutical Analysis) at MRSPTU. The scheme and syllabi are already approved and available at university website.

Dr. Amit Bhatia
Chairperson

Dr. Ashish Baldi
Member

- Online -
Dr. Raj Kumar
Member

- Online -
Dr. Rakesh Garg
Member

- Online -
Dr. Balbir Singh
Member

- Online -
Dr. HC Patil
Member

- Online -
Dr. HS Chahal
Member

- Online -
Prof. Anu Goyal
Member

Dr. Varinder Singh
Member

Dr. Shruti Chopra
Member

Duration of courses of B.Sc. Programme

Following B.Sc. programme running under faculty of pharmacy especially in various Paramedical Sciences following:

Sr. No.	Course Name	Current Duration (Years)	Proposed Duration (Years)	Exit option (after year)
1	B.Sc. (Operation Theater Technology)	3	4	3
2	B.Sc. (Radio Medical Imaging Technology)	3	4	3
3	B.Sc. (Dialysis Technology)	4	4	3
4	B.Sc. (Medical Laboratory Sciences)	3	4	3
5	B. Sc. (Optometry)	4	4	3
6	B.Sc. (Cardiac Care Technology)	4	4	3
7	B.Sc. (Respiratory Care Technology)	4	4	3
8	B.Sc. (Anesthesia Technology)	4	4	3
9	B.Sc. Medical Technology (Anesthesia & Operation Theatre Technology)	4	4	3

Note: B.Sc. (Hons). programme may be offered for 4 years with an exit option after 3rd year with B.Sc. degree as mentioned above.

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ।

Sub.: Proposal regarding starting new programmes, addition / reduction in sanctioned intake & closure of some programmes for the session 2024-25.

As per the proposals received from the various University departments / PITs / PSAEC Patiala regarding starting new programmes, addition / reduction in sanctioned intake & closure of some programmes for the session 2024-25, the list is as mentioned below:

S. No.	Name of Institute/ College	Programme Name	Duration (yrs)	Type of Programme	Sanctioned Intake	Remarks
1	MRSPTU Main Campus	M.Pharm. (Pharmaceutics)	2Yrs.	UA-PCI	15*	Seats increased from 09 to 15
2	MRSPTU Main Campus	PG Diploma in Pharmacovigilance	2Yrs.	Non-AICTE	15	Seats decreased from 30 to 15
3	MRSPTU Main Campus	PG Diploma in Intellectual Property Rights	2Yrs.	Non-AICTE	15	Seats decreased from 30 to 15
4	MRSPTU Main Campus	Integrated/Dual degree BBA-MBA	5Yrs.	UA-AICTE	120	Seats increased from 90 to 120
5	MRSPTU Main Campus	Integrated/Dual degree B.Com.-M.Com.	5Yrs.	Non-AICTE	180	Seats increased from 90 to 180
6	MRSPTU Main Campus	B.Tech. CSE (Artificial Intelligence & Machine Learning)	4Yrs.	UA-AICTE	120	Seats increased from 60 to 120
7	MRSPTU Main Campus	M. Pharm. (Pharmaceutical Analysis)	2Yrs.	New	09**	New Course
8	MRSPTU Main Campus	M. Phann. (Pharmacognosy)	2Yrs.	New	09**	New Course
9	MRSPTU Main Campus	B.Sc. Medical Technology (Anesthesia & Operation Theatre Technology)	3Yrs.	Non-AICTE	30	Closed
10	MRSPTU Main Campus	B.Sc. (Radio Medical Imaging Technology)	3Yrs.	Non-AICTE	30	Closed
11	MRSPTU Main Campus	M. Tech. Electrical Engineering (Power System) Part Time	3Yrs.	UA-AICTE	18	Closed
12	MRSPTU Main Campus	Executive MBA	3 Years	UA-AICTE	30	Closed
13	MRSPTU Main Campus	PGDCA (Part Time)	1.5 Years	Non-AICTE	30	Closed
14	MRSPTU Main Campus	Master of Fine Arts (Painting)	2 Years	Non-AICTE	30	Closed
15	MRSPTU Main Campus	Skill Certificate Course in Refrigeration & Air-Conditioning Mechanic	1 Yr.	Skill	30	Closed
16	MRSPTU Main Campus	Skill Certificate Course in Welder	1 Yr.	Skill	30	Closed
17	MRSPTU Main Campus	Skill Certificate Course in Additive Manufacturing	1 Yr.	Skill	60	Closed
18	MRSPTU Main Campus	Skill Certificate Course in Electrician	1 Yr.	Skill	30	Closed
19	MRSPTU Main Campus	Bachelor of Physiotherapy	4.5 Yrs.	Non-AICTE	60	Closed
20	PIT, GTB Garh, Moga	Skill Certificate Course in Tally	6 Months	Skill	30	Closed
21	PIT, Rajpura	BCA	3 Years	UA-AICTE	60	Decreased Intake from 90 to 60
22	PIT, Rajpura	BBA	3 Years	UA-AICTE	30	Decreased Intake from 60 to 30

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ।

23	PIT, Rajpura	B. Com. (Hons.)	3 Years	Non-AICTE	30	Decreased Intake from 60 to 30
24	PIT, Rajpura	M.Com.	2 Years	Non-AICTE	30	Closed
25	PIT, Rajpura	Integrated/Dual Degree BBA-MBA	5 Years	Non-AICTE	30	Closed
26	PIT, Rajpura	Skill Certificate Course in Plumbing	1 Year	Skill	30	Closed
27	PSAEC, Patiala	BBA (Aviation Management)	3 Years	UA-AICTE	30	Decreased seats from 40 to 30
28	PSAEC, Patiala	MBA (Aviation Management)	2 Years	UA-AICTE	15	Decreased seats from 20 to 15
29	PSAEC, Patiala	Skill Certificate Course in Bakery and Confectionary	6 Months	Skill	30	Closed
30	PSAEC, Patiala	Skill Certificate Course in Airline Ticketing	(4 Month Teaching + 2 Month Training)	Skill	30	Closed
31	PSAEC, Patiala	Skill Certificate Course in Ansys	6 Months	Skill	15	Closed
32	PSAEC, Patiala	Skill Certificate Course in Catia	6 Months	Skill	15	Closed
33	PSAEC, Patiala	Skill Certificate Course in Solid Works	6 Months	Skill	15	Closed
34	PSAEC, Patiala	Skill Certificate Course in Nastran	6 Months	Skill	15	Closed

* Seats have been increased from 09 to 15. This is subject to approval from Pharmacy Council of India (PCI). However, without PCI approval, the seats shall remain same i.e. 09 for the 2024-25 academic session.

** New programs shall be offered, contingent upon approval from the Pharmacy Council of India (PCI). In the absence of PCI approval, these programs will not be offered for the 2024-25 academic session.

Submitted for your consideration and approval, please.

Prepared by

Assistant Dean (Academics) 16/05/2024

may kindly be approved, please.

16/5/2024

Associate Dean (Academic Affairs)

Registrar

Vice Chancellor (Term ended on 01.11.2023)

Hon'ble Principal/Secretary
Technical Education & Industrial Training-Punjab,
Cum Chairman/Board of Governors
MRSPTU, Bathinda

24.V.24 A.O.A.A
A.O.A.A

Diary No.6072.
Date16/5/2024.
Dean Academic Affairs,
MRSSTU, Bathinda

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ।

SUBJECT: PROPOSAL TO APPROVE THE SAME NOTIFICATIONS FOR FEE STRUCTURES, CHIEF MINISTER SCHOLARSHIP SCHEME, PROGRAMMES AND SCHOLARSHIP SCHEME FOR PHARM. D. STUDENTS AS NOTIFIED IN 2023-24 FOR SESSION 2024-25.

The University is on the verge of initiating new academic session. In light of this, it is proposed that the existing Fee Structures, Chief Minister Scholarship Scheme, Programmes offered (as per **Annexure-I**), and the Pharm. D. scholarship scheme from the previous academic year 2023-24 be continued for the upcoming session 2024-25.

Submitted for your consideration and approval, please.

Prepared By
16/05/24

Satnam
16/05/2024
Assistant Dean (Academics)

may kindly be approved so that admission process can be started.

16/05/2024
Associate Dean (Academic Affairs)

16/05/24
Registrar

Vice Chancellor (Term ended on 01.11.2023)

Hon'ble Principal Secretary
Technical Education & Industrial Training-Punjab,
Cum Chairman Board of Governors
MRSPTU, Bathinda

24.V.24

Registration

A D A A

Diary No. 6073
Date 16/5/2024
Dean Academic Affairs,
MRSSTU, Bathinda

PROGRAMMES TO BE OFFERED FOR SESSION 2024-25

S.No.	Name of Institute/ College	Programme Name	Duration (yrs)	Type of Programme	Sanctioned Intake	Remarks
1	MRSPTU Main Campus	B.Pharm.	4Yrs.	UA-PCI	100	No change
2	MRSPTU Main Campus	B.Pharm. (Lateral Entry)	3Yrs.	UA-PCI	As per rule	No change
3	MRSPTU Main Campus	M.Pharm. (Pharmacology)	2Yrs.	UA-PCI	9	No change
4	MRSPTU Main Campus	B.Sc. Medical Laboratory Science	3Yrs.	Non-AICTE	30	No change
5	MRSPTU Main Campus	Pharm. D	6Yrs.	UA-PCI	30	No change
6	MRSPTU Main Campus	Integrated UG Course B.Sc. (Food Science & Tech.) 3 years /Bachelor of Food Sciences & Tech. (Hons.) 4 years	3Yrs./ 4Yrs.	Non-AICTE	30	No change
7	MRSPTU Main Campus	M.Sc. (Food Sci. & Tech.)	2Yrs.	Non-AICTE	30	No change
8	MRSPTU Main Campus	B.Sc. (Hons.) Agriculture	4Yrs.	Non-AICTE	60	No change
9	MRSPTU Main Campus	B.Sc. (Hons.) Agriculture (Lateral Entry)	3Yrs.	Non-AICTE	As per rule	No change
10	MRSPTU Main Campus	Integrated/Dual Degree B.Sc.-M.Sc. (Forensic Science)	5Yrs.	Non-AICTE	30	No change
11	MRSPTU Main Campus	B. Sc. (Non-Medical)	3Yrs.	Non-AICTE	60	No change
12	MRSPTU Main Campus	B.Tech. (Agricultural Engineering)	4Yrs.	UA-AICTE	60	No change
13	MRSPTU Main Campus	B.Sc. (Hons.) Mathematics	3Yrs.	Non-AICTE	60	No change
14	MRSPTU Main Campus	B.Sc. (Hons.) Physics	3Yrs.	Non-AICTE	30	No change
15	MRSPTU Main Campus	B.Sc. (Hons.) Chemistry	3Yrs.	Non-AICTE	30	No change
16	MRSPTU Main Campus	M.Sc. (Physics)	2Yrs.	Non-AICTE	30	No change
17	MRSPTU Main Campus	M.Sc. (Chemistry)	2Yrs.	Non-AICTE	30	No change
18	MRSPTU Main Campus	M.Sc. (Mathematics)	2Yrs.	Non-AICTE	30	No change
19	MRSPTU Main Campus	B. Sc. (Fashion Technology)	3Yrs.	Non-AICTE	60	No change
20	MRSPTU Main Campus	B. Sc. (Fashion Technology) Lateral Entry	2Yrs.	Non-AICTE	As per rule	No change
21	MRSPTU Main Campus	M. Tech. (Electronics & Communication Engineering)	2Yrs.	UA-AICTE	18	No change
22	MRSPTU Main Campus	M. Tech. Electrical Engineering (Power System)	2Yrs.	UA-AICTE	18	No change
23	MRSPTU Main Campus	M. Tech. (Textile Engineering)	2Yrs.	UA-AICTE	18	No change
24	MRSPTU Main Campus	M. Tech. (Textile Engineering) Part Time	3Yrs.	UA-AICTE	18	No change
25	MRSPTU Main Campus	M. Tech. (Electronics & Communication Engineering) Part Time	3Yrs.	UA-AICTE	18	No change
26	MRSPTU Main Campus	M. Tech. (Computer Science & Engineering) Part Time	3Yrs.	UA-AICTE	18	No change
27	MRSPTU Main Campus	MBA	2Yrs.	UA-AICTE	60	No change
28	MRSPTU Main Campus	MBA (Hospital Administration)	2Yrs.	UA-AICTE	30	No change
29	MRSPTU Main Campus	Bachelor of Management Studies (Hotel Management & Catering Technology)	3Yrs.	Non-AICTE	30	No change
30	MRSPTU Main Campus	MCA	2Yrs.	UA-AICTE	30	No change
31	MRSPTU Main Campus	B.Sc. (Graphics & Web Designing)	3Yrs.	Non-AICTE	60	No change
32	MRSPTU Main Campus	B.Arch.	5Yrs.	CoA	40	No change
33	MRSPTU Main Campus	M.Planning	2Yrs.	Non-AICTE	18#	No change
34	MRSPTU Main Campus	M.A. (Fine Arts)	2Yrs.	Non-AICTE	30	No change
35	MRSPTU Main Campus	Integrated/Dual Degree BCA-MCA	5Yrs.	UA-AICTE	180	No change
36	MRSPTU Main Campus	Integrated/Dual Degree BCA-MCA (Lateral Entry)	4Yrs.	UA-AICTE	As per rule	No change
37	MRSPTU Main Campus	Integrated/Dual Degree BFA-MFA (Applied Arts)	5Yrs.	Non-AICTE	30	No change
38	MRSPTU Main Campus	B.Tech. CSE (Artificial Intelligence & Machine Learning) Lateral Entry	3Yrs.	UA-AICTE	As per rule	No change
39	MRSPTU Main Campus	B.Tech. (Biomedical Engineering)	4Yrs.	UA-AICTE	60	No change
40	MRSPTU Main Campus	B. Tech. (Biomedical Engineering) Lateral Entry	3Yrs.	UA-AICTE	As per rule	No change
41	MRSPTU Main Campus	B.A. (Computer Science)	3Yrs.	Non-AICTE	120	No change
42	MRSPTU Main Campus	Bachelor of Design (Interior Design)	4Yrs.	Non-AICTE	30	No change
43	GZSCCET, MRSPTU	B.Tech. (Civil Engineering)	4 Years	AICTE	60	No change
44	GZSCCET, MRSPTU	B.Tech. (Civil Engineering) Lateral Entry	3 Years	AICTE	As per rule	No change
45	GZSCCET, MRSPTU	B.Tech. (Electrical Engineering)	4 Years	AICTE	60	No change
46	GZSCCET, MRSPTU	B.Tech. (Electrical Engineering) Lateral Entry	3 Years	AICTE	As per rule	No change
47	GZSCCET, MRSPTU	B.Tech. (Electronics & Communication Engineering)	4 Years	AICTE	60	No change
48	GZSCCET, MRSPTU	B.Tech. (Electronics & Communication Engineering) Lateral Entry	3 Years	AICTE	As per rule	No change

S.No.	Name of Institute/ College	Programme Name	Duration (yrs)	Type of Programme	Sanctioned Intake	Remarks
49	GZSCCET, MRSPTU	B.Tech. (Mechanical Engineering)	4 Years	AICTE	90	No change
50	GZSCCET, MRSPTU	B.Tech. (Mechanical Engineering) Lateral Entry	3 Years	AICTE	As per rule	No change
51	GZSCCET, MRSPTU	B.Tech. (Textile Engineering)	4 Years	AICTE	60	No change
52	GZSCCET, MRSPTU	B.Tech. (Textile Engineering) Lateral Entry	3 Years	AICTE	As per rule	No change
53	GZSCCET, MRSPTU	B.Tech. (Computer Science & Engineering)	4 Years	AICTE	150	No change
54	GZSCCET, MRSPTU	B.Tech. (Computer Science & Engineering) Lateral Entry	3 Years	AICTE	As per rule	No change
55	GZSCCET, MRSPTU	M. Tech. (Construction Technology & Management)	2 Years	AICTE	18	No change
56	GZSCCET, MRSPTU	M. Tech. (Computer Science & Engineering)	2 Years	AICTE	18	No change
57	GZSCCET, MRSPTU	M. Tech. (Mechanical Engineering)	2 Years	AICTE	18	No change
58	PIT, Nandgarh	BBA	3 Years	UA-AICTE	30	No change
59	PIT, Nandgarh	BCA	3 Years	UA-AICTE	60	No change
60	PIT, Nandgarh	BCA (Lateral Entry)	2 Years	UA-AICTE	As per rule	No change
61	PIT, Nandgarh	B. Com. (Hons.)	3 Years	Non-AICTE	60	No change
62	PIT, Nandgarh	MCA	2 Years	UA-AICTE	30	No change
63	PIT, Nandgarh	M. Com.	2 Years	Non-AICTE	30	No change
64	PIT, Nandgarh	MBA	2 Years	UA-AICTE	18	No change
65	PIT, Nandgarh	Executive MBA	3 Years	UA-AICTE	18	No change
66	PIT, Nandgarh	B.Tech. (Computer and Communication Engineering)	4 Years	UA-AICTE	30	No change
67	PIT, Nandgarh	M. Tech. (Computer and Communication Engineering) Part Time	3 Years	UA-AICTE	18	No change
68	PIT, Nandgarh	M. Tech. (Computer and Communication Engineering)	2 Years	UA-AICTE	18	No change
69	PIT, Nandgarh	Skill Certificate Course in Computer Proficiency	6 months	Skill	30	No change
70	PIT, Nandgarh	Skill Certificate course in Computer Maintenance & Programming Assistant	1 Year	Skill	30	No change
71	PIT, Nandgarh	Skill Certificate Course in Sewing Machine Operator	6 months	Skill	15	No change
72	PIT, Nandgarh	PG Diploma in Artificial Intelligence and Machine Learning	1 Year	Non-AICTE	18	No change
73	PIT, GTB Garh, Moga	B.Tech. (Electrical Engineering)	4 Years	UA-AICTE	30	No change
74	PIT, GTB Garh, Moga	B.Tech. (Electrical Engineering) Lateral Entry	3 Years	UA-AICTE	As per rule	No change
75	PIT, GTB Garh, Moga	B.Tech. (Computer Science & Engineering)	4 Years	UA-AICTE	30	No change
76	PIT, GTB Garh, Moga	B.Tech. (Computer Science & Engineering) Lateral Entry	3 Years	UA-AICTE	As per rule	No change
77	PIT, GTB Garh, Moga	BBA	3 Years	UA-AICTE	30	No change
78	PIT, GTB Garh, Moga	BCA	3 Years	UA-AICTE	90	No change
79	PIT, GTB Garh, Moga	BCA (Lateral Entry)	2 Years	UA-AICTE	As per rule	No change
80	PIT, GTB Garh, Moga	B.Com. (Hons.)	3 Years	Non-AICTE	60	No change
81	PIT, GTB Garh, Moga	MCA	2 Years	UA-AICTE	30	No change
82	PIT, GTB Garh, Moga	MBA	2 Years	UA-AICTE	30	No change
83	PIT, GTB Garh, Moga	M. Tech. (Electrical Engineering)	2 Years	UA-AICTE	18	No change
84	PIT, GTB Garh, Moga	Skill Certificate Course in Electrician	1 Years	Skill	30	No change
85	PIT, GTB Garh, Moga	Skill Certificate Course in Computer Maintenance & Programming Assistant	1 Years	Skill	30	No change
86	PIT, GTB Garh, Moga	Skill Certificate Course in Refrigeration & Air Conditioning Mechanic	1 Years	Skill	30	No change
87	PIT, Rajpura	B.Tech. (Computer Science & Engineering)	4 Years	UA-AICTE	30	No Change
88	PIT, Rajpura	B.Tech. (Computer Science & Engineering) Lateral Entry	3 Years	UA-AICTE	As per rule	No Change
89	PIT, Rajpura	B.Tech. (Electrical Engineering)	4 Years	UA-AICTE	30	No Change
90	PIT, Rajpura	BCA (Lateral Entry)	2 Years	UA-AICTE	As per rule	No Change
91	PIT, Rajpura	M.Tech. (Computer Science & Engineering)	2 Years	UA-AICTE	18	No Change
92	PIT, Rajpura	MCA	2 Years	UA-AICTE	30	No Change
93	PIT, Rajpura	MBA	2 Years	UA-AICTE	30	No Change
94	PIT, Rajpura	Integrated/Dual Degree BCA-MCA	5 Years	Non-AICTE	30	No Change
95	PIT, Rajpura	Integrated/Dual Degree BCA-MCA (Lateral Entry)	4 Years	Non-AICTE	As per rule	No Change

Signature

S.No.	Name of Institute/ College	Programme Name	Duration (yrs)	Type of Programme	Sanctioned Intake	Remarks
96	PIT, Rajpura	PGDCA	1 Year	Non-AICTE	30	No Change
97	PIT, Rajpura	B. Sc. (Food Science & Technology)	3 Years	Non-AICTE	30	No Change
98	PIT, Rajpura	B.Sc. (Non-Medical)	3 Years	Non-AICTE	30	No Change
99	PIT, Rajpura	B.Sc. (Fashion Technology)	3 Years	Non-AICTE	30	No Change
100	PIT, Rajpura	B.Sc. (Fashion Technology) Lateral Entry	2 Years	Non-AICTE	As per rule	No Change
101	PIT, Rajpura	Skill Certificate Course in Welder	1 Year	Skill	30	No Change
102	PIT, Rajpura	Skill Certificate Course in Refrigeration & Air Conditioning Mechanic	1 Year	Skill	30	No Change
103	PIT, Rajpura	Skill Certificate Course in Computer Maintenance & Programming Assistant	1 Year	Skill	30	No Change
104	PSAEC, Patiala	B.Tech. (Aeronautical Engg.)	4 Years	UA-AICTE	30	No Change
105	PSAEC, Patiala	B.Tech. (Aeronautical Engg.) Lateral Entry	3 Years	UA-AICTE	As per rule	No change
106	PSAEC, Patiala	B.Tech. (Aerospace Engineering)	4 Years	UA-AICTE	30	No change
107	PSAEC, Patiala	B.Tech. (Aerospace Engineering) Lateral Entry	3 Years	UA-AICTE	As per rule	No change
108	PSAEC, Patiala	BCA	3 Years	UA-AICTE	30	No change
109	PSAEC, Patiala	BCA Lateral Entry	2 Years	UA-AICTE	As per rule	No change
110	PSAEC, Patiala	B.Com. (Aviation, Logistics and Supply Chain Management)	3 Years	Non-AICTE	30	No change
111	PSAEC, Patiala	Bachelor of Management Studies (Airlines, Tourism & Hospitality)	3 Years	UA-AICTE	60	No change

Programmes Type/Description of Programme:

UA-PCI : PCI Approved Programmes

AICTE : AICTE Approved Programmes

CoA : Council of Architecture approved programme

UA-AICTE : University Approved AICTE

Non-AICTE : UGC Programmes

Skill : Skill Certificate Courses

The M.Planning Course is listed as UGC Course as per the notification no. F. 1-52/97 (CPP-II) of University Grant Commission



Maharaja Ranjit Singh Punjab Technical University
Dabwali Road, Bathinda -151001

(Estb. by Govt. of Punjab vide Act No. 5 [2015] and u/s 2(f) and 12 B of UGC Act, 1956)

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ।

Ref No : Reg/Notification/206

Dated 28/5/2024

(REVISED)
NOTIFICATION
(Through E-mail only)

Consequent upon the approval of the competent authority, the list of programmes offered by Maharaja Ranjit Singh Punjab Technical University, Bathinda at its Main Campus/ GZSCCET/PITs/PSAEC, Patiala for the Academic Session 2024-25 are hereby notified as under:

S.No.	Name of Institute/ College	Programme Name	Duration (yrs)	Type of Programme	Sanctioned Intake
1.	MRSPTU Main Campus	M.Pharm. (Pharmaceutics)	2Yrs.	UA-PCI	15*
2.	MRSPTU Main Campus	PG Diploma in Pharmacovigilance	1Yr.	Non-AICTE	15
3.	MRSPTU Main Campus	PG Diploma in Intellectual Property Rights	1Yr.	Non-AICTE	15
4.	MRSPTU Main Campus	B.Pharm.	4Yrs.	UA-PCI	100
5.	MRSPTU Main Campus	B.Pharm. (Lateral Entry)	3Yrs.	UA-PCI	As per rule
6.	MRSPTU Main Campus	M.Pharm. (Pharmacology)	2Yrs.	UA-PCI	9
7.	MRSPTU Main Campus	B.Sc. Medical Laboratory Science	3Yrs.	Non-AICTE	30
8.	MRSPTU Main Campus	Pharm. D	6Yrs.	UA-PCI	30
9.	MRSPTU Main Campus	Integrated UG Course B.Sc. (Food Science & Tech.) 3 years /Bachelor of Food Sciences & Tech. (Hons.) 4 years	3Yrs./ 4Yrs.	Non-AICTE	30
10.	MRSPTU Main Campus	M.Sc. (Food Sci. & Tech.)	2Yrs.	Non-AICTE	30
11.	MRSPTU Main Campus	B.Sc. (Hons.) Agriculture	4Yrs.	Non-AICTE	60
12.	MRSPTU Main Campus	B.Sc. (Hons.) Agriculture (Lateral Entry)	3Yrs.	Non-AICTE	As per rule
13.	MRSPTU Main Campus	Integrated/Dual Degree B.Sc.-M.Sc. (Forensic Science)	5Yrs.	Non-AICTE	30
14.	MRSPTU Main Campus	B. Sc. (Non-Medical)	3Yrs.	Non-AICTE	60
15.	MRSPTU Main Campus	B.Tech. (Agricultural Engineering)	4Yrs.	UA-AICTE	60
16.	MRSPTU Main Campus	B.Sc. (Hons.) Mathematics	3Yrs.	Non-AICTE	60
17.	MRSPTU Main Campus	B.Sc. (Hons.) Physics	3Yrs.	Non-AICTE	30
18.	MRSPTU Main Campus	B.Sc. (Hons.) Chemistry	3Yrs.	Non-AICTE	30
19.	MRSPTU Main Campus	M.Sc. (Physics)	2Yrs.	Non-AICTE	30
20.	MRSPTU Main Campus	M.Sc. (Chemistry)	2Yrs.	Non-AICTE	30
21.	MRSPTU Main Campus	M.Sc. (Mathematics)	2Yrs.	Non-AICTE	30
22.	MRSPTU Main Campus	B. Sc. (Fashion Technology)	3Yrs.	Non-AICTE	60

Website: mrsptu.ac.in, Ph. No 0164-2284297 Email: reg@mrsptu.ac.in

23.	MRSPTU Main Campus	B. Sc. (Fashion Technology) Lateral Entry	2Yrs.	Non-AICTE	As per rule
24.	MRSPTU Main Campus	M. Tech. (Electronics & Communication Engineering)	2Yrs.	UA-AICTE	18
25.	MRSPTU Main Campus	M. Tech. Electrical Engineering (Power System)	2Yrs.	UA-AICTE	18
26.	MRSPTU Main Campus	M. Tech. (Textile Engineering)	2Yrs.	UA-AICTE	18
27.	MRSPTU Main Campus	M. Tech. (Textile Engineering) Part Time	3Yrs.	UA-AICTE	18
28.	MRSPTU Main Campus	M. Tech. (Electronics & Communication Engineering) Part Time	3Yrs.	UA-AICTE	18
29.	MRSPTU Main Campus	M. Tech. (Computer Science & Engineering) Part Time	3Yrs.	UA-AICTE	18
30.	MRSPTU Main Campus	MBA	2Yrs.	UA-AICTE	60
31.	MRSPTU Main Campus	MBA (Hospital Administration)	2Yrs.	UA-AICTE	30
32.	MRSPTU Main Campus	Bachelor of Management Studies (Hotel Management & Catering Technology)	3Yrs.	UA-AICTE	30
33.	MRSPTU Main Campus	MCA	2Yrs.	UA-AICTE	30
34.	MRSPTU Main Campus	B.Sc. (Graphics & Web Designing)	3Yrs.	Non-AICTE	60
35.	MRSPTU Main Campus	B.Arch.	5Yrs.	CoA	40
36.	MRSPTU Main Campus	M.Planning	2Yrs.	Non-AICTE	18#
37.	MRSPTU Main Campus	M.A. (Fine Arts)	2Yrs.	Non-AICTE	30
38.	MRSPTU Main Campus	Integrated/Dual degree BBA-MBA	5Yrs.	UA-AICTE	120
39.	MRSPTU Main Campus	Integrated/Dual Degree BCA-MCA	5Yrs.	UA-AICTE	180
40.	MRSPTU Main Campus	Integrated/Dual Degree BCA-MCA (Lateral Entry)	4Yrs.	Non-AICTE	As per rule
41.	MRSPTU Main Campus	Integrated/Dual degree B.Com.-M.Com.	5Yrs.	Non-AICTE	180
42.	MRSPTU Main Campus	Integrated/Dual Degree BFA-MFA (Applied Arts)	5Yrs.	Non-AICTE	30
43.	MRSPTU Main Campus	Integrated/Dual Degree BFA-MFA (Applied Arts) Lateral Entry	4Yrs.	Non-AICTE	As per rule
44.	MRSPTU Main Campus	B.Tech. CSE (Artificial Intelligence & Machine Learning)	4Yrs.	UA-AICTE	120
45.	MRSPTU Main Campus	B.Tech. CSE (Artificial Intelligence & Machine Learning) Lateral Entry	3Yrs.	UA-AICTE	As per rule
46.	MRSPTU Main Campus	B.Tech. (Biomedical Engineering)	4Yrs.	UA-AICTE	60
47.	MRSPTU Main Campus	B. Tech. (Biomedical Engineering) Lateral Entry	3Yrs.	UA-AICTE	As per rule
48.	MRSPTU Main Campus	B.A. (Computer Science)	3Yrs.	Non-AICTE	120
49.	MRSPTU Main Campus	Bachelor of Design (Interior Design)	4Yrs.	Non-AICTE	30
50.	MRSPTU Main Campus	M. Pharm. (Pharmaceutical Analysis)	2Yrs.	UA-PCI	09**
51.	MRSPTU Main Campus	M. Pharm. (Pharmacognosy)	2Yrs.	UA-PCI	09**
52.	GZSCCET, MRSPTU	B.Tech. (Civil Engineering)	4 Years	AICTE	60
53.	GZSCCET, MRSPTU	B.Tech. (Civil Engineering) Lateral Entry	3 Years	AICTE	As per rule
54.	GZSCCET, MRSPTU	B.Tech. (Electrical Engineering)	4 Years	AICTE	60
55.	GZSCCET, MRSPTU	B.Tech. (Electrical Engineering) Lateral Entry	3 Years	AICTE	As per rule

56.	GZSCCET, MRSPTU	B.Tech. (Electronics & Communication Engineering)	4 Years	AICTE	60
57.	GZSCCET, MRSPTU	B.Tech. (Electronics & Communication Engineering) Lateral Entry	3 Years	AICTE	As per rule
58.	GZSCCET, MRSPTU	B.Tech. (Mechanical Engineering)	4 Years	AICTE	90
59.	GZSCCET, MRSPTU	B.Tech. (Mechanical Engineering) Lateral Entry	3 Years	AICTE	As per rule
60.	GZSCCET, MRSPTU	B.Tech. (Textile Engineering)	4 Years	AICTE	60
61.	GZSCCET, MRSPTU	B.Tech. (Textile Engineering) Lateral Entry	3 Years	AICTE	As per rule
62.	GZSCCET, MRSPTU	B.Tech. (Computer Science & Engineering)	4 Years	AICTE	150
63.	GZSCCET, MRSPTU	B.Tech. (Computer Science & Engineering) Lateral Entry	3 Years	AICTE	As per rule
64.	GZSCCET, MRSPTU	M. Tech. (Construction Technology & Management)	2 Years	AICTE	18
65.	GZSCCET, MRSPTU	M. Tech. (Computer Science & Engineering)	2 Years	AICTE	18
66.	GZSCCET, MRSPTU	M. Tech. (Mechanical Engineering)	2 Years	AICTE	18
67.	PIT, Nandgarh	BBA	3 Years	UA-AICTE	30
68.	PIT, Nandgarh	BCA	3 Years	UA-AICTE	60
69.	PIT, Nandgarh	BCA (Lateral Entry)	2 Years	Non-AICTE	As per rule
70.	PIT, Nandgarh	B. Com. (Hons.)	3 Years	Non-AICTE	60
71.	PIT, Nandgarh	MCA	2 Years	UA-AICTE	30
72.	PIT, Nandgarh	M. Com.	2 Years	Non-AICTE	30
73.	PIT, Nandgarh	MBA	2 Years	UA-AICTE	18
74.	PIT, Nandgarh	Executive MBA	3 Years	UA-AICTE	18
75.	PIT, Nandgarh	B.Tech. (Computer and Communication Engineering)	4 Years	UA-AICTE	30
76.	PIT, Nandgarh	M. Tech. (Computer and Communication Engineering) Part Time	3 Years	UA-AICTE	18
77.	PIT, Nandgarh	M. Tech. (Computer and Communication Engineering)	2 Years	UA-AICTE	18
78.	PIT, Nandgarh	Skill Certificate Course in Computer Proficiency	6 months	Skill	30
79.	PIT, Nandgarh	Skill Certificate course in Computer Maintenance & Programming Assistant	1 Year	Skill	30
80.	PIT, Nandgarh	Skill Certificate Course in Sewing Machine Operator	6 months	Skill	15
81.	PIT, Nandgarh	PG Diploma in Artificial Intelligence and Machine Learning	1 Year	Non-AICTE	18
82.	PIT, GTB Garh, Moga	B.Tech. (Electrical Engineering)	4 Years	UA-AICTE	30
83.	PIT, GTB Garh, Moga	B.Tech. (Electrical Engineering) Lateral Entry	3 Years	UA-AICTE	As per rule
84.	PIT, GTB Garh, Moga	B.Tech. (Computer Science & Engineering)	4 Years	UA-AICTE	30
85.	PIT, GTB Garh, Moga	B.Tech. (Computer Science & Engineering) Lateral Entry	3 Years	UA-AICTE	As per rule
86.	PIT, GTB Garh, Moga	BBA	3 Years	UA-AICTE	30
87.	PIT, GTB Garh, Moga	BCA	3 Years	UA-AICTE	90
88.	PIT, GTB Garh, Moga	BCA (Lateral Entry)	2 Years	Non-AICTE	As per rule
89.	PIT, GTB Garh, Moga	B.Com. (Hons.)	3 Years	Non-AICTE	60
90.	PIT, GTB Garh, Moga	MCA	2 Years	UA-AICTE	30
91.	PIT, GTB Garh, Moga	MBA	2 Years	UA-AICTE	30
92.	PIT, GTB Garh, Moga	M. Tech. (Electrical Engineering)	2 Years	UA-AICTE	18
93.	PIT, GTB Garh, Moga	Skill Certificate Course in Electrician	1 Years	Skill	30
94.	PIT, GTB Garh, Moga	Skill Certificate Course in Computer Maintenance & Programming Assistant	1 Years	Skill	30
95.	PIT, GTB Garh, Moga	Skill Certificate Course in Refrigeration & Air Conditioning Mechanic	1 Years	Skill	30
96.	PIT, Rajpura	B.Tech. (Computer Science & Engineering)	4 Years	UA-AICTE	30

97.	PIT, Rajpura	B.Tech. (Computer Science & Engineering) Lateral Entry	3 Years	UA-AICTE	As per rule
98.	PIT, Rajpura	B.Tech. (Electrical Engineering)	4 Years	UA-AICTE	30
99.	PIT, Rajpura	BCA (Lateral Entry)	2 Years	Non-AICTE	As per rule
100.	PIT, Rajpura	M.Tech. (Computer Science & Engineering)	2 Years	UA-AICTE	18
101.	PIT, Rajpura	MCA	2 Years	UA-AICTE	30
102.	PIT, Rajpura	MBA	2 Years	UA-AICTE	30
103.	PIT, Rajpura	Integrated/Dual Degree BCA-MCA	5 Years	UA-AICTE	30
104.	PIT, Rajpura	Integrated/Dual Degree BCA-MCA (Lateral Entry)	4 Years	Non-AICTE	As per rule
105.	PIT, Rajpura	PGDCA	1 Year	Non-AICTE	30
106.	PIT, Rajpura	B. Sc. (Food Science & Technology)	3 Years	Non-AICTE	30
107.	PIT, Rajpura	B.Sc. (Non-Medical)	3 Years	Non-AICTE	30
108.	PIT, Rajpura	B.Sc. (Fashion Technology)	3 Years	Non-AICTE	30
109.	PIT, Rajpura	B.Sc. (Fashion Technology) Lateral Entry	2 Years	Non-AICTE	As per rule
110.	PIT, Rajpura	Skill Certificate Course in Welder	1 Year	Skill	30
111.	PIT, Rajpura	Skill Certificate Course in Refrigeration & Air Conditioning Mechanic	1 Year	Skill	30
112.	PIT, Rajpura	Skill Certificate Course in Computer Maintenance & Programming Assistant	1 Year	Skill	30
113.	PIT, Rajpura	BCA	3 Years	UA-AICTE	60
114.	PIT, Rajpura	BBA	3 Years	UA-AICTE	30
115.	PIT, Rajpura	B. Com. (Hons.)	3 Years	Non-AICTE	30
116.	PSAEC, Patiala	B.Tech. (Aeronautical Engg.)	4 Years	UA-AICTE	30
117.	PSAEC, Patiala	B.Tech. (Aeronautical Engg.) Lateral Entry	3 Years	UA-AICTE	As per rule
118.	PSAEC, Patiala	B.Tech. (Aerospace Engineering)	4 Years	UA-AICTE	30
119.	PSAEC, Patiala	B.Tech. (Aerospace Engineering) Lateral Entry	3 Years	UA-AICTE	As per rule
120.	PSAEC, Patiala	BCA	3 Years	UA-AICTE	30
121.	PSAEC, Patiala	BCA Lateral Entry	2 Years	Non-AICTE	As per rule
122.	PSAEC, Patiala	B.Com. (Aviation, Logistics and Supply Chain Management)	3 Years	Non-AICTE	30
123.	PSAEC, Patiala	Bachelor of Management Studies (Airlines, Tourism & Hospitality)	3 Years	UA-AICTE	60
124.	PSAEC, Patiala	BBA (Aviation Management)	3 Years	UA-AICTE	30
125.	PSAEC, Patiala	MBA (Aviation Management)	2 Years	UA-AICTE	15

Programmes Type/Description of Programme:

UA-PCI : PCI Approved Programmes

AICTE : AICTE Approved Programmes

CoA : Council of Architecture approved programme

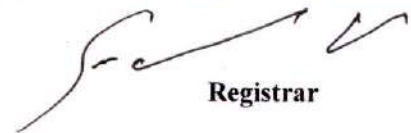
UA-AICTE : University Approved AICTE

Non-AICTE : UGC Programmes

Skill : Skill Certificate Courses

Note:

1. *The M.Planning Course is listed as UGC Course as per the notification no. F. 1-52/97 (CPP-II) of University Grant Commission.
2. *Seats have been increased from 09 to 15, subject to approval from Pharmacy Council of India (PCI). Without PCI approval, the seats remain same i.e. 09 for the 2024-25 academic session.
3. **New programs are being offered, contingent upon approval from the Pharmacy Council of India (PCI). Without PCI approval, these programs will not be offered for the 2024-25 academic session.


Registrar

Copy to:

1. PA to Vice Chancellor, MRSPTU, Bathinda
2. Registrar, MRSPTU, Bathinda / o/o DAA, MRSPTU, BT
3. Director (College Development Council), MRSPTU for information & necessary action
4. Incharge, Admission Cell, MRSPTU
5. Prof I/C ITES, MRSPTU, Bathinda for uploading on University website
6. All concerned

Website: mrsptu.ac.in, Ph. No 0164-2284297 Email: reg@mrsptu.ac.in

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ।

Subject: Regarding to offer new Diploma/UG/PG programmes in affiliated colleges of MRSPTU, Bathinda for the Academic Session 2024-25.

In line with the evolving trends in the field of education, the colleges affiliated with MRSPTU, Bathinda, are keen to introduce new Diploma/UG/PG, both AICTE and Non-AICTE, for the 2024-25 Academic Session.

List of the programmes are given as under:

SNo.	Proposed Courses Name	Duration	Course Category
1.	M.Sc. (Forensic Science)	2 Years	Non-AICTE
2.	Diploma in Radio Medical Imaging Technology	2 Years	Non-AICTE
3.	Diploma in Medical Lab Technology	2 Years	Non-AICTE
4.	BMS (Bachelor of Management Studies)	3 Years/ 4 Years	AICTE
5.	B.Com.	3 Years	Non-AICTE

Submitted for your perusal and kind approval, please.

(Prepared by)

S. A. Khan
04/04/2024
Assistant Dean (Academics)

Recommended for kind approval, please.

4/4/2024
Associate Dean (Academic Affairs)

S. P. I.
Registrar

Vice Chancellor (Term ended on 01.11.2023)

Hon'ble Principal Secretary
Technical Education & Industrial Training-Punjab,
Cum Chairman Board of Governors
MRSPTU, Bathinda

Registrar

W. I. S.
05-IV-24
A D A A



ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਤਕਨੀਕੀ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ

ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ - 151001

Maharaja Ranjit Singh Punjab Technical University
DABWALI ROAD, BATHINDA-151001

[A State University Estb. by Govt. of Punjab Act No. 5(2015) u/s 2(f) & Approved u/s 12B of UGC Act, 1956]

ਐਸੋ. ਡੀਨ (ਅਕਾਦਮਿਕ ਮਾਮਲੇ)

Associate Dean (Academic Affairs)

Ref. No.: DAA/MRSPTU/Notifications/ 184

Date: 15/04/2024

NOTIFICATION

Consequent upon the approval from the Competent Authority vide diary no. 268 dated 09.04.2024, University is pleased to offer new Diploma/UG/PG programmes as mentioned below in all the Affiliated Colleges of MRSPTU, Bathinda from the Academic Session 2024-25 onwards.

S.No.	Programme Name	Programme Category	Programme Type	Duration	Programme Code
1.	B.Com.	Non-AICTE	UG	3 Years	BCOM-5
2.	M.Sc. (Forensic Science)	Non-AICTE	PG	2 Years	MPRM-7
3.	Diploma in Radio Medical Imaging Technology	Non-AICTE	Diploma	2 Years	DPRM-2
4.	Diploma in Medical Lab Technology	Non-AICTE	Diploma	2 Years	DPRM-3
5.	Bachelor of Management Studies (BMS)	AICTE	UG	3 Years/ 4 Years	BBAD-4

Associate Dean (Academic Affairs)
MRSPTU, Bathinda

Copy to:

1. PA to Vice Chancellor, MRSPTU, Bathinda
2. Registrar, MRSPTU, Bathinda
3. Director (College Development Council), MRSPTU for information & necessary action
4. Incharge, Admission Cell, MRSPTU
5. Prof I/C ITES, MRSPTU, Bathinda for uploading on University website
6. All concerned

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ।

Sub.: Proposed Academic Calendar for the session 2024-25 for all batches.

ODD SEMESTER (UG/PG)		
S. No.	Description	Period
1.	Commencement of Semester	22 nd July, 2024
2.	1 st Mid Semester Test	23 rd to 27 th September, 2024
3.	2 nd Mid Semester Test	18 th to 22 nd November, 2024
4.	Classes up to	28 th November, 2024
5.	End Semester Examinations	03 rd to 31 st December, 2024
6.	Practical Examinations	Immediately after the end of regular Theory Examinations
7.	Vacations	25 th December, 2024 to 5 th January, 2025

EVEN SEMESTER (UG/PG)		
S. No.	Description	Period
1.	Commencement of Semester	06 th January, 2025
2.	1 st Mid Semester Test	03 rd to 07 th March, 2025
3.	2 nd Mid Semester Test	28 th April to 02 nd May, 2025
4.	Classes up to	07 th May, 2025
5.	End Semester Examinations	13 th May to 06 th June, 2025
6.	Practical Examinations	Immediately after the end of regular Theory Examinations
7.	Vacations	07 th June to 06 th July, 2025
8.	End Semester Summer Training	07 th June to 20 th July, 2025
9.	Commencement of Academic Year 2025-26	21 st July, 2025 (Tentative)

Note:

1. Every institute is required to provide at least 90 teaching days. If necessary, to meet this requirement, classes may also be conducted on Saturdays.

This is submitted for your consideration and approval, please.

Prepared by

Assistant Dean (Academics)

Submitted for kind approval, please.

Associate Dean (Academic Affairs)

Registrar

Vice Chancellor (Term ended on 01.11.2023)

Hon'ble Principal Secretary
Technical Education & Industrial Training-Punjab,
Cum Chairman Board of Governors
MRSPTU, Bathinda

Diary No. 6084.
Date 19/6/2024
Dean Academic Affairs,
MRSSTU, Bathinda





ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਤਕਨੀਕੀ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ
ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ - 151001

Maharaja Ranjit Singh Punjab Technical University
DABWALI ROAD, BATHINDA-151001

[A State University Estb. by Govt. of Punjab Act No. 5(2015) u/s 2(f) & Approved u/s 12B of UGC Act, 1956]

ਐਸੇ. ਡੀਨ (ਅਕਾਦਮਿਕ ਮਾਮਲੇ)

Associate Dean (Academic Affairs)

Ref. No.: DAA/MRSPTU/Notifications/ 187

Date: 01/07/2024

(Through E-Mail only)

ACADEMIC CALENDAR

Session: 2024-25

(For All Batches)

ODD SEMESTER (UG/PG)

S. No.	Description	Period
1.	Commencement of Semester	22 nd July, 2024
2.	1 st Mid Semester Test	23 rd to 27 th September, 2024
3.	2 nd Mid Semester Test	18 th to 22 nd November, 2024
4.	Classes up to	28 th November, 2024
5.	End Semester Examinations	03 rd to 31 st December, 2024
6.	Practical Examinations	Immediately after the end of regular Theory Examinations
7.	Vacations	25 th December, 2024 to 5 th January, 2025


EVEN SEMESTER (UG/PG)

S. No.	Description	Period
1.	Commencement of Semester	06 th January, 2025
2.	1 st Mid Semester Test	03 rd to 07 th March, 2025
3.	2 nd Mid Semester Test	28 th April to 02 nd May, 2025
4.	Classes up to	07 th May, 2025
5.	End Semester Examinations	13 th May to 06 th June, 2025
6.	Practical Examinations	Immediately after the end of regular Theory Examinations
7.	Vacations	07 th June to 06 th July, 2025
8.	End Semester Summer Training	07 th June to 20 th July, 2025
9.	Commencement of Academic Year 2025-26	21st July, 2025 (Tentative)

Note:

1. Every institute is required to provide at least 90 teaching days. If necessary, to meet this requirement, classes may also be conducted on Saturdays.

This has the approval of the competent authority vide diary no. 482 dated 27.06.2024.


Associate Dean (Academic Affairs)
MRSPTU, Bathinda

Copy to:

1. PA to Vice Chancellor, MRSPTU, Bathinda.
2. Registrar, MRSPTU, Bathinda
3. CoE, MRSPTU, Bathinda
4. Chairman, Admission Cell
5. Prof. I/C (Finance), MRSPTU, Bathinda
6. Prof. I/C, ITES, MRSPTU, Bathinda for uploading on University website.
7. Heads/Principal/Directors of Main Campus/Constituents/PITs/PSAEC/ Affiliated Colleges of MRSPTU, Bathinda
8. All concerned.

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ।

ਫਾਰਮਾਸਿਊਟੀਕਲ ਵਿਗਿਆਨ ਅਤੇ ਤਕਾਨੋਲੋਜੀ ਵਿਭਾਗ

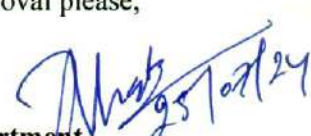
Subject: Regarding Academic Calender Doctor of Pharmacy (Pharm. D.) session 2024-25.

Dear Sir,


Please find the following academic calendar of the Doctor of Pharmacy (Pharm. D) session 2024-25.


S. No.	Description	Period
1.	Commencement of Year	22 nd July 2024
2.	1 st Mid Semester Test	18 th to 22 nd November 2024
3.	Vacations	25 th December 2024 to 5 th January 2025
4.	2 nd Mid Semester Test	28 th April to 2 nd May 2025
5.	Classes up to	7 th May 2025
6.	End Term Examination	13 th May to 6 th June 2025
7.	Practical Examination	Immediately after the End of the regular theory Examination
8.	End Semester Summer training	7 th June to 20 th July, 2025
9.	Commencement of Academic Year 2025-26	21st July, 2025 (Tentative)

Put up for approval please,


Head of Department,
Dept. of Pharm. Sci. & Tech.,
MRSPTU, Bathidna.


Assistant Dean (Academic Affairs),
MRSPTU, Bathidna.


Associate Dean (Academic Affairs),
MRSPTU, Bathidna.


Registrar
MRSPTU, Bathinda.


Hon'ble Vice Chancellor

Order No. 6185
Date 26/07/2024
Dean Academic Affairs,
MRSSTU, Bathinda





ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਤਕਨੀਕੀ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ
ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ - 151001

Maharaja Ranjit Singh Punjab Technical University
DABWALI ROAD, BATHINDA-151001

[A State University Estb. by Govt. of Punjab Act No. 5(2015) u/s 2(f) & Approved u/s 12B of UGC Act, 1956]

ਐਸੋ. ਡੀਨ (ਅਕਾਦਮਿਕ ਮਾਮਲੇ)

Associate Dean (Academic Affairs)

Ref. No.: DAA/MRSPTU/Notifications/ 189


Date: 02/08/2024

(Through E-Mail only)

ACADEMIC CALENDAR
(Pharm. D.)
Session: 2024-25

Consequent upon the approval of the competent authority vide diary no. 587 dated 31.07.2024, the Academic Calendar for Doctor of Pharmacy (Pharm. D.) is hereby notified as under for University Main Campus / GZSCCET / PITs / PSAEC, Patiala / Affiliated Colleges for Session 2024-25:

S. No.	Description	Period
1.	Commencement of Year	22 nd July 2024
2.	1 st Mid Semester Test	18 th to 22 nd November 2024
3.	Vacations	25 th December 2024 to 5 th January 2025
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Associate Dean (Academic Affairs)
MRSPTU, Bathinda

Copy to:

1. PA to Vice Chancellor, MRSPTU, Bathinda for information to the Hon'ble Vice Chancellor, please
2. Registrar, MRSPTU, Bathinda
3. CoE, MRSPTU, Bathinda
4. Chairman, Admission Cell
5. Prof. I/C (Finance), MRSPTU, Bathinda
6. Prof. I/C, ITES, MRSPTU, Bathinda for uploading on University website.
7. Heads/Principal/Directors of Main Campus/Constituents/PITs/PSAEC/Affiliated Colleges of MRSPTU, Bathinda
8. All concerned.

File No. I-15/1258/2023-DEAN ACAD-MRSPTU-BTD

Autonomous

Universities of Punjab

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY-BATHINDA

O/o DEAN ACADEMIC-MRSPTU-BATHINDA

SUBJECT

Main Category : Approvals

Sub Category :

Description : Regarding proposal for extension in tenure of BoS
Agriculture Sciences upto 08.08.2024

OTHER DETAILS

Language : English

Remarks :

No correspondence is attached in this file.

Note No. #1

In reference to the subject matter, it is to inform that the Board of Studies in Agriculture Sciences which was constituted in the year 2021 was expired on 12.08.2023 (copy attached).

Whereas, the tenure of all other newly constituted Board of Studies which were constituted in 2022 are expiring on 08.08.2024.

Therefore, it is proposed to extend the tenure of BoS in Agriculture Sciences upto 08.08.2024.

Moreover, the newly recruited faculty Dr. Wineet Chawala, Assistant Professor School of Agriculture Engineering & Technology may be added as co-opted member in the same BoS upto 08.08.2024.

This is submitted for your consideration and approval, please.

 **BOS in Agriculture Sciences.pdf**

18/09/2023 12:11 PM

SATNAM SINGH
(ASST. DEAN(ACADEMICS)-MRSPTU)

Note No. #2

Recommended and submitted for your approval, please.

18/09/2023 1:22 PM

KAWALJIT SINGH SANDHU
(ASSO DEAN(ACADEMICS)-MRSPTU)

Note No. #3

Approved.

18/09/2023 1:48 PM

BUTA SINGH SIDHU
(VICE CHANCELLOR-MRSPTU-BTD)

Note No. #1



ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਠਿੰਡਾ
 ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ - 151001
Maharaja Ranjit Singh Punjab Technical University
 DABWALI ROAD, BATHINDA-151001

[A State University Estb. by Govt. of Punjab Act No. 5(2015) u/s 2(f) & Approved u/s 12B of UGC Act, 1956]

ਡੀਨ (ਅਕਾਦਮਿਕ ਮਾਮਲੇ)

DEAN (Academic Affairs)

Ref. No.: DAA/MRSPTU/Notification/115

Date: 13.08.2021

NOTIFICATION**BOARD OF STUDIES IN AGRICULTURE SCIENCES**

(Tenure: 13.08.2021 to 12.08.2023)

Whereas, Maharaja Ranjit Singh Punjab Technical University has been established u/s 2(f) of the UGC Act, 1956; vide Punjab Act 5(2015) notified through Punjab Government Gazette Extraordinary (Regd No CHD/0092/2015-2017) Notification No. 5-Leg./2015 dated 12th February 2015.

Further Whereas, the structure of Board of Studies for various courses running in the University was approved by the Board of Governors of MRSPTU vide item 2.19 in its 2nd meeting held on 7.9.2015.

Whereas, with approval of the competent authority vide no. VC/319 dt. 12.08.2021, BoS in Agriculture Sciences is notified as under:

SNo	NOMENCLATURE	NAME & ADDRESS	DESIGNATION
(i)	Head of the University Department concerned	Dr. Kawaljit Singh Sandhu, Associate Professor, Deptt of Food Sci & Tech, MRSPTU, Bathinda Email: kssandhu@mrsptu.ac.in (Mob. 7015709403)	CHAIRPERSON (Ex-Officio)
(ii)	One Faculty member from University Department concerned (of each specialization)	Vacant (This program is going to start in MRSPTU from Sept, 2021 onwards. These shall be included as and when available. At present no faculty is available).	Member(s)
(iii)	One Expert (in the subject from outside the Univ.)	Dr. Jitender Singh Brar Retired Director, PAU, Krishi Vigyan Kendra, Bathinda. Email: jitender62brar@gmail.com (Mob. 9417732932)	Member
(iv)	Two Experts (nominated by the Vice Chancellor)	1. Dr. Sandeep Singh Sandhu Principal Agronomist Climate Change & Agricultural Meterology Punjab Agricultural University, Ludhiana Email: ssandhu@pau.edu (Mob. 8146300110) 2. Dr. K.K. Gill Principal Agrometeorologist Communication Centre, PAU, Ludhiana Email: kkgill@pau.edu (Mob. 9855385287)	Members
(v)	Two Faculty members (from Affiliated/ Constituent colleges)	1. Dr. S. S. Bal Professor & Dean (Deptt. of Agriculture), Baba Farid College, Bathinda Email: drssbal@yahoo.co.in (Mob. 9501115223) 2. Dr. K.S. Dadhich Professor & Director Academics & Research, Dolphin PG College, Chunni Kalan Email: ksd1947@gmail.com (Mob. 8079054475)	Members

BOARD OF STUDIES IN AGRICULTURE SCIENCES (13.08.2021 to 12.08.2023)

Page 1 of 2

Note No. #1

Attachment: BOS in Agriculture Sciences.pdf

(vi)	One representative (from industry/ corporate sector)	Jagtar Singh Brar, Progressive Farmer VPO: Mehma Sarja, Bathinda Email: jagtarbrarbti@gmail.com (Mob. 9417158928)	Member
(vii)	One Post-Graduate meritorious alumnus	Vacant (Not available at present)	Member
(viii)	Any other against vacancy of (ii) & (vii) above (for 2 years or untill further orders whichever is earlier)	1. Dr. Amarinder Singh Riar Assistant Professor, Deptt of Agriculture, GNDU, Amritsar, Email: amarinder.agri@gndu.ac.in (Mob. 8146255300) 2. Dr. Gurupkar Singh Sidhu Fruit Biotechnologist, Room no. 204 School of Agricultural Biotechnology, PAU, Ludhiana, Email: gurupkar-soab@pau.edu (Mob. 9781503780)	

For Programmes:

1	B.Sc. (Hons.) Agriculture
In addition: Any other Agriculture related program as referred by Academic Council	

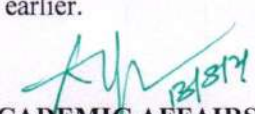
MAIN FUNCTIONS:

- To prepare syllabi for various Programmes in line with the Vision, Mission and Objectives of the university/ department, interest of all stakeholders, including employers and national requirements, for consideration and approval of the Academic Council
- To suggest methods and methodologies for innovative teaching and evaluation techniques
- To coordinate research, teaching and extension/ outreach activities in the university/ department
- To suggest to Academic Council, an expert panel of faculty members for Q-Paper setters; Evaluators and for examining the lab courses
- Any other assignment, as referred to, by the MRSPTU Academic Council

QUORUM:

Quorum of the BoS meeting shall be minimum of half of the members of the BoS constituted including the Chairperson of the BoS.

In case of Change of Head of Deptt during the tenure period of BoS, the new appointed Head of Deptt shall take over as Chairperson of BoS ex-officio. The term of members expires after two years from the date of notification or till they hold official positions as above, whichever is earlier.


DEAN ACADEMIC AFFAIRS
(Savina Bansal)

Endst. No. DAA/MRSPTU/NOTIFICATION/115/1-4

Dated: 13-08-2021

Forwarded to the following for information and further necessary action please:

- Hon'ble Vice Chancellor cum Chairman Academic Council MRSPTU, Bathinda
- Registrar cum Member Secretary BoG of MRSPTU Bathinda
- Dean Academics, MRSPTU Bathinda
- All Concerned

