

**MAHARAJA RANJIT SINGH PUNJAB TECHNICAL
UNIVERSITY, BATHINDA**
[Established by Govt. of Punjab under Punjab Act 5 of 2015
and UGC Act 2 (f) and 12(B)]



AGENDA: 3RD MEETING OF ACADEMIC COUNCIL

MEETING VENUE: COMMITTEE ROOM

DATE: 16-11-2018

TIME: 10:00 A.M.



Maharaja Ranjit Singh Punjab Technical University

DABWALI ROAD, BATHINDA-151001

[Established by Govt. of Punjab vide Act No. 5 of 2015, UGC Act 2(f) & 12B]

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Ref. No.: DAA/MRSPTU/2234

Date: 12.11.2018

SUBJECT: MRSPTU 3rd ACADEMIC COUNCIL MEETING ON 16.11.2018

To

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3rd MEETING OF ACADEMIC COUNCIL ON 16.11.2018 at 10.00 A.M.

Sir/Madam,

It is to inform you that 3rd Meeting of Academic Council has been scheduled on 16/11/2018 at 10.00 A.M. in Committee Room of GZS Campus College of Engineering & Technology, MRSPTU, Dabwali Road, Bathinda. You are requested to make it convenient to attend this meeting. You are further requested to confirm your availability to attend this meeting and travel plan by email. TA/Honourarium will be paid as per MRSPTU, BTI norms. Agenda of the meeting is appended.

Note: It is to be noted that while claiming TA for travel by own car/taxi, toll tax receipts on the route are to be attached.


DEAN ACADEMIC AFFAIRS, MRSPTU, BTI

Copy to

1. PA to Vice Chancellor MRSPTU, Bathinda for information of the Vice Chancellor please,
2. Registrar MRSPTU, Bathinda,
3. Deputy Registrar (A&R), MRSPTU, Bathinda,
4. Finance Officer, MRSPTU, Bathinda.
5. Master File

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**ITEM NO. 03.01 CONFIRMATION OF MINUTES OF 2ND MEETING OF ACADEMIC
COUNCIL HELD ON 31.05.17**

It is for information of the members that 2nd Meeting of Academic Council was held on 31.5.2017. Minutes of this Meeting are enclosed (**ANNEXURE-I, Pages 10-24**).

The Members are requested to confirm the minutes.

**ITEM NO. 03.02 CONFIRMATION OF MINUTES OF 2ND MEETING OF STANDING
COMMITTEE OF ACADEMIC COUNCIL HELD ON 26.2.2018**

It is for information of the members that 2nd Meeting of Standing Committee of Academic Council was held on 26.2.2018. Minutes of this Meeting are enclosed (**ANNEXURE-II: Pages 25-41**).

The Members are requested to confirm the minutes.

**ITEM NO. 03.03 APPROVAL OF MINUTES OF 2ND MEETING OF FACULTY OF
ENGINEERING & TECHNOLOGY HELD ON 13.8.18**

It is for information of the members that 2nd Meeting of Faculty of Engineering & Technology was held on 13.8.2018. Minutes of this Meeting are enclosed (**ANNEXURE-III: Pages 42-48**).

The Members are requested to approve the minutes.

**ITEM NO. 03.04 APPROVAL OF MINUTES OF 2ND MEETING OF FACULTY OF
SCIENCES HELD ON 17.9.18**

It is for information of the members that 2nd Meeting of Faculty of Sciences was held on 17.9.2018. Minutes of this Meeting are enclosed (**ANNEXURE-IV: Pages 49-53**).

The Members are requested to approve the minutes.

ITEM NO. 03.05 APPROVAL OF SYLLABI OF UNDER GRADUATE PROGRAMMES

Syllabi of Under Graduate Programmes have been prepared (**ANNEXURE-V: Pages 54-341**) as per details given below:

TABLE-I		
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4	B.Sc. (Hons. School) Mathematics Syllabus (Sem. 2) 2018 Batch onwards	169-174
5	B.Sc. Aircraft Maintenance Engineering Syllabus 2018 Batch onwards	175-232
6	B.Tech. Agricultural Engg. (Sem 7-8) Syllabus 2016 Batch onwards	233-259
7	B.Sc. Agriculture Syllabus (Sem 6) 2016 Batch onwards	260-266
8	B.Pharm. (Sems. 5–8) 2016 Batch	267-339

The Members are requested to approve the syllabi.

ITEM NO. 03.06 APPROVAL OF SYLLABI OF POST GRADUATE PROGRAMMES

Syllabi of Post Graduate Programmes have been prepared (**ANNEXURE-VI: Pages 342-434**) as per details given below:

TABLE-II		
S.N.	ITEM	PAGE NO.
1	MBA Syllabus (Sem. 1-2) 2019 Batch onwards	340-356
2	M.Sc. Clinical Research Syllabus 2018 Batch onwards	357-366
3	Masters in Hospitality & Tourism Management Syllabus (Sem 1-2) 2018 Batch onwards	367-382
4	M.Sc. (Computer Science) (Sem 1-2) Syllabus 2018 Batch onwards	383-393
5	M.Tech. Electrical Engg. (Power System) (Sem 2-4) 2018 Batch onwards	394-423
6	Pre-Ph.D. (Physics) Course Syllabus 2018 Batch onwards	424-432

The Members are requested to approve the syllabi.

ITEM NO. 03.07 APPROVAL OF SYLLABI OF SKILL CERTIFICATE PROGRAMMES

Syllabi of Skill Certificate Programmes have been prepared (**ANNEXURE-VII: Pages 435-532**) as per details given below:

TABLE-III		
S.N.	ITEM	PAGE NO.
1	6-Months Skill Certificate Programme in Functional English 2018 batch onwards	433-438
2	6-Months PG Skill Certificate Course in Hospital Administration 2018 Batch onwards	439-443
3	One-Year Skill Certificate Course in Computer Hardware and Networking 2018 batch onwards	444-468
4	One-Year Skill Certificate Course in Medical Lab Technology Syllabus 2018 Batch onwards	469-480
5	6-Months Skill Certificate Programme in Lathe Operator 2018 Batch onwards	481-494
6	6-Months Skill Certificate Programme in Sewing Machine Operator 2018 Batch onwards	495-508
7	One-Year Skill Certificate Programme in Fashion and Apparel Technology 2019 Batch onwards	509-530

The Members are requested to approve the syllabi.

ITEM NO. 03.08 RATIFICATION OF MoU SIGNED BY MRSPTU

University has signed MoU with various organisations (**ANNEXURE-VIII: Pages 533-565**) as per details given below:

TABLE-IV		
S.N.	ORGANISATION	PAGE NO.
1	INSEEC FRANCE	
2	CDSL VENTURES LIMITED, MUMBAI	
3	NATIONAL COOPERATIVE CONSUMERS FEDERATION OF INDIA LIMITED (NCCF), NOIDA	
4	UNIVERSITY CANADA WEST	
5	VANCOUVER ISLAND UNIVERSITY, CANADA	
6	CONCORDIA UNIVERSITY OF EDMONTON, CANADA	
7	AMAZON INTERNET SERVICES PVT. LIMITED	

The Members are requested to ratify the MoU.

**ITEM NO. 03.09 TO NOTE AND APPROVE THE CANCELLATION OF Ph.D.
ENROLMENT-CUM-ADMISSIONS**

Some Ph.D. Enrolment-cum-admissions have been cancelled (**ANNEXURE-IX: Pages 566-569**).

The Members are requested to note them and approve the same.

ITEM NO. 03.10 APPROVAL OF PROVISIONAL Ph.D. REGISTRATION

Some Ph.D. Enrolment-cum-admissions have been done (**ANNEXURE-X: Pages 570-574**).

The Members are requested to approve the registration.

**ITEM NO. 03.11 APPROVAL TO CANDIDATES REGISTERED/ENROLLED BEFORE
2018-19 TO CONTINUE WITH SUPERVISORS, WHOSE COLLEGES
HAVE CHANGED AFFILIATION FROM MRSPTU TO IKGPTU
W.E.F. JULY 2018**

Some candidates got registered/enrolled before 2018-19 with supervisors of MRSPTU, Bathinda. However, their colleges have changed affiliation from MRSPTU to IKGPTU w.e.f. July, 2018 (**ANNEXURE-XI: Pages 575-579**).

The Members are requested to approve/allow these students to continue with these supervisors.

**ITEM NO. 03.12 TO INFORM AND APPROVE Ph.D. CANDIDATES
ENROLLED/REGISTERED WITH MRSPTU UP TO 31.10.2018**

The detailed list of Ph.D. candidates enrolled/registered with MRSPTU, Bathinda up to 31.10.2018 under various Disciplines is appended (**ANNEXURE-XII: Pages 580-586**). The same stands uploaded on www.mrsptu.ac.in as per UGC format.

The Members are requested to approve above list.

**ITEM NO. 03.13 TO APPROVE THE MINUTES OF DDRC MEETINGS HELD IN
VARIOUS DISCIPLINES FOR Ph.D. ADMISSIONS & RELATED
ISSUES**

Departmental Doctoral Research Committees have met from time to time for admitting Ph.D. students and to address various related issues. Minutes of meetings/recommendations of these committees are appended (**ANNEXURE-XIII: Pages 587-593**).

The Members are requested to approve these minutes.

**ITEM NO. 03.14 APPROVAL TO SUPERVISE Ph.D. CANDIDATES IN A DISCIPLINE
BY AN APPROPRIATE SUPERVISOR FROM THE CONCERNED
FACULTY UNDER MRSPTU**

Owing to administrative reasons, some colleges were allowed to change their affiliation from MRSPTU to IKGPTU w.e.f. 2018-19 onwards. Accordingly, Ph.D. candidates already enrolled/registered with the supervisors from these institutes were asked to change their supervisors as per UGC Ph.D. Regulations-2016. However, requests were received from various candidates to permit continuation of Ph.D. work under the existing supervisor to avoid undue disturbance in their already identified field of research. A committee was constituted to look into the matter. Minutes of meeting were put up to the Vice Chancellor (**ANNEXURE-XIV: Pages 594-595**).

The Members are requested to approve the supervisors for MRSPTU candidates with which they are already working, although their colleges have changed affiliation to IKGPTU.

**ITEM NO. 03.15 TO APPROVE RATIONALISATION OF CHOICE BASED CREDIT
SYSTEM SOFTWARE TO OBTAIN MORE JUSTIFIED RESULTS**

It has been observed in the previous examinations that some students obtain low grade, even if they score high marks and vice versa. In order to rationalise the Choice Based Credit system, some checks may be inserted in the software in order to have more justified results.

The Members are requested to deliberate and decide the modifications required in the examination software.

**ITEM NO. 03.16 TO APPROVE THE ISSUANCE OF MERIT CERTIFICATES AND
GOLD MEDALS TO MERITORIOUS STUDENTS**

The University has been issuing the merit for each branch for first three positions. To felicitate the students, it is proposed to give merit certificates and gold medals at the end of programme to the meritorious students.

1. Merit Certificates are to be issued to the first three candidates based on the aggregate of all semesters. Three merit certificates for 1st, 2nd, 3rd position shall be given for each programme.
2. Gold medal is to be issued to the topper of each programme based on the aggregate of all semesters. It will be given provided number of students in that programme is 20 or more.
3. The calculation of merit shall be done after revaluation results have been declared by the University.
4. If the last semester is the thesis semester, students who have submitted the thesis to the University, with in stipulated period, i.e. up to 30th June, shall be considered for merit.
5. Students with reappear will not be considered for merit certificate/gold medal.
6. If the total marks/CGPA is the same for some students, then order of merit shall be based on the following criteria in preferential order.

On the basis of Total Marks (2015 Batch)

- a) Marks obtained in theory subjects (Internal and external).
- b) Marks obtained in theory subjects (External only).

On the basis of CGPA (2016 Batch onwards)

- a) Number of A+ grades scored in theory subjects
- b) Number of A grades scored in theory subjects

The Members are requested to deliberate and approve the proposal.

ITEM NO. 03.17 RATIFICATION FOR INCREASE IN NUMBER OF SEATS OF B.COM (HONS.) FROM 60 TO 120 FOR PUNJAB INSTITUTE OF TECHNOLOGY, RAJPURA

It has been proposed to increase the number of seats of B.Com. (Hons.) from 60 to 120 for Punjab Institute of Technology, Rajpura (**ANNEXURE-XV: Pages 596**). Admissions have been carried out for 2018 Batch for the enhanced intake.

The Members are requested to ratify the increase the number of seats of B.Com. (Hons.).

ITEM NO. 03.18 TO APPROVE CONDUCT OF Ph.D. ADMISSION TEST TWICE A YEAR BY MRSPTU

It has been proposed to conduct of Ph.D. admission test twice a year by MRSPTU (**ANNEXURE-XVI: Pages 597**).

The Members are requested to deliberate and approve it.

ITEM NO. 03.19 TO APPROVE B. VOC. (FOOD PROCESSING) AND B. VOC. (FOOD PROCESSING AND ENGINEERING) DEGREE HOLDERS ELIGIBLE FOR ADMISSIONS TO M.Sc. (FOOD SCIENCE AND TECHNOLOGY)

It has been proposed to approve VOC. (Food Processing) and B. VOC. (Food Processing and Engineering) degree holders eligible for admissions to M.Sc. (Food Science and Technology) (**ANNEXURE-XVII: Pages 598**).

The Members are requested to deliberate and approve it.

ITEM NO. 03.20 RATIFICATION OF START OF B.COM (HONS.) AT PIT GTB GARH MOGA

It has been proposed to start B.Com. (Hons.) at PIT GTB Garh Moga from 2018-19 session (**ANNEXURE-XVIII: Pages 599-600**). Admissions have been carried out.

The Members are requested to ratify the admissions.

ITEM NO. 03.21 RATIFICATION OF START OF BCA-MCA 5 YRS. DUAL DEGREE PROGRAMME IN UNIV. MAIN CAMPUS

It has been proposed to start BCA-MCA 5 yrs. Dual Degree Programme in Univ. Main Campus from 2018-19 session (**ANNEXURE-XIX: Pages 601**). Admissions have been carried out.

The Members are requested to ratify the admissions.

ITEM NO. 03.22 AUTHORIZATION OF VICE CHANCELLOR, MRSPTU BATHINDA TO TAKE DECISIONS IN CASE OF URGENT MATTERS TO BE RATIFIED LATER ON BY MRSPTU ACADEMIC COUNCIL.

It is proposed to authorize Vice Chancellor, MRSPTU Bathinda to take decisions in case of urgent matters to be ratified later on by Academic Council, MRSPTU, Bathinda.

NOTE: *Any other Agenda item can be discussed with the permission of the Chair.*

TABLE AGENDA

ITEM NO. 03.23 APPROVAL TO START Ph.D. PROGRAMME IN DEPTT. OF FOOD SC. & TECHNOLOGY UNDER FACULTY OF SCIENCES

It is proposed to start Ph.D. Programme in Deptt. of Food Sc. & Technology under Faculty of Sciences (ANNEXURE-XX, Pages 602-619).

The Members are requested to approve it.

ITEM NO. 03.24 TO EXPLORE POSSIBILITY OF STARTING B.TECH. PROGRAMME IN DEFENCE TECHNOLOGY

It is to be deliberated whether University should start B. Tech. Programme in Defence Technology (ANNEXURE-XXI: Pages 620).

The Members are requested to deliberate on it and decide.

ITEM NO. 03.25 TO EXPLORE POSSIBILITY OF STARTING A CHAIR AT MRSPTU IN THE NAME OF SHER-E-PUNJAB MAHARAJA RANJIT SINGH

It is proposed to start A Chair at MRSPTU in the name of Sher-E-Punjab Maharaja Ranjit Singh (ANNEXURE-XXI: Pages 620).

The Members are requested to deliberate on it and decide.

ITEM NO. 03.26 APPROVAL FOR 6-MONTHS SKILL CERTIFICATE PROGRAMME SYLLABUS IN CAD/CAM FROM 2018 BATCH ONWARDS

Syllabus of 6-months Skill Certificate Programme in CAD/CAM has been prepared (ANNEXURE-XXII: Pages 621-647).

The Members are requested to deliberate and approve it.

ITEM NO. 03.27 RATIFICATION OF START OF ONE-YEAR SKILL CERTIFICATE PROGRAMME IN ELECTRICIAN AT PIT GTB GARH MOGA

It has been proposed to start One-Year Skill Certificate Programme in Electrician at PIT GTB Garh Moga from 2018-19 session (ANNEXURE-XXIII: Pages 648). Admissions have been carried out.

The Members are requested to ratify the admissions.

**ITEM NO. 03.28 APPROVAL TO START BACHELORS IN INTERIOR DESIGN AND
BACHELORS IN FINE ARTS IN ARCHITECTURE DEPARTMENT
UNIVERSITY MAIN CAMPUS FROM 2019 BATCH**

It is proposed to start Bachelors in Interior Design and Bachelors in Fine Arts in Architecture Department University Main Campus from 2019-20 session **(ANNEXURE-XXIV: Pages 649).**

The Members are requested to deliberate and approve it.

**ITEM NO. 03.29 APPROVAL TO INCLUDE NAME OF SENIOR TOWN PLANNER
MR. JIT KUMAR GUPTA AS A SPECIAL INVITEE IN BoS IN
ARCHITECTURE AND PLANNING**

For the preparation of syllabus for M. Planning, inputs of a senior town planner are required. It is proposed to include Name of Senior Town Planner (Retired) Mr. Jit Kumar Gupta as a special invitee in BoS in Architecture and Planning **(ANNEXURE-XXIV: Pages 649).**

The Members are requested to approve it.



Maharaja Ranjit Singh Punjab Technical University

DABWALI ROAD, BATHINDA-151001

[Established by Govt. of Punjab vide Act No. 5 of 2015, UGC Act 2(f)]

DEAN ACADEMIC AFFAIRS

www.mrsptu.ac.in

Ref. No.: DAA/MRSPTU/

Ph. 8725072488, 0164-2284298

daa.mrsstu@gmail.com

Date:

MINUTES OF 2ND ACADEMIC COUNCIL MEETING HELD ON 31.05.2017

2nd Meeting of Academic Council of Maharaja Ranjit Singh Punjab Technical University, Bathinda was held on 31.05.2017 at 11:30 AM in the Committee Room of GZSCCET, Bathinda under the chairmanship of Hon'ble Vice Chancellor. The following members were present:

1. **Dr. (Prof.) Mohan Paul Singh Ishar** **Chairperson**
Vice-Chancellor, MRSSTU, Bathinda,
vc@mrsstu.ac.in Ph. 8725072300
2. **Dr. (Prof.) Ashish Baldi,** **Member**
Dean Faculty (Pharmacy), Mrsptu Bti,
(Ph. 08968423848) baldiashish@gmail.com
3. **Campus Director,** **Member**
Giani Zail Singh Campus College of Engineering & Technology,
Bathinda (Constituent College). (Ph. 08725072488)
principalgzscet@yahoo.co.in
4. **Director,** **Member**
Punjab Institute of Technology, Nandgarh, District Bathinda
(Constituent College). (Ph. 08725072485) pitn_ptu@yahoo.com
5. **Director,** **Member**
Punjab Institute of Technology, GTB Garh, District Moga
(Constituent College),
(Ph. 09478022281) pitgtb@yahoo.in
6. **Director,** **Member**
Punjab Institute of Technology, Mansa (Constituent College).
(Ph. 09815126102) dir.pitm@gmail.com
7. **Director,** **Member**
Punjab Institute of Technology, Rajpura (Constituent College).
(Ph. 09876006758) dir.pitr@gmail.com, pitrajpura@yahoo.com
8. **Principal,** **Member**
Baba Banda Singh Bahadur Engineering College, Fatehgarh Sahib
(Punjab).
(Ph. 098142-21213, 01763-503056, 503143) principal@bbsbec.ac.in

- 9. Representative of Principal,** **Member**
Lala Lajpat Rai College of Pharmacy, Moga (Punjab).
(Ph. 09501197936, 01636-501067, 509980) llrcp2014@gmail.com
- 10. Director,** **Member**
Baba Hira Singh Bhattal Institute of Engineering & Technology,
Sunam-Jakhal Road, Lehragaga, Sangrur-148031 (Punjab).
(Ph. 07087000702, 01676-272800) academic.bhsbiet@gmail.com
- 11. Dr. S.S. Marwaha,** **Member**
CEO, Biotechnology Incubator, Punjab,
(Ph. 09815014974) ssmarwaha@yahoo.com
- 12. Dean, Academic Affairs,** **Special Invitee**
MRSPTU, Bathinda
(Ph. 08725972488) daa.mrsstu@gmail.com
- 13. Dean, College Development Council,** **Special Invitee**
MRSPTU, Bathinda
(Ph. 08725072491) dir.cd@mrsstu.ac.in
- 14. Dean, R&D,** **Special Invitee**
MRSPTU, Bathinda
(Ph. 08725072492) drd@mrsstu.ac.in
- 15. Dean, Students Welfare,** **Special Invitee**
MRSPTU, Bathinda
(Ph. 09463000954) drrakeshkbansal@gmail.com
- 16. Dr. Balwinder Singh Sidhu,** **Special Invitee**
HOD, Mechanical Engineering, GZSCCET, Bathinda
drbwssidhu07@gmail.com
- 17. Controller of Examinations,** **Special Invitee**
MRSPTU, Bathinda
(Ph. 08872211150) coe@mrsstu.ac.in
- 18. Registrar,** **Member-Secretary**
MRSPTU, Bathinda,
(Ph. 08872500251) reg@mrsstu.ac.in

MINUTES OF 2ND ACADEMIC COUNCIL MEETING HELD ON 31.05.2017

The following decisions were taken in the meeting:

Item No.	Description	Decision Taken
02.01	<p>CONFIRMATION OF THE PROCEEDINGS OF 1ST MRSPTU ACADEMIC COUNCIL MEETING HELD ON 11.03.2016.</p> <p>The 1st meeting of MRSPTU Academic Council was held on 11.03.2016 in the Committee Room of MRSPTU, Bathinda. The proceedings of the meeting were circulated to all the members. The proceedings of the minutes are placed at ANNEXURE-I.</p> <p>The matter was placed before the Academic Council for confirmation.</p>	Confirmed.
02.02	<p>TO REPORT ACTION TAKEN ON THE DECISIONS TAKEN IN THE 1ST MRSPTU ACADEMIC COUNCIL MEETING HELD ON 11.03.2016.</p> <p>The decisions and Action taken in the 1st MRSPTU Academic Council Meeting was put up to the Council for ratification.</p> <p>The matter was placed before the Academic Council for information.</p>	Noted.
02.03	<p>APPROVAL FOR PROPOSED AMENDMENTS IN CHOICE BASED CREDIT SYSTEM-2016.</p> <p>Choice Based Credit System-2016 was approved in the 1st Academic Council Meeting held on 11.03.2016 vide Agenda Item No. 01.18. The following amendments/additions are proposed in the above approved Choice Based Credit System-2016. The proposed amendments are incorporated in ANNEXURE-II.</p> <ol style="list-style-type: none"> 1. Proposed: In a UG/PG Programme, every student has to register for minimum 15/12 Credits, respectively. Every student can register for maximum 35 Credits in a Semester. Existing: Every student has to register for minimum 15 Credits and maximum 36 Credits in a Semester. 2. Proposed: The student should obtain at least 25% marks in External University Examination in a Course to qualify it. Existing: A student has to earn $\geq 30\%$ marks in a Course to qualify it. 3. Proposed: A student is required to earn at least 25% of the credits registered by him/her in an Academic Year, failing which he/she will be declared failed in that Academic Year. Existing: A student is required to earn at least 4.5 CGPA at the end of each Academic Year, failing which he/she will be declared failed in that Academic Year. 	Approved.

	<p>4. Proposed: A student is allowed to register for Reappear Examination of a Course in both odd and even Semesters. Existing: No.</p> <p>5. Proposed: A student getting F grade may retain his/her Internal Assessment for Reappear Examination of the Course. He/she has the option to improve his/her Internal Assessment by appearing in Continuous Evaluation Tests, quizzes etc. during the Semester. If the student does not improve his/her Internal Assessment in a Course, then his/her previous Internal Assessment will be retained. He/she has to appear in End Semester University Examination to qualify this Course. Existing: A failed student has to repeat the Course by appearing in continuous evaluation tests, quizzes etc. during the Semester and End Semester University Examinations.</p> <p>6. Proposed: In a Programme of more than 2 years, A student can register for Courses of 5th Semester, only if, he/she has earned atleast 50% of the Credits registered by him/her for the 1st Semester. A student can register for Courses of 6th Semester, only if, he/she has earned atleast 50% of the Credit registered by him/her for 1st year. Existing: A student can register for Courses of 5th Semester, only after clearing his/her all Courses of 1st Semester. A student can register for Courses of 6th Semester, only after clearing his/her all Courses of 2nd Semester.</p> <p>The matter was placed before the Academic Council for approval of amendments.</p>	
02.04	<p>APPROVAL FOR PROPOSED AMENDMENTS IN MIGRATION REGULATIONS-2016</p> <p>Migration Regulations-2016 were approved in the 1st Academic Council Meeting held on 11-03-2016 vide agenda Item No. 01.22. The following amendments/additions are proposed in the above approved Migration Regulations-2016. The proposed amendments are incorporated in ANNEXURE-III.</p> <p>1. Proposed: Intra University or Inter University migration to 3rd semester of UG Programmes and PG Programmes will be allowed to those students, who are eligible to register for 3rd semester of their UG Programmes. However, migration to 3rd semester of PG Programmes will be allowed only in exceptional cases. Inter College migration will be allowed, only if, the distance between the parent Institute and the Institute, where migration is sought, are more than 40 kilometers apart by road. Existing: Intra University or Inter University migration will be allowed to those students who are eligible to register for under</p>	Approved.

	<p>mentioned semester.</p> <table border="1"> <thead> <tr> <th>S.N.</th> <th>Duration of Programme / Discipline</th> <th>Semester in which migration is sought</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>4/5 years degree programme</td> <td>3rd or higher</td> </tr> <tr> <td>2.</td> <td>2/3 years degree programme</td> <td>2nd or higher</td> </tr> </tbody> </table> <p>2. Proposed: Migration will be allowed to the students, who have cleared all subjects of the first year. Existing: (a) Merit, worked out on the basis of marks obtained in the first and second semester (combined), shall form the basis of migration for 4/5-year degree programme and first semester for 2/3-year degree programme, respectively. (b) Preference will be given to the students who have cleared all subjects of the first year and first semester of their 4/5-year degree programme and 2/3-year degree programme, respectively.</p> <p>3. Proposed: Applications for Intra University migration along with NOCs from the both parent and the host Colleges/Universities shall be received by the University up to 15th August every year. Migration process will be over by 31st August every year. This migration is allowed after the branch upgradation (if applicable) is over. Existing: Migration shall be allowed before start of the semester/session along with NOCs from the both parent and the host Colleges/Universities.</p> <p>4. Proposed: Applications for migration to a Constituent/Affiliated Institute of the University from other UGC recognized Universities will be allowed up to 15th August every year, but may be considered during the semester under special circumstances. Existing: Migration to a Constituent/Affiliated Institute of the University from other recognized Universities will be allowed 15 days prior to the start of a semester generally, but may be considered during the semester under special circumstances.</p> <p>The matter was placed before the Academic Council for approval of amendments.</p>	S.N.	Duration of Programme / Discipline	Semester in which migration is sought	1.	4/5 years degree programme	3 rd or higher	2.	2/3 years degree programme	2 nd or higher	
S.N.	Duration of Programme / Discipline	Semester in which migration is sought									
1.	4/5 years degree programme	3 rd or higher									
2.	2/3 years degree programme	2 nd or higher									
<p>02.05</p>	<p>APPROVAL FOR REVISED ELIGIBILITY CRITERIA FOR ADMISSIONS BY MRSPTU, BATHINDA TO B.ARCH. IN GZSCCET, BATHINDA AND PITs OF MRSPTU, BATHINDA, AFTER THE COMPLETION OF 2ND ROUND OF CENTRALIZED ONLINE COUNSELLING BY IKGPTU, KAPURTHALA AND EXHAUSTING THE LIST OF ELIGIBLE NATA QUALIFIED CANDIDATES</p> <p>The Punjab Government notification for admission to B.Arch. course for Session 2017-18, no. 08/12/2017-4TE2 dated 06/04/2017, states</p>	<p>1. Approved. 2. The issue has been taken up with Govt. of Punjab, Department of Technical Education and Industrial Training regarding eligibility of JEE-Main Paper-2</p>									

MINUTES OF 2ND ACADEMIC COUNCIL MEETING HELD ON 31.05.2017

	<p>that the eligibility for B.Arch. course, it was put up to the Council for deliberation and approval ANNEXURE-IV.</p> <p>The matter was placed before the Academic Council for approval.</p>	<p>qualified candidates for admission to B.Arch. Orders issued, if any, in this regard by the Govt. will be followed.</p>
02.06	<p>PROPOSAL FOR DEVELOPING ACADEMIC GRADING SYSTEM BASED ON QUALITY PARAMETERS GRADATION OF ALL AFFILIATED/CONSTITUENT COLLEGES OF MRSPTU, BATHINDA.</p> <p>It was proposed to approve an Academic Grading System based on quality parameters for teaching, research, placement, infrastructure and other outcomes etc. to issue ranking, i.e. Five/Four/Three Stars for all affiliated colleges. MRSPTU has constituted a committee for framing guidelines and parameters for grading of colleges so that academic audit of all institutions can be conducted ANNEXURE-V.</p> <p>The matter was placed before the Academic Council for approval.</p>	<p>Approved.</p>
02.07	<p>PROPOSAL TO EMPOWER MRSPTU, BATHINDA THAT IT MAY DENY RECOMMENDATION FOR POST MATRIC SCHOLARSHIPS TO THE STUDENTS STUDYING IN COLLEGES WITH LOWEST GRADING IN ACADEMIC AUDIT OR NON-IMPLEMENTATION OF BIO-METRIC ATTENDANCE.</p> <p>It was proposed that MRSPTU, Bathinda may be empowered to deny recommendations for granting Post-Matric Scholarship to the students studying in colleges with lowest grading in academic audit or non-implementation of bio-metric attendance. Directions were issued to the Affiliated Colleges vide letter no. CDC/610 dated 16.05.2017.</p> <p>The matter was placed before the Academic Council for approval.</p>	<p>Approved that Extension of Affiliation may be denied by the University to Institutions with lowest academic grade in academic audit or to Institutions which do not implement biometric attendance.</p>
02.08	<p>APPROVAL FOR AUTHORIZATION OF THE UNIVERSITY TO TAKE STRICT MEASURES FOR FAIR CONDUCT OF UNIVERSITY EXAMINATIONS/EVALUATION.</p> <p>It was proposed to authorize the University to take strict measures for fair conduct of examinations to generate confidence in the students, their parents and society for the University. Zero tolerance policy on faulty evaluation by teachers and use of unfair means by students/institutes during examination is to be implemented. In case of malpractices at Exam Centres, if caught by a Flying Squad, stringent actions on the student, Invigilator and Centre Superintendent may be recommended. However, if caught by Centre Superintendent, student</p>	<p>Approved.</p>

	<p>and the invigilator shall face stringent punishment as decided by University. If caught by the invigilator, then the student will face stringent punishment as decided by the University. On repeated offences, other disciplinary actions like closure of examination/evaluation centre, debarring of concerned evaluator and UMC on students etc., University may take strict action for the same. It may be added that,</p> <p>(i) All examination centres have been provided with IP based CCTV cameras and are monitored from the University.</p> <p>(ii) UMC cases are framed based on CCTV cameras.</p> <p>The matter was placed before the Academic Council for approval.</p>	
<p>02.09</p>	<p>INFORMATION REGARDING UPLOADING OF THE EVALUATED ANSWER SHEETS IN THE STUDENT LOGIN ON THE UNIVERSITY PORTAL ON THE DAY OF DECLARATION OF RESULTS FOR THE INFORMATION OF STUDENTS CONCERNED</p> <p>In order to minimise the discrepancies during the process of evaluation and to develop a transparent system, all evaluated answer-sheets may be uploaded in the student login on the University Portal on the day of declaration of results, for the information of students concerned. It is informed that,</p> <ol style="list-style-type: none"> 1. Re-evaluation cases of the University are as low as to 3.5%. 2. Erring evaluators/re-evaluators have been identified and action have been taken against them. 3. Process for putting evaluated answer-sheets on University website is being developed. 4. A separate item is being put up before the BOG in this regard. <p>The matter was placed before the Academic Council for information.</p>	<ol style="list-style-type: none"> 1. Noted. 2. Approved that the photocopies of evaluated answer sheets may be given to students at a nominal price on demand of the students, until a system is developed to upload the evaluated answer sheets in student login. 3. It was further suggested that parent login may also be started like student login for awareness of the parents about performance of their wards.
<p>02.10</p>	<p>APPROVAL FOR INCLUSION OF SKILL DEVELOPMENT COMPONENT IN THE CURRICULUM ITSELF AND ORGANIZATION OF FINISHING SCHOOLS FOR VARIOUS SKILLS INCLUDING IELTS EXAMINATIONS</p> <p>It was proposed that for the development of skill-set required for making students job-ready, Skill Development Component may be inculcated in the curriculum itself. In order to update students with current technological advancements finishing schools for particular skill including IELTS examination may be organised on regular basis by the colleges under supervision of University & University may provide partial financial assistance for the same.</p>	<ol style="list-style-type: none"> 1. Approved. 2. Boards of Studies be informed to incorporate component of Skill Development Programmes in the Syllabi.

MINUTES OF 2ND ACADEMIC COUNCIL MEETING HELD ON 31.05.2017

	<p>It is informed that MRSPTU, Bathinda has signed MOUs with different Institutes/Organizations for Soft Skill improvement and University has also started Finishing Schools on University Campus to develop the skills of students.</p> <p>The matter was placed before the Academic Council for approval.</p>	
02.11	<p>PROPOSAL TO ESTABLISH DEPARTMENT OF EDUCATION TECHNOLOGY IN THE UNIVERSITY CAMPUS.</p> <p>It was proposed that MRSPTU, Bathinda may establish Department of Education Technology in its Campus to impart training to Faculty of all the Affiliated/Constituent Colleges, after completion of the construction work.</p> <p>The matter was placed before the Academic Council for approval.</p>	Approved.
02.12	<p>APPROVAL TO OFFER PG PROGRAMMES M. TECH. (COMPUTER APPLICATIONS) AND M.SC. (MATHEMATICS AND COMPUTING) FOR 2017-18 ACADEMIC SESSION BY UNIVERSITY MAIN CAMPUS</p> <p>It is decided to offer PG Programme M. Tech. (Computer Applications) and M.Sc. (Mathematics and Computing) for 2017-18 Academic Session. Vice Chancellor is authorized to approve the curriculum of these Programmes after recommendation by the concerned Board of Study ANNEXURE-VI.</p> <p>The matter was placed before the Academic Council for approval.</p>	Approved.
02.13	<p>INFORMING THE EXTENSION OF DATE OF SUBMISSION OF APPLICATION FORM FOR BECOMING Ph.D. SUPERVISORS BY THE ELIGIBLE FACULTY MEMBERS AND ADOPTION OF MODIFIED PATTERN OF PET QUESTION PAPER, RESEARCH METHODOLOGY QUESTION PAPER & QUALIFYING CRITERIA.</p> <p>It is to inform you that a letter no. DRD/MRSPTU/335 dated 27.04.2017 was issued by Dean R & D, MRSPTU, Bathinda mentioning the slots for Ph.D. Supervisors and Ph.D. Entrance Exam Pattern.</p> <p>Later on, it was observed that many eligible faculty members could not apply for becoming Ph.D. Supervisors. As a result, an approval was given by the Vice Chancellor for extension of date for submission of application for becoming Ph.D. Supervisors by the eligible faculty members vide letter no. DAA/MRSPTU/2017/886 dated 18.05.2017. As per this approval, the last date to apply for becoming Ph.D. Supervisors was extended up to 26.05.2017 and the approved Ph.D. Supervisors for Supervisors allocation would be considered whose</p>	Noted.

MINUTES OF 2ND ACADEMIC COUNCIL MEETING HELD ON 31.05.2017

	<p>applications have been received up to 26.05.2017 in the context of above said letters and advertisement issued in The Tribune dated 30.4.2017 for Ph.D. admissions ANNEXURE-VII.</p> <p>The matter was placed before the Academic Council for information.</p>	
<p>02.14</p>	<p>DELIBERATION ON MINIMUM SUBJECTWISE QUALIFYING CRITERIA FOR Ph.D. COURSE WORK AND APPROVAL</p> <p>The Ph.D. Course Work will follow Credit based system, the details of which are given in ANNEXURE-VIII. Ph.D. student will be required to obtain at least "C+" grade in each course. A student getting "C" or lower Grade in any Course will have to opt another Course in lieu of such a course with the approval of his/her supervisor, and will have to obtain at least "C+" grade in this course within one year of first taking up of that course, failing which his/her pre-registration to the Ph.D. Programme will be cancelled.</p> <p>The matter was placed before the Academic Council for deliberation and approval.</p>	<p>It was approved that Absolute Grading System is to be followed. Controller of Examination was entrusted the task of preparing the draft for Grading System in consultation with Dean R&D in the light of UGC notification-2016 and to put it up in the next meeting of BOG for approval.</p>
<p>02.15</p>	<p>DELIBERATION ON Ph.D. AND OTHER COURSES FEE STRUCTURE FOR FOREIGN STUDENTS AND APPROVAL</p> <p>Proposed Fee Structure for Foreign Students is included in the ANNEXURE-IX for deliberation and approval.</p> <p>The matter was placed before the Academic Council for deliberation and approval.</p>	<ol style="list-style-type: none"> 1. Approved that Committee constituted to recommend the Fee Structure will submit the detailed Semester/Annual Fee structure as applicable during the normal duration of the Degree. 2. Detailed Fee Structure should include tuition fee, refundable security, examination fee, counselling fee and other funds etc. 3. Reappear Examination Fee per Subject/all subjects. 4. Semester/Annual Fee as applicable beyond the normal duration of the Degree.

MINUTES OF 2ND ACADEMIC COUNCIL MEETING HELD ON 31.05.2017

<p>02.16</p>	<p>APPROVAL OF SYLLABI AND MINUTES OF FACULTY MEETINGS</p> <p>1st Meetings of following Faculties were held as per schedule given below. Syllabi presented to these Faculties and the Minutes of their Meetings are appended as per details given in the table. These are placed before the Academic Council for consideration and approval:</p> <table border="1"> <thead> <tr> <th>S. N.</th> <th>FACULTY</th> <th>MEETING HELD ON</th> <th>ANNEXURE (MINUTES)</th> <th>ANNEXURE (AGENDA)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Engineering & Technology</td> <td>25.4.2017</td> <td>X (Pg 114-121)</td> <td>XXV (Pg 649-1586)</td> </tr> <tr> <td>2</td> <td>Sciences</td> <td>28.4.2017</td> <td>XI (Pg 122-125)</td> <td>XXVI (Pg 1587-2073)</td> </tr> <tr> <td>3</td> <td>Architecture & Planning</td> <td>02.5.2017</td> <td>XII (Pg 126-127)</td> <td>XXVII (Pg 2074-2182)</td> </tr> <tr> <td>4</td> <td>Commerce & Management</td> <td>05.5.2017</td> <td>XIII (Pg 128-131)</td> <td>XXVIII (Pg 2183-2403)</td> </tr> <tr> <td>5</td> <td>Pharmacy</td> <td>24.5.2017</td> <td>XIV (Pg 132-137)</td> <td>XXIX (Pg 2404-2409)</td> </tr> </tbody> </table> <p>The matter was placed before the Academic Council for approval.</p>	S. N.	FACULTY	MEETING HELD ON	ANNEXURE (MINUTES)	ANNEXURE (AGENDA)	1	Engineering & Technology	25.4.2017	X (Pg 114-121)	XXV (Pg 649-1586)	2	Sciences	28.4.2017	XI (Pg 122-125)	XXVI (Pg 1587-2073)	3	Architecture & Planning	02.5.2017	XII (Pg 126-127)	XXVII (Pg 2074-2182)	4	Commerce & Management	05.5.2017	XIII (Pg 128-131)	XXVIII (Pg 2183-2403)	5	Pharmacy	24.5.2017	XIV (Pg 132-137)	XXIX (Pg 2404-2409)	<p>Syllabi and Minutes approved.</p>
S. N.	FACULTY	MEETING HELD ON	ANNEXURE (MINUTES)	ANNEXURE (AGENDA)																												
1	Engineering & Technology	25.4.2017	X (Pg 114-121)	XXV (Pg 649-1586)																												
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4	Commerce & Management	05.5.2017	XIII (Pg 128-131)	XXVIII (Pg 2183-2403)																												
5	Pharmacy	24.5.2017	XIV (Pg 132-137)	XXIX (Pg 2404-2409)																												
<p>02.17</p>	<p>INFORMING THE FEE STRUCTURE FOR UNIVERSITY MAIN CAMPUS, CONSTITUENT COLLEGES AND AFFILIATED COLLEGES FOR 2017-18 BATCH ONWARDS ADMISSIONS APPROVED IN 4TH MRSPTU FINANCE COMMITTEE MEETING HELD ON 14.03.2017.</p> <p>It is informed that Fee structure for University Main Campus, Constituent Colleges and affiliated colleges for 2017-18 batch onward admissions ANNEXURE-XV was approved in 4th MRSPTU Finance Committee Meeting held on 14.3.2017.</p> <p>The matter was placed before the Academic Council for information.</p>	<p>Noted.</p>																														
<p>02.18</p>	<p>INFORMING THE REMITTANCE AND REFUND OF FEE FROM STUDENTS TO BE ADMITTED IN YEAR 2017 BATCH APPROVED IN 3RD MRSPTU FINANCE COMMITTEE MEETING HELD ON 17.01.2017.</p> <p>It is informed that in the meeting of 3rd Finance Committee Meeting of MRSPTU, Bathinda vide Agenda Item No. 03.11 (ANNEXURE-XVI) the remittance and refund of fee was decided.</p> <p>The matter was placed before the Academic Council for information.</p>	<p>Noted.</p>																														

<p>02.19</p>	<p>APPROVAL OF ADDITIONAL SPECIALIZATION OF RETAIL MANAGEMENT IN MBA PROGRAMME IN THE UNIVERSITY MAIN CAMPUS FROM 2017-18 BATCH</p> <p>The following courses (Super specialization & Major/Minor) have been recommended (ANNEXURE-XVII, Page 161) from the session 2016-17 for MRSPTU University Main Campus, Constituent Colleges and Affiliated Colleges.</p> <ol style="list-style-type: none"> 1. Marketing Management 2. Financial Management 3. Human Resource Management 4. Operation Management <p>The following one additional specialization (Super and Major & Minor) has been approved for the session 2017-18 for MRSPTU University Main Campus, Bathinda only by the Faculty of Commerce and Management in its Meeting held on 05.05.2017.</p> <ol style="list-style-type: none"> 1. Retail Management. <p>The matter was placed before the Academic Council for approval.</p>	<p>Approved.</p>
<p>02.20</p>	<p>APPROVAL TO CHANGE NOMENCLATURE OF B.Sc. (AIRLINE, TOURISM & HOSPITALITY MANAGEMENT) & B.Sc. (HOTEL MANAGEMENT AND CATERING TECHNOLOGY) BOTH 3 YEARS NON AICTE PROGRAMMES AND TO OFFER BACHELOR OF TOURISM & TRAVEL MANAGEMENT 4 YEARS AICTE PROGRAMME</p> <p>In view of the UGC Notification dated 05 July, 2014 and IKGPTU, Kapurthala Notification No. IKGPTU(reg/N/1585) dated 25-05-2016 (47th Meeting of Academic Council held on 05-02-2016), it is recommended (ANNEXURE-XVIII, Page 162) that,</p> <ol style="list-style-type: none"> 1. B.Sc. (Airline, Tourism and Hospitality Management) (3 years) Non AICTE Programmes may be renamed as Bachelor of Management Studies (Airline, Tourism and Hospitality) (3 Years) Non AICTE Programmes. 2. B.Sc. (Hotel Management and Catering Technology) (3 years) Non AICTE Programmes may be renamed as Bachelor of Management Studies (Hotel Management& Catering Technology) (3 Years) Non AICTE Programmes. 3. Programme Bachelor of Tourism and Travel Management (4 year) AICTE Programme be offered. <p>The matter was placed before the Academic Council for approval.</p>	<p>Approved.</p>
<p>02.21</p>	<p>RATIFICATION OF MINUTES OF 1ST MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL HELD ON 20.12.2016.</p>	<p>Ratified.</p>

MINUTES OF 2ND ACADEMIC COUNCIL MEETING HELD ON 31.05.2017

	<p>In the 1st Meeting of Standing Committee of Academic Council held on 20.12.2016 ANNEXURE-XIX.</p> <p>The matter was placed before the Academic Council for ratification.</p>																			
02.22	<p>APPROVAL OF AMENDMENTS IN SYLLABI OF ONE-YEAR SKILL CERTIFICATE PROGRAMMES PREPARED BY NITTTR, CHANDIGARH FOR MRSPTU, BATHINDA</p> <p>The Syllabi of the following One Year Skill Certificate Programmes have been prepared by NITTTR, Chandigarh for MRSPTU, Bathinda. These syllabi were put up before the Standing Committee on Academic Council in its Meeting held on 20.12.2016 for constitution and approval. These syllabi were approved. Some amendments have been made in it by NITTTR which are as under:</p> <table border="1"> <thead> <tr> <th>S.N.</th> <th>Changes approved by Academic Council on 20-12-2016</th> <th>Proposed Amendments</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Communication Skills Course was introduced in 1st and 2nd Semesters</td> <td>It will be introduced in one semester only either 1st Semester or 2nd Semester.</td> </tr> <tr> <td>2.</td> <td>Basic Sciences Course was introduced in 1st and 2nd Semesters</td> <td>It will be introduced in one Semester only either 1st Semester or 2nd Semester.</td> </tr> <tr> <td>3.</td> <td>The Credits and Internal/External assessment marks, of all the subjects, were based upon the judgement of the expert designing the curriculum.</td> <td>Credits and Assessment marks were rationalized based upon the no. of hours assigned to the course.</td> </tr> <tr> <td>4.</td> <td>The hours allocated to the practical work were less in various courses.</td> <td>More no. of hours are proposed for practical work in various courses.</td> </tr> <tr> <td>5.</td> <td>Industrial Training after 1st and 2nd Semesters was not uniform in all the courses.</td> <td>The duration and marks of industrial training are proposed to be increased to four weeks and made uniform for all the courses.</td> </tr> </tbody> </table> <p>These amendments in the syllabi are put up before the Academic Council for constitution and approval.</p>	S.N.	Changes approved by Academic Council on 20-12-2016	Proposed Amendments	1.	Communication Skills Course was introduced in 1 st and 2 nd Semesters	It will be introduced in one semester only either 1 st Semester or 2 nd Semester.	2.	Basic Sciences Course was introduced in 1 st and 2 nd Semesters	It will be introduced in one Semester only either 1 st Semester or 2 nd Semester.	3.	The Credits and Internal/External assessment marks, of all the subjects, were based upon the judgement of the expert designing the curriculum.	Credits and Assessment marks were rationalized based upon the no. of hours assigned to the course.	4.	The hours allocated to the practical work were less in various courses.	More no. of hours are proposed for practical work in various courses.	5.	Industrial Training after 1 st and 2 nd Semesters was not uniform in all the courses.	The duration and marks of industrial training are proposed to be increased to four weeks and made uniform for all the courses.	Ratified.
S.N.	Changes approved by Academic Council on 20-12-2016	Proposed Amendments																		
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5.	Industrial Training after 1 st and 2 nd Semesters was not uniform in all the courses.	The duration and marks of industrial training are proposed to be increased to four weeks and made uniform for all the courses.																		

	<p>The matter was placed before the Academic Council for ratification.</p>	
02.23	<p>APPROVAL OF THE PROPOSAL TO START ONE-YEAR SKILL CERTIFICATE PROGRAMMES FOR 2017-18 BATCH AND OTHER SKILL CERTIFICATE/DIPLOMA PROGRAMMES IN PITs OF MRSPTU, BATHINDA</p> <p>It was proposed that along with one-year skill certificate courses in various areas, diploma courses on textile & apparel designing, household maintenance and cutting & sewing may be started at different PITs to create self-employment opportunities for rural population of Punjab. Cutting and Sewing course has already been started at PIT Nandgarh under the skill certificate course. The number of skill certificate courses shall also be initiated in other PITs. A course in Textile based cottage industry is being planned. The Vice Chancellor is authorized to approve its curriculum after recommendation from the concerned BOS.</p> <p>The matter was placed before the Academic Council for approval.</p>	Approved.
02.24	<p>INFORMING THE MoUs SIGNED BY MRSPTU, BATHINDA WITH DIFFERENT INSTITUTES / ORGANISATIONS</p> <p>It was informed that MRSPTU, Bathinda has entered into MoUs with different Institutes/Organizations.</p> <p>The matter was placed before the Academic Council for information.</p>	Noted.
02.25	<p>APPROVAL OF COOPTING FEW MEMBERS IN BOARDS OF STUDIES & IN FACULTY AS SPECIAL INVITEES.</p> <p>On the recommendations of Chairpersons of some BOS & Faculty, few members have been added as Special Invitees for smooth functioning of the Board of Studies & Faculty.</p> <ol style="list-style-type: none"> 1. BOS in Electronics & Communication Engineering 2. BOS in Electrical & Electronics Engineering 3. BOS in Electrical Engineering 4. BOS in Fashion Technology 5. BOS in Chemical Engineering 6. Faculty in Pharmacy <p>The matter was placed before the Academic Council for approval.</p>	Approved. It was also approved that separate BOSs in Agriculture Engineering and B.Sc. (Agriculture) be constituted.

MINUTES OF 2ND ACADEMIC COUNCIL MEETING HELD ON 31.05.2017

02.26	<p>APPROVAL OF MINUTES OF VARIOUS DDRCS MEETINGS HELD IN VARIOUS DISCIPLINES</p> <p>It was informed that the interviews for admission in Ph.D. course in various disciplines under various faculties have been held in the presence of Chairperson and members of DDRCs in the office of Dean R & D, MRSPTU, Bathinda (ANNEXURE-XXIV, Pages 632-648) and students have been enrolled and registered.</p> <p>The matter was placed before the Academic Council for approval.</p>	Approved.
02.27	<p>APPROVAL TO ADOPT THE DISTANCE EDUCATION PROGRAMME BEING FOLLOWED BY IKGPTU, KAPURTHALA.</p> <p>It is proposed to adopt the distance education programme being followed by IKGPTU, Kapurthala.</p> <p>The matter was placed before the Academic Council for approval.</p>	<ol style="list-style-type: none"> 1. Approved 2. The Vice Chancellor is authorized to constitute a committee for studying the proposal and give recommendations. 3. The Vice Chancellor is authorized to consider the recommendations of the committee and approve it after amendments in it (if any) and the same will be put before the BOG for approval.
02.28	<p>APPROVAL TO EMPOWER THE VICE CHANCELLOR TO TAKE DECISIONS IN CASE OF ANY URGENT MATTERS</p> <p>It was proposed to empower the Vice Chancellor to take decisions in case of urgent matters, to be ratified later on by the Board of Governors of the University.</p> <p>The matter is placed before the Academic Council for approval.</p>	Approved.
TABLE AGENDA		
02.29	<p>APPROVAL FOR NOT TRANSFERRING Ph.D. SCHOLARS FROM IKGPTU, KAPURTHALA TO MRSPTU, BATHINDA</p> <p>The matter regarding transfer of Ph.D. Scholars from IKGPTU, Kapurthala to MRSPTU, Bathinda was deliberated upon by the Vice Chancellor and it was decided that transfer of any Ph.D. scholar from IKGPTU to MRSPTU is not admissible in the light of clause no. 1.3 and 12.1 of UGC Ph.D. Regulations-2016, as these scholars were enrolled/registered for their Ph.D. degree before the UGC-2016 Ph.D.</p>	Approved.

MINUTES OF 2ND ACADEMIC COUNCIL MEETING HELD ON 31.05.2017

	<p>Regulations notifications. These Scholars shall be governed by UGC-2009 Ph.D. regulations only as stipulated in UGC-2016 regulations itself. Dean RIC of IKGPTU, Kapurthala shall be intimated of this decision taken by 2nd Academic Council Meeting of MRSPTU, Bathinda.</p> <p>The matter was placed before the Academic Council for approval.</p>	
	<p align="center">GENERAL DISCUSSION</p> <ol style="list-style-type: none"> 1. Proposal for uploading the placement record of every student of all the Affiliated/Constituent Colleges on University Placement Portal. 2. Proposal to develop facilities and infrastructure in Central Instrumentation and Research Facility Centre at the University for promoting research & development. 3. The decision taken in 4th MRSPTU Finance Committee Meeting held on 14.03.2017 for opening of admission offices of University outside the State of Punjab was discussed. 4. Grant of provisional membership by Association of Indian Universities (AIU) to MRSPTU, Bathinda w.e.f. 01.04.2016 was discussed. 5. Incentives approved in 4th MRSPTU Finance Committee Meeting held on 14.03.2017 for University Sports Achievers (men and women both) were discussed. 	<p>Discussed and approved.</p>

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

**DEAN ACADEMIC AFFAIRS,
MRSPTU, BATHINDA**

**MINUTES OF 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL
HELD ON 26.02.2018**



**MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY
DABWALI ROAD, BATHINDA-151001**

**Established by Govt. of Punjab Act 5(2015) & Approved u/s 2(f) & 12(b) of UGC Act, 1956
DEAN ACADEMIC AFFAIRS**

www.mrsptu.ac.in

Ph. 8725072488, 0164-2284298

daa.mrsstu@gmail.com

Ref. No.: DAA/MRSPTU/1457

Date: 05.3.2018

**MINUTES OF 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL
HELD ON 26.02.2018**

2nd Meeting of Standing Committee of Academic Council of Maharaja Ranjit Singh Punjab Technical University, Bathinda was held on 26.02.2018 at 11:00 AM in the Committee Room of MRSPTU, Bathinda with Hon'ble Vice Chancellor, MRSPTU in the Chair. The following members were present:

- 1. Dr. (Prof.) Mohan Paul Singh Ishar,** **Chairperson**
Vice-Chancellor, MRSPTU, Bathinda,
vcMrsstu@gmail.com
- 2. Dr. (Prof.) Paramjeet Singh,** **Member**
Dean Faculty (Engineering & Technology),
Former Professor of Chemical Engineering & Former Registrar,
Panjab University Chd., Former Registrar, Adesh University, Bathinda.
H. No. 2921, Phase-7, Mohali.
(Ph. 09814469688) pjsingh8399@gmail.com
- 4. Dr. (Prof.) Parikshat Singh Manhas,** **Member**
School of Hospitality and Tourism Management,
University of Jammu, Jammu.
(Ph. 09419188260) psmanhas@htmail.com
- 5. Dr. (Prof.) Ashish Baldi,** **Member**
Dean Faculty (Pharmacy),
Professor, HOD, Deptt. of Pharmacy, Main Campus, MRSPTU, Bathinda,
(Ph. 08968423848) principal.isfcp@gmail.com, baldiashish@gmail.com
- 6. Campus Director,** **Member**
Giani Zail Singh Campus College of Engineering & Technology,
Bathinda (Constituent College).
(Ph. 08725072488) principalgzscet@yahoo.co.in,
director.gzscet@gmail.com
- 7. Director,** **Member**
Punjab Institute of Technology, Nandgarh,
District Bathinda (Constituent College).
(Ph. 09463936756) drbwssidhu07@gmail.com
- 8. Director,** **Member**
Punjab Institute of Technology, GTB Garh,
District Moga (Constituent College),
(Ph. 09996800758) pitgtb@yahoo.in

**MINUTES OF 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL
HELD ON 26.02.2018**

- | | |
|--|------------------------|
| 9. Director,
Punjab Institute of Technology, Rajpura (Constituent College).
(Ph. 07015112387) dir.pitr@gmail.com, pitrajpura@yahoo.com | Member |
| 10. Dean Academic Affairs,
MRSPTU, Bathinda
(Ph. 08725972488) daa.mrsstu@gmail.com | Member |
| 11. Dean College Development Council,
MRSPTU, Bathinda
(Ph. 08872500259) dir.cd@mrsstu.ac.in | Member |
| 12. Dean R & D,
MRSPTU, Bathinda
(Ph. 08725072492) deanrnd.mrsstu@gmail.com | Member |
| 13. Dean Students Welfare,
MRSPTU, Bathinda
(Ph. 09463000954) drrakeshbansal@gmail.com | Member |
| 14. Dean Planning & Development,
MRSPTU, Bathinda,
(Ph. 09501109002) butasidhu@yahoo.com | Member |
| 15. Controller of Examinations,
MRSPTU, Bathinda
(Ph. 08872211150) coe@mrsstu.ac.in | Member |
| 16. Director,
Internal Quality Assurance Cell, MRSPTRU, Bathinda
(Ph. 09878757562) jyotianupam@yahoo.com | Member |
| 17. Registrar,
MRSPTU, Bathinda, (Ph. 08872500251) reg@mrsstu.ac.in | Member |
| 18. Dr. (Prof.) A.K. Goel,
Professor and Head, Department of Electronics and Communication
Engineering, GZS Campus CET Bathinda
(Ph. 08725072491) ashokkgoel@gmail.com | Special Invitee |
| 19. Dr. (Prof.) Balwinder Singh,
Professor, Department of Mech. Engg. GZS Campus CET Bathinda
(Ph. 08872500275) drbwssidhu07@gmail.com | Special Invitee |
| 20. Dr. (Prof.) Sandeep Kansal,
Professor & Head, Dept. of Applied Physics, GZSCCET, Bathinda
(Ph. 08725072490) skansal@mrsptu.ac.in | Special Invitee |
| 21. Dr. (Prof.) Manjeet Bansal,
Head Deptt. of Civil Engg., GZS Campus CET, Bathinda
(Ph. 8725072480) pushkar5@yahoo.com | Special Invitee |
| 22. Dr. (Prof.) Naresh Kumar Garg,
Professor & Head, GZSCCET, Dabwali Road, Bathinda
(Ph. 8725072422, 9463077886) cse.gzscet@gmail.com | Special Invitee |

**MINUTES OF 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL
HELD ON 26.02.2018**

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|--|------------------------|
| 23. Dr. (Prof.) Sarbjeet Kaur Bath
Prof. and Head, Deptt. of Electrical Engg., Giani Zail Singh Campus College of Engineering & Technology, Bathinda, Punjab-151001
(Ph. 9463836070, 8725072420) sjkbath77@gmail.com | Special Invitee |
| 24. Dr. (Prof.) Ashish Baldi
Prof. & Head, Department of Pharmaceutical Sciences, MRSPTU, BTI
(Ph. 8725072348) baldiashish@gmail.com | Special Invitee |
| 25. Prof. Karanvir Singh
Head, Department of Applied Mathematics, GZS Campus CET,
Dabwali Road, Bathinda – 151001
(Ph. 8872211150) karanvirs786@gmail.com | Special Invitee |
| 26. Dr. Seema Sharma,
Associate Professor, Deptt. of Applied Chemistry,
GZS Campus CET, Bathinda (Inorganic Chemistry),
(Ph. 9417114169, 8872500279) harprit6920@gmail.com | Special Invitee |
| 27. Ar. Ripu Daman Singh,
Head, GZS Campus CET, Dabwali Road, Bathinda
(Ph. 8725072417, 9815222335) ripu_jatinder@yahoo.co.in . | Special Invitee |
| 28. Dr. Devanand Uttam,
Head of Department, Department of Textile Engg., GZSCCET, Bathinda,
(Ph. 08725072426) textilegzscetbti@gmail.com | Special Invitee |
| 29. Dr. Kawaljit Singh Sandhu,
Associate Professor, Department of Food Science and Technology,
Maharaja Ranjit Singh Punjab Technical University, Bathinda
(Ph. 9896268539) kawsandhu@rediffmail.com | Special Invitee |
| 30. Dr. Suman Kathuria,
GZSCCET, Dabwali Road, Bathinda
(Ph. 8725072428) suman_kathuria@yahoo.co.in | Special Invitee |

At the outset the Chairman informed the members present about the grant of 12(b) status by UGC to MRSPTU within three years of its inception. After that agenda items were taken up one by one and the following decisions were arrived at unanimously after due deliberations in the meeting:

Item No.	Description	Decision Taken
02.01	<p>TO INFORM CONSTITUTION OF ACADEMIC COUNCIL</p> <p>Academic Council has been constituted by the Board of Governors of the MRSPTU vide Agenda Item no. 6.12 in its 6th meeting held on 25.07.2017 for a period of two years from 01.10.17 to 30.09.19. It has been notified vide notification no. Reg/Notification/73/57 dated 05.01.2018 (ANNEXURE-I: Pages 16-17).</p> <p>The Item is placed before the Standing Committee of Academic Council for information please</p>	Noted.

**MINUTES OF 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL
HELD ON 26.02.2018**

<p>02.02</p>	<p>TO INFORM ABOUT DEANS OF FACULTIES</p> <p>Seven Deans of Faculties have been approved by the BoG of MRSPTU for a period of two years from 01.10.17 to 30.09.19 (ANNEXURE-II: Page 18).</p> <table border="1"> <thead> <tr> <th>S.N.</th> <th>Faculty</th> <th>Name & Address</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Engg & Technology</td> <td>Prof. (Dr.) Paramjit Singh H. No. 2921, Phase-7, Mohali</td> </tr> <tr> <td>2</td> <td>Pharmacy</td> <td>Prof. (Dr.) Ashish Baldi, Deptt of Pharmaceutical Sc & Tech MRSPTU, Bathinda</td> </tr> <tr> <td>3</td> <td>Sciences</td> <td>Prof. (Dr.) Geeta Hundal, Department of Chemistry Guru Nanak Dev University, Amritsar</td> </tr> <tr> <td>4</td> <td>Commerce & Business Management</td> <td>Prof. (Dr.) Sanjeev Kumar Sharma, University Inst of Applied Mgt Scs, Panjab University, Chandigarh</td> </tr> <tr> <td>5</td> <td>Architecture & Planning</td> <td>Prof. (Dr.) Karamjit Singh Chahal, Department of Architecture Guru Nanak Dev University, Amritsar</td> </tr> <tr> <td>6</td> <td>Hospitality & Tourism Management</td> <td>Prof. (Dr.) Parikshat Singh Manhas, School of Hospitality & Tourism Mgt University of Jammu, Jammu</td> </tr> <tr> <td>7</td> <td>Humanities & Social Studies</td> <td>Prof. (Dr.) Paramjit Singh Judge Department of Sociology Guru Nanak Dev University, Amritsar</td> </tr> </tbody> </table> <p>The Item is placed before the Standing Committee of Academic Council for information please.</p>	S.N.	Faculty	Name & Address	1	Engg & Technology	Prof. (Dr.) Paramjit Singh H. No. 2921, Phase-7, Mohali	2	Pharmacy	Prof. (Dr.) Ashish Baldi, Deptt of Pharmaceutical Sc & Tech MRSPTU, Bathinda	3	Sciences	Prof. (Dr.) Geeta Hundal, Department of Chemistry Guru Nanak Dev University, Amritsar	4	Commerce & Business Management	Prof. (Dr.) Sanjeev Kumar Sharma, University Inst of Applied Mgt Scs, Panjab University, Chandigarh	5	Architecture & Planning	Prof. (Dr.) Karamjit Singh Chahal, Department of Architecture Guru Nanak Dev University, Amritsar	6	Hospitality & Tourism Management	Prof. (Dr.) Parikshat Singh Manhas, School of Hospitality & Tourism Mgt University of Jammu, Jammu	7	Humanities & Social Studies	Prof. (Dr.) Paramjit Singh Judge Department of Sociology Guru Nanak Dev University, Amritsar	<p>Noted.</p>
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<p>02.03</p>	<p>TO APPROVE COMPOSITION OF FACULTIES</p> <p>The composition of seven faculties has been proposed for a period of two years from 01.10.17 to 30.09.19. (ANNEXURE-III: Pages 19-33).</p> <table border="1"> <thead> <tr> <th>S.N.</th> <th>Faculty</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Engineering & Technology</td> </tr> <tr> <td>2</td> <td>Pharmacy</td> </tr> <tr> <td>3</td> <td>Sciences</td> </tr> <tr> <td>4</td> <td>Commerce & Business Management</td> </tr> </tbody> </table>	S.N.	Faculty	1	Engineering & Technology	2	Pharmacy	3	Sciences	4	Commerce & Business Management	<p>Approved.</p>														
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**MINUTES OF 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL
HELD ON 26.02.2018**

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02.04	<p>TO APPROVE COMPOSITION OF BOARDS OF STUDIES</p> <p>24-Boards of Studies have been proposed for a period of two years from 01.10.17 to 30.09.19. (ANNEXURE-IV: Pages 34-88).</p> <table border="1"> <thead> <tr> <th>S.N.</th> <th>Board of Studies</th> </tr> </thead> <tbody> <tr><td>1</td><td>Architecture & Planning</td></tr> <tr><td>2</td><td>Agriculture Engineering</td></tr> <tr><td>3</td><td>Agriculture Sciences</td></tr> <tr><td>4</td><td>Biotechnology</td></tr> <tr><td>5</td><td>Chemical Engineering</td></tr> <tr><td>6</td><td>Chemistry</td></tr> <tr><td>7</td><td>Civil Engineering</td></tr> <tr><td>8</td><td>Commerce and Business Management</td></tr> <tr><td>9</td><td>Computer Applications</td></tr> <tr><td>10</td><td>Computer Science & Engineering</td></tr> <tr><td>11</td><td>Electrical & Electronics Engineering</td></tr> <tr><td>12</td><td>Electrical Engineering</td></tr> <tr><td>13</td><td>Electronics Engineering</td></tr> <tr><td>14</td><td>Environmental Science & Technology</td></tr> <tr><td>15</td><td>Food Science & Technology</td></tr> <tr><td>16</td><td>Hospitality & Tourism Management</td></tr> <tr><td>17</td><td>Humanities & Social Studies</td></tr> <tr><td>18</td><td>Information Technology</td></tr> <tr><td>19</td><td>Marine Engineering</td></tr> <tr><td>20</td><td>Mathematics</td></tr> <tr><td>21</td><td>Mechanical Engineering</td></tr> <tr><td>22</td><td>Pharmacy</td></tr> <tr><td>23</td><td>Physics</td></tr> <tr><td>24</td><td>Textile Engineering</td></tr> </tbody> </table> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	S.N.	Board of Studies	1	Architecture & Planning	2	Agriculture Engineering	3	Agriculture Sciences	4	Biotechnology	5	Chemical Engineering	6	Chemistry	7	Civil Engineering	8	Commerce and Business Management	9	Computer Applications	10	Computer Science & Engineering	11	Electrical & Electronics Engineering	12	Electrical Engineering	13	Electronics Engineering	14	Environmental Science & Technology	15	Food Science & Technology	16	Hospitality & Tourism Management	17	Humanities & Social Studies	18	Information Technology	19	Marine Engineering	20	Mathematics	21	Mechanical Engineering	22	Pharmacy	23	Physics	24	Textile Engineering	Approved.
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**MINUTES OF 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL
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<p>02.05</p>	<p>TO APPROVE UNDER GRADUATE SYLLABI</p> <p>Under graduate syllabi as detailed below have been proposed (ANNEXURE-V: Pages 89-771).</p> <table border="1"> <thead> <tr> <th>S.N.</th> <th>Under Graduate Syllabi</th> <th>Page No</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>B.Sc. (Agriculture) 4th Sem. 2016 Batch onwards</td> <td>89-95</td> </tr> <tr> <td>2</td> <td>B.Sc. (Medical Lab. Science) 5th – 6th Sem. 2016 Batch onwards</td> <td>96-104</td> </tr> <tr> <td>3</td> <td>B.Tech. (Civil Engg.) 5th – 8th Sem. 2016 Batch onwards</td> <td>105-131</td> </tr> <tr> <td>4</td> <td>B.Tech. (Automobile Engg.) 3rd – 6th Sem. 2016 Batch onwards</td> <td>132-162</td> </tr> <tr> <td>5</td> <td>B.Tech. (Electrical & Electronics Engg.) 5th – 6th Sem. 2016 Batch onwards</td> <td>163-186</td> </tr> <tr> <td>6</td> <td>B.Tech. (Electronics & Communications Engg.) 3rd – 8th Sem. 2016 Batch onwards</td> <td>187-246</td> </tr> <tr> <td>7</td> <td>B.Tech. (Electronics & Telecommunications Engg.) 3rd – 8th Sem. 2016 Batch onwards</td> <td>247-306</td> </tr> <tr> <td>8</td> <td>B.Tech. (Electronics & Instrumentation Engg.) 3rd – 8th Sem. 2016 Batch onwards</td> <td>307-359</td> </tr> <tr> <td>9</td> <td>B.Tech. (Information Technology) 5th – 6th Sem. 2016 Batch onwards</td> <td>360-377</td> </tr> <tr> <td>10</td> <td>B.Tech. (Marine Engg.) 3rd – 6th Sem. 2016 Batch onwards</td> <td>378-408</td> </tr> <tr> <td>11</td> <td>Bachelor of HMCT 3rd – 4th Sem. 2016 Batch onwards</td> <td>409-426</td> </tr> <tr> <td>12</td> <td>Bachelor of Management Studies (Airlines, Tourism and Hospitality) Sem. 1st – 2nd 2017 Batch onwards</td> <td>427-437</td> </tr> <tr> <td>13</td> <td>Bachelor of Management Studies (Airlines, Tourism and Hospitality) Sem. 1st – 6th 2016 Batch</td> <td>438-458</td> </tr> <tr> <td>14</td> <td>Bachelor of Management Studies (HMCT) Sem. 1st – 6th 2016 Batch onwards</td> <td>459-522</td> </tr> <tr> <td>15</td> <td>Soft Skills I-IV</td> <td>523-526</td> </tr> <tr> <td>16</td> <td>UG Open Electives-I 2016 Batch onwards</td> <td>527-536</td> </tr> <tr> <td>17</td> <td>UG Open Electives-II 2016 Batch onwards</td> <td>537-545</td> </tr> <tr> <td>18</td> <td>UG Open Electives-III 2016 Batch onwards</td> <td>546-549</td> </tr> <tr> <td>19</td> <td>Bachelor of Hotel Management & Catering Technology Sem. 1st – 8th</td> <td>550-620</td> </tr> </tbody> </table>	S.N.	Under Graduate Syllabi	Page No	1	B.Sc. (Agriculture) 4 th Sem. 2016 Batch onwards	89-95	2	B.Sc. (Medical Lab. Science) 5 th – 6 th Sem. 2016 Batch onwards	96-104	3	B.Tech. (Civil Engg.) 5 th – 8 th Sem. 2016 Batch onwards	105-131	4	B.Tech. (Automobile Engg.) 3 rd – 6 th Sem. 2016 Batch onwards	132-162	5	B.Tech. (Electrical & Electronics Engg.) 5 th – 6 th Sem. 2016 Batch onwards	163-186	6	B.Tech. (Electronics & Communications Engg.) 3 rd – 8 th Sem. 2016 Batch onwards	187-246	7	B.Tech. (Electronics & Telecommunications Engg.) 3 rd – 8 th Sem. 2016 Batch onwards	247-306	8	B.Tech. (Electronics & Instrumentation Engg.) 3 rd – 8 th Sem. 2016 Batch onwards	307-359	9	B.Tech. (Information Technology) 5 th – 6 th Sem. 2016 Batch onwards	360-377	10	B.Tech. (Marine Engg.) 3 rd – 6 th Sem. 2016 Batch onwards	378-408	11	Bachelor of HMCT 3 rd – 4 th Sem. 2016 Batch onwards	409-426	12	Bachelor of Management Studies (Airlines, Tourism and Hospitality) Sem. 1 st – 2 nd 2017 Batch onwards	427-437	13	Bachelor of Management Studies (Airlines, Tourism and Hospitality) Sem. 1 st – 6 th 2016 Batch	438-458	14	Bachelor of Management Studies (HMCT) Sem. 1 st – 6 th 2016 Batch onwards	459-522	15	Soft Skills I-IV	523-526	16	UG Open Electives-I 2016 Batch onwards	527-536	17	UG Open Electives-II 2016 Batch onwards	537-545	18	UG Open Electives-III 2016 Batch onwards	546-549	19	Bachelor of Hotel Management & Catering Technology Sem. 1 st – 8 th	550-620	<p>These syllabi be put up before the concerned Faculty for consideration and approval.</p>
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02.06	<p>TO APPROVE POST GRADUATE SYLLABI</p> <p>Post graduate syllabi have been proposed (ANNEXURE-VI: Pages 772-956).</p> <table border="1"> <thead> <tr> <th>S.N.</th> <th>Post Graduate Syllabi</th> <th>Page No</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>M.Sc. (Fashion Technology) Sem. 1st – 4th 2016 Batch</td> <td>772-788</td> </tr> <tr> <td>2</td> <td>M.Sc. (Fashion Technology) Sem. 1st – 4th 2017 Batch onwards</td> <td>789-813</td> </tr> <tr> <td>3</td> <td>M.Tech. ECE (Microelectronics) Sem. 1st – 4th 2016 Batch onwards</td> <td>814-837</td> </tr> <tr> <td>4</td> <td>M.Tech ECE Sem. 1st – 4th 2016 Batch onwards</td> <td>838-862</td> </tr> <tr> <td>5</td> <td>M.Tech. (Production Engineering) Sem. 1st – 4th 2016 Batch onwards</td> <td>863-883</td> </tr> <tr> <td>6</td> <td>PG Open Electives-I 2016 Batch onwards</td> <td>884-909</td> </tr> <tr> <td>7</td> <td>PG Open Electives-II 2016 Batch onwards</td> <td>910-932</td> </tr> <tr> <td>8</td> <td>M.Sc. (Food Technology) 2018 Batch onwards</td> <td>933-955</td> </tr> <tr> <td>9</td> <td>PG Open Electives 2018 Batch onwards</td> <td>956-957</td> </tr> </tbody> </table> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	S.N.	Post Graduate Syllabi	Page No	1	M.Sc. (Fashion Technology) Sem. 1 st – 4 th 2016 Batch	772-788	2	M.Sc. (Fashion Technology) Sem. 1 st – 4 th 2017 Batch onwards	789-813	3	M.Tech. ECE (Microelectronics) Sem. 1 st – 4 th 2016 Batch onwards	814-837	4	M.Tech ECE Sem. 1 st – 4 th 2016 Batch onwards	838-862	5	M.Tech. (Production Engineering) Sem. 1 st – 4 th 2016 Batch onwards	863-883	6	PG Open Electives-I 2016 Batch onwards	884-909	7	PG Open Electives-II 2016 Batch onwards	910-932	8	M.Sc. (Food Technology) 2018 Batch onwards	933-955	9	PG Open Electives 2018 Batch onwards	956-957	<p>These syllabi be put up before the concerned Faculty for consideration and approval.</p>
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8	M.Sc. (Food Technology) 2018 Batch onwards	933-955																														
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02.07	<p>TO APPROVE B.TECH. 1ST YEAR 2018 BATCH STUDY SCHEME & SYLLABUS AS PER GUIDELINES OF AICTE</p> <p>It is proposed to adopt B.Tech. 1st Year 2018 Batch Study Scheme & Syllabus as per guidelines of AICTE with small modifications, wherever necessary (ANNEXURE-VII: Pages 958-979).</p> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	<p>This syllabus be put up in the meeting of Chairpersons of the concerned Boards of Studies.</p>																														

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<p>02.08</p>	<p>TO APPROVE STARTING OF NEW PROGRAMMES IN DEPARTMENT OF PHARMACEUTICAL SCIENCES & TECHNOLOGY AT MRSPTU MAIN CAMPUS</p> <p>It is proposed to start the following Programmes in Department of Pharmaceutical Science & Technology at MRSPTU Main Campus from the Academic Session 2018-19 (ANNEXURE-VIII: Page 980).</p> <table border="1"> <thead> <tr> <th>S. No.</th> <th>Programmes</th> <th>Annual Intake</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>B.Pharm.</td> <td>60</td> </tr> <tr> <td>2.</td> <td>M.Sc. Clinical Research</td> <td>60</td> </tr> <tr> <td>3.</td> <td>M.Sc. Biotechnology</td> <td>60</td> </tr> </tbody> </table> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	S. No.	Programmes	Annual Intake	1.	B.Pharm.	60	2.	M.Sc. Clinical Research	60	3.	M.Sc. Biotechnology	60	<p>1. B.Pharm. was approved with effect from 2018-19 session for 60 seats</p> <p>2. M.Sc. in Clinical Research was approved with effect from 2018-19 session for 15 seats</p> <p>3. M.Sc. Biotechnology was approved with effect from 2019-20 session for 15 seats</p>
S. No.	Programmes	Annual Intake												
1.	B.Pharm.	60												
2.	M.Sc. Clinical Research	60												
3.	M.Sc. Biotechnology	60												
<p>02.09</p>	<p>TO APPROVE STARTING OF NEW PROGRAMMES IN DEPARTMENT OF FOOD SCIENCE & TECHNOLOGY AT MRSPTU MAIN CAMPUS</p> <p>It is proposed to start the following Programmes in Department of Food Science & Technology at MRSPTU Main Campus from the Academic Session 2018-19 (ANNEXURE-IX: Page 981).</p> <table border="1"> <thead> <tr> <th>S. No.</th> <th>Programmes</th> <th>Annual Intake</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>M.Sc. Food Technology</td> <td>30</td> </tr> <tr> <td>2.</td> <td>B.Sc. Food Technology</td> <td>30</td> </tr> <tr> <td>3.</td> <td>B.Sc. Home Science</td> <td>30</td> </tr> </tbody> </table> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	S. No.	Programmes	Annual Intake	1.	M.Sc. Food Technology	30	2.	B.Sc. Food Technology	30	3.	B.Sc. Home Science	30	<p>MSc in Food Technology was approved with effect from 2018-19 session with 30 seats in Science faculty.</p>
S. No.	Programmes	Annual Intake												
1.	M.Sc. Food Technology	30												
2.	B.Sc. Food Technology	30												
3.	B.Sc. Home Science	30												
<p>02.10</p>	<p>B.Sc. (Hons.) PHYSICS, B.Sc. (Hons.) CHEMISTRY & B.Sc. (Hons.) MATHEMATICS AT MRSPTU MAIN CAMPUS</p> <p>It is proposed to start the following Programmes in Department of Physics, Chemistry & Mathematics at MRSPTU Main Campus from the Academic Session 2018-19 (ANNEXURE-X: Page 982).</p> <table border="1"> <thead> <tr> <th>S. No.</th> <th>Programmes</th> <th>Annual Intake</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>B.Sc. (Hons.) in Physics</td> <td>60</td> </tr> <tr> <td>2.</td> <td>B.Sc. (Hons.) in Chemistry</td> <td>60</td> </tr> <tr> <td>3.</td> <td>B.Sc. (Hons.) in Mathematics</td> <td>60</td> </tr> </tbody> </table> <p>The Item is placed before the Standing Committee of Academic Council for approval please</p>	S. No.	Programmes	Annual Intake	1.	B.Sc. (Hons.) in Physics	60	2.	B.Sc. (Hons.) in Chemistry	60	3.	B.Sc. (Hons.) in Mathematics	60	<p>1. B.Sc. (Hons. School) in Mathematics was approved with effect from 2018-19 session with 60 seats.</p> <p>2. B.Sc. (Hons. School) in Physics and Chemistry were deferred.</p>
S. No.	Programmes	Annual Intake												
1.	B.Sc. (Hons.) in Physics	60												
2.	B.Sc. (Hons.) in Chemistry	60												
3.	B.Sc. (Hons.) in Mathematics	60												

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<p>02.11</p>	<p>TO APPROVE STARTING OF NEW PROGRAMMES AT ARCHITECTURE DEPARTMENT GZSCCET, BATHINDA</p> <p>It is proposed to start the following Programmes at GZSCCET Bathinda from the Academic Session 2018-19 (ANNEXURE-XI: Pages 983-991).</p> <table border="1"> <thead> <tr> <th>S.N.</th> <th>Programmes</th> <th>Annual Intake</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>B. Planning (4 Yrs.)</td> <td>30</td> </tr> <tr> <td>2.</td> <td>M. Planning</td> <td>18</td> </tr> <tr> <td>3.</td> <td>M.Arch. (Building Engg. & Management)</td> <td>18</td> </tr> </tbody> </table> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	S.N.	Programmes	Annual Intake	1.	B. Planning (4 Yrs.)	30	2.	M. Planning	18	3.	M.Arch. (Building Engg. & Management)	18	<ol style="list-style-type: none"> 1. B.Planning (4 yrs) was approved w.e.f. 2018-19 session with 15 seats 2. M.Planning and M.Arch. (Building Engg. & Management) was approved w.e.f. 2018-19 session with 18 seats each 3. Head Archi shall take care of the modalities required 						
S.N.	Programmes	Annual Intake																		
1.	B. Planning (4 Yrs.)	30																		
2.	M. Planning	18																		
3.	M.Arch. (Building Engg. & Management)	18																		
<p>02.12</p>	<p>TO APPROVE STARTING OF NEW PROGRAMMES AT PIT RAJPURA</p> <p>It is proposed to start the following Programmes at PIT Rajpura from the Academic Session 2018-19 (ANNEXURE-XII: Page 992).</p> <table border="1"> <thead> <tr> <th>S.N.</th> <th>Programmes</th> <th>Annual Intake</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>B.Tech. Computer Science & Engineering</td> <td>60</td> </tr> <tr> <td>2.</td> <td>Skill Certificate Course in Computer Maintenance and Programming Assistant</td> <td>60</td> </tr> <tr> <td>3.</td> <td>B.Tech. Computer Science & Engineering (LEET) for 2018 Batch only</td> <td>60</td> </tr> </tbody> </table> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	S.N.	Programmes	Annual Intake	1.	B.Tech. Computer Science & Engineering	60	2.	Skill Certificate Course in Computer Maintenance and Programming Assistant	60	3.	B.Tech. Computer Science & Engineering (LEET) for 2018 Batch only	60	<ol style="list-style-type: none"> 1. B.Tech. (CSE) along with LEET was approved w.e.f. 2018-19 session for 60 seats 2. Skill Certificate Course in Computer Maintenance and Programming Assistant was approved w.e.f. 2018-19 session for 60 seats. 						
S.N.	Programmes	Annual Intake																		
1.	B.Tech. Computer Science & Engineering	60																		
2.	Skill Certificate Course in Computer Maintenance and Programming Assistant	60																		
3.	B.Tech. Computer Science & Engineering (LEET) for 2018 Batch only	60																		
<p>02.13</p>	<p>TO APPROVE STARTING OF NEW PROGRAMMES AT PIT NANDGARH</p> <p>It is proposed to start the following Programmes at PIT Nandgarh from the Academic Session 2018-19 (ANNEXURE-XIII: Page 993).</p> <table border="1"> <thead> <tr> <th>S.N.</th> <th>Programmes</th> <th>Annual Intake</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>B.Sc. Agriculture (Hons.) (4 Yrs.)</td> <td>60</td> </tr> <tr> <td>2.</td> <td>B.Sc. (Non-Medical)</td> <td>60</td> </tr> <tr> <td>3.</td> <td>Skill Certificate Course in Welding</td> <td>30</td> </tr> <tr> <td>4.</td> <td>Skill Certificate Course in Plumbing</td> <td>30</td> </tr> <tr> <td>5.</td> <td>Skill Certificate Course in Computer Maintenance and Programming Assistant</td> <td>60</td> </tr> </tbody> </table>	S.N.	Programmes	Annual Intake	1.	B.Sc. Agriculture (Hons.) (4 Yrs.)	60	2.	B.Sc. (Non-Medical)	60	3.	Skill Certificate Course in Welding	30	4.	Skill Certificate Course in Plumbing	30	5.	Skill Certificate Course in Computer Maintenance and Programming Assistant	60	<p>Approved for B.Sc. Non-Medical for 60-seats along with Skill Certificate Courses in Welding and Plumbing for 30-seats each along with Skill Certificate Course in Computer Maintenance & Programming Asstt for 60-seats w.e.f. 2018-19</p>
S.N.	Programmes	Annual Intake																		
1.	B.Sc. Agriculture (Hons.) (4 Yrs.)	60																		
2.	B.Sc. (Non-Medical)	60																		
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	The Item is placed before the Standing Committee of Academic Council for approval please.																						
02.14	<p>TO APPROVE STARTING OF NEW PROGRAMMES AT PIT GTB GARH MOGA</p> <p>It is proposed to start the following Programmes at PIT GTB Garh from the Academic Session 2018-19 (ANNEXURE-XIV: Page 994).</p> <table border="1"> <thead> <tr> <th>S.N.</th> <th>Programmes</th> <th>Annual Intake</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>BBA</td> <td>60</td> </tr> <tr> <td>2.</td> <td>BCA</td> <td>60</td> </tr> <tr> <td>3.</td> <td>B.Sc. (Non-Medical)</td> <td>60</td> </tr> <tr> <td>4.</td> <td>B.Sc. Agriculture (Hons.) (4 Yrs.)</td> <td>60</td> </tr> <tr> <td>5.</td> <td>Skill Certificate Course in Computer Maintenance and Programming Assistant</td> <td>60</td> </tr> <tr> <td>6.</td> <td>Skill Certificate Course in Electrician</td> <td>30</td> </tr> </tbody> </table> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	S.N.	Programmes	Annual Intake	1.	BBA	60	2.	BCA	60	3.	B.Sc. (Non-Medical)	60	4.	B.Sc. Agriculture (Hons.) (4 Yrs.)	60	5.	Skill Certificate Course in Computer Maintenance and Programming Assistant	60	6.	Skill Certificate Course in Electrician	30	Approved for BBA & BCA for 60 seats each along with Skill certificate Course in Computer Maintenance & Programming Asstt for 60-seats w.e.f. 2018-19
S.N.	Programmes	Annual Intake																					
1.	BBA	60																					
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6.	Skill Certificate Course in Electrician	30																					
02.15	<p>TO APPROVE ACADEMIC CALENDER-2018</p> <p>The Academic Calendar-2018 has been proposed (ANNEX-XV: Page 995).</p> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	Approved.																					
02.16	<p>TO APPROVE HOLIDAYCALENDER-2018</p> <p>The Holiday Calendar-2018 has been proposed (Annexure-XVI: Pages 996-998).</p> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	Approved.																					
02.17	<p>TO APPROVE SIGNING OF MoU/AGGREMENT BY MRSPTU</p> <p>The University has entered into MoU/Agreement (Annexure-XVII A: Pages 999-1059) with following Universities/Organizations,</p> <table border="1"> <thead> <tr> <th>S.N.</th> <th>MoU/Agreement</th> <th>Page No.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Wayne State University Detroit, Michigan, USA, Part-1, 2, 3</td> <td>999-1016</td> </tr> <tr> <td>2</td> <td>Thompson Rivers University, Kamloops, BC, Canada</td> <td>1017-1026</td> </tr> <tr> <td>3</td> <td>CALYXPOD, Josh Technology Group, Gurgaon, India</td> <td>1027-1032</td> </tr> </tbody> </table>	S.N.	MoU/Agreement	Page No.	1	Wayne State University Detroit, Michigan, USA, Part-1, 2, 3	999-1016	2	Thompson Rivers University, Kamloops, BC, Canada	1017-1026	3	CALYXPOD, Josh Technology Group, Gurgaon, India	1027-1032	Noted. It was further decided that for every MoU/Agreement there shall be a Nodal Officer who shall be responsible for its effective implementation. He/She shall communicate with the colleges the advantages & highlights of these MoU/									
S.N.	MoU/Agreement	Page No.																					
1	Wayne State University Detroit, Michigan, USA, Part-1, 2, 3	999-1016																					
2	Thompson Rivers University, Kamloops, BC, Canada	1017-1026																					
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**MINUTES OF 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL
HELD ON 26.02.2018**

	<table border="1"> <tr> <td>4</td> <td>Central Tool Room, Ludhiana, India</td> <td>1033-1035</td> </tr> <tr> <td>5</td> <td>Red Hat India Private Limited, Mumbai</td> <td>1036-1049</td> </tr> <tr> <td>6</td> <td>Skills Anytime, Chandigarh of bksb India Pvt. Limited, a Subsidiary of bksb Limited, United Kingdom</td> <td>1050-1056</td> </tr> <tr> <td>7</td> <td>‘Truechip’ Solutions Pvt. Ltd., Noida, The Verification IP Specialist</td> <td>1057-1059</td> </tr> <tr> <td>8</td> <td>TiE Chandigarh Fostering Entrepreneurship, Chandigarh (Annexure-XVII B: Pages 1060-1063)</td> <td>1060-1063</td> </tr> <tr> <td>9</td> <td>Centex International Pvt. Limited (Annexure-XVII C: Pages 1064-65)</td> <td>1064-1065</td> </tr> </table> <p>The Item is placed before the Standing Committee of Academic Council for approval please</p>	4	Central Tool Room, Ludhiana, India	1033-1035	5	Red Hat India Private Limited, Mumbai	1036-1049	6	Skills Anytime, Chandigarh of bksb India Pvt. Limited, a Subsidiary of bksb Limited, United Kingdom	1050-1056	7	‘Truechip’ Solutions Pvt. Ltd., Noida, The Verification IP Specialist	1057-1059	8	TiE Chandigarh Fostering Entrepreneurship, Chandigarh (Annexure-XVII B: Pages 1060-1063)	1060-1063	9	Centex International Pvt. Limited (Annexure-XVII C: Pages 1064-65)	1064-1065	Agreements.
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9	Centex International Pvt. Limited (Annexure-XVII C: Pages 1064-65)	1064-1065																		
02.18	<p>TO INFORM INCLUSION OF MRSPTU IN LIST OF UNIVERSITIES UNDER SECTION 12(B) OF UGC ACT 1956</p> <p>UGC has granted 12(B) status to University vide letter no. 9-11/2015 (CPP-I/PU) dated 3.1.2018 (Annexure-XVIII: Page 1066).</p> <p>The Item is placed before the Standing Committee of Academic Council for information please.</p>	Noted. It was further decided that the constituted grant committee shall do the necessary presentation cum motivations to all the depts of GZSCCET, and Univ Main Campus, regarding the benefits of 12(B) status and how to get financial assistance from Central Funding agencies in the 1 st phase																		
02.19	<p>TO INFORM Ph.D. CANDIDATES ENROLLED/REGISTERED WITH MRSPTU UP TO 31.12.2017</p> <p>The detailed list of Ph.D. candidates enrolled/registered with MRSPTU, Bathinda up to 31.12.2017 under various Disciplines is appended (ANNEXURE-XIX: Pages 1067-1071). The same stands uploaded on MRSPTU web-site also as per the UGC format.</p> <p>The Item is placed before the Standing Committee of Academic Council for information please.</p>	Noted.																		
02.20	<p>TO RATIFY MINUTES OF DDRC’S MEETINGS HELD IN VARIOUS DISCIPLINES</p> <p>To address research related issues at Ph.D. level in various Disciplines under different Faculties of MRSPTU, Department Doctoral Research Committees have met from time to time. Minutes of these meetings are appended (ANNEXURE-XX: Pages 1072-1092).</p>	Ratified.																		

**MINUTES OF 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL
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	<p>The Item is placed before the Standing Committee of Academic Council for information please.</p>	
02.21	<p>TO INFORM MRSPTU Ph.D. REGULATIONS-2016 WITH AMENDMENT</p> <p>As per the provisions contained in UGC (Minimum Standards and Procedures for Award of M.Phil./Ph.D. Degree) Regulations, 2016, MRSPTU has modified its Ph.D. Regulations-2015 and notified the modified MRSPTU Ph.D. Regulations-2016 vide DAA/MRSPTU/Notification/20 dated 23.11.2017 and Amendment in Ph.D. Regulation 2016 in Clause No. 4.1 (ii) vide DAA/MRSPTU/Notification/22 dated 22.1.2018 (ANNEXURE-XXI: Pages 1093-1121).</p> <p>The Item is placed before the Standing Committee of Academic Council for information please.</p>	Noted.
02.22	<p>TO APPROVE ‘INFORMATION TECHNOLOGY’ AS ONE OF THE SPECIALIZATIONS IN MBA FOR UNIVERSITY MAIN CAMPUS, CONSTITUENT & AFFILIATED COLLEGES</p> <p>It is proposed to include ‘Information Technology’ as one of the specializations in MBA for University Main Campus, Constituent & Affiliated Colleges (ANNEXURE-XXII: Pages 1122-1123).</p> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	<ol style="list-style-type: none"> 1. ‘Information Technology’ as one of the specialization in MBA was approved. 2. It was further decided to start MBA in Hospitality and Tourism Mgt (MBHT) with 30 seats. (For this purpose, the BOS in Commerce & Mgt and Hospitality & Tourism Mgt will work together.
02.23	<p>TO INCLUDE MATH-III, MATH-IV AS THE CORE SUBJECTS OF B. TECH., ESPECIALLY B.TECH. MECH., ELECTRICAL, ECE and CSE& TO INCLUDE NUMERICAL METHODS IN 5th SEMESTER OF B.TECH. MECHANICAL AND ELECTRICAL</p> <p>It is proposed to include Math-III, Math-IV as the core subjects of B. Tech, especially B. Tech. Mechanical, Electrical, ECE and CSE from the Academic Session 2018-19. Further, it is proposed to include Numerical Methods in 5th semester of B. Tech. Mechanical and Electrical (ANNEXURE-XXIII: Page 1124).</p> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	It was decided that Math-III, Math-IV and Numerical Methods may be offered/included as departmental electives in B. Tech for batches admitted on or before 2017

**MINUTES OF 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL
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<p>02.24</p>	<p>PROPOSAL TO MAKE PUNJAB STATE AERONAUTICAL ENGINEERING COLLEGE (PSAEC), PATIALA, A CONSTITUENT COLLEGE OF THE UNIVERSITY</p> <p>A proposal to make Punjab State Aeronautical Engineering College (PSAEC), Patiala, a Constituent College of the University has been received by the University from the Govt. of Punjab. Chief Principal Secretary to Hon'ble Chief Minister convened a meeting with Additional Chief Secretary, Department of Technical Education & Industrial Training, Secretary, Civil Aviation and CEO, PSCAC in this regard. It was proposed to make PSAEC a Constituent College of MRSPTU, Bathinda subject to the approval of the Hon'ble Chief Minister for being the Civil Aviation Minister and also Chairman, Punjab State Civil Aviation Council (ANNEXURE-XXIV: Pages 1125-1130).</p> <table border="1"> <thead> <tr> <th>S. N.</th> <th>Programme</th> <th>Annual Intake</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>B.Tech. Aeronautical Engg.</td> <td>60</td> </tr> <tr> <td>2.</td> <td>B.Sc. (Hons.) Aircraft Maintenance</td> <td>60</td> </tr> </tbody> </table> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	S. N.	Programme	Annual Intake	1.	B.Tech. Aeronautical Engg.	60	2.	B.Sc. (Hons.) Aircraft Maintenance	60	<p>Noted.</p>
S. N.	Programme	Annual Intake									
1.	B.Tech. Aeronautical Engg.	60									
2.	B.Sc. (Hons.) Aircraft Maintenance	60									
<p>02.25</p>	<p>TO INFORM THE STARTING OF SWAYAM PRABHA DISH CHANNELS IN GZSCCET, BATHINDA DEPARTMENTS</p> <p>It is to inform that SWAYAM Prabha Dish Channels in GZSCCET, Bathinda (Constituent College) Departments have been started in 11 Departments of GZSCCET, Bathinda (ANNEXURE-XXV: Page 1131). Students are being motivated and registered for self-paced SWAYAM MOOCS.</p> <p>The Item is placed before the Standing Committee of Academic Council for information please.</p>	<p>Noted.</p>									
<p>02.26</p>	<p>TO INFORM THE OFFER TO AFFILIATED COLLEGES FOR STARTING NEW NON-AICTE PROGRAMMES FROM SESSION 2018-19</p> <p>It is proposed to offer new Programmes in Affiliated Colleges from the Academic Session 2018-19. Complete list including new Programmes is attached (ANNEXURE-XXVI: Pages 1132-1134).</p> <p>The Item is placed before the Standing Committee of Academic Council for information please.</p>	<p>Noted.</p>									

**MINUTES OF 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL
HELD ON 26.02.2018**

<p>02.27</p>	<p>TO INFORM THE SIGNING OF SERVICE LEVEL AGREEMENT (SLA) AND REGISTRATION WITH CDSL VENTURES LIMITED (CVL) TO CHOOSE CVL NATIONAL ACADEMIC DEPOSITORY (CVL NAD) AS ITS ACADEMIC DEPOSITORY</p> <p>It is to inform that Maharaja Ranjit Singh Punjab Technical University has signed Service Level Agreement on 25.1.2018 with CDSL Ventures Limited (CVL) and registered to choose CVL NAD as National Academic Depository of the University. University will keep the academic awards in the digital format and ensure the data integrity. It is a 24x7 online mode for making available academic awards and helps in validating its authenticity, safe storage and easy retrieval. This Agreement is as per directions of UGC (ANNEX-XXVII: Page 1135).</p> <p>The Item is placed before the Standing Committee of Academic Council for information please.</p>	<p>Noted.</p>
<p>02.28</p>	<p>TO APPROVE THE MANDATORY CONDITIONS TO QUALIFY THE APPLICATION & EVALUATION PROCESS FOR FINANCIAL ASSISTANCE TO TRAVEL ABROAD AND ATTEND INTER-NATIONAL CONFERENCE (FOR GZSCCET, BATHINDA AND OTHER PITS' OF MRSPTU, BATHINDA).</p> <p>Mandatory conditions to qualify the application & evaluation process for financial assistance to travel abroad and attend International conference (for GZSCCET, Bathinda and other PITS' of MRSPTU, Bathinda) have been proposed (ANNEX-XXVIII: Pages 1136-1141).</p> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	<p>Approved for MRSPTU Univ Campus, GZSCCET and PITS</p>
<p>02.29</p>	<p>TO APPROVE THE STUDY SCHEMES OF NEW NON-AICTE PROGRAMMES OFFERED TO AFFILIATED COLLEGES FOR 2018 BATCH</p> <p>Some new Non-AICTE Programmes have been offered to Affiliated Colleges from 2018 Batch. It is proposed to follow Syllabi/Study Schemes of these Programmes of other Universities for 2018 Batch students or till their Syllabi/Study Schemes are not ready (ANNEXURE-XXIX: Pages 1142-1182).</p>	<p>It was decided that these schemes/syllabi be first put up before the concerned Board of Studies and then to Concerned Faculty for consideration and approval before bringing it to Academic Council</p>

**MINUTES OF 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL
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S.N.	Study Schemes	Page No.
1	B.Sc. (Food Technology) Sem. 1 st – 6 th 2018 Batch onwards	1142-1144
2	B.Sc. (Garment Design) Sem. 1 st – 6 th 2018 Batch onwards	1145-1147
3	B.Sc. (Home Science) Sem. 1 st – 6 th 2018 Batch onwards	1148-1151
4	Bachelor of Management Studies (Rural Development) Sem. 1 st – 6 th 2018 Batch onwards	1152-1154
5	M.Sc. (Mathematics & Computing) Sem. 1 st – 4 th 2018 Batch onwards	1155-1156
6	B.Sc. (Hons.) (Agronomy) Sem. 1 st – 8 th 2018 Batch onwards	1157-1160
7	B.Com. (E-Commerce) Sem. 1 st – 2 nd 2018 Batch onwards	1161
8	B.Sc. (Animation & Multimedia Technology) Sem. 1 st – 6 th 2018 Batch onwards	1162-1164
9	B.Sc. (Computer Science) Sem. 1 st – 6 th 2018 Batch onwards	1165-1168
10	B.Sc. (Non- Medical) Sem. 1 st – 6 th 2018 Batch onwards	1169-1173
11	M.Sc. (Clinical Research) Sem. 1 st – 4 th 2018 Batch onwards	1174-1175
12	M.Sc. (Computer Science) Sem. 1 st – 4 th 2018 Batch onwards	1176-1178
13	Skill Certificate Course in Computer Hardware and Networking Sem. 1 st 2018 Batch onwards	1179
14	Skill Certificate Course in Computer Proficiency-I, Sem. 1 st 2018 Batch onwards	1180
15	Skill Certificate Course in Computer Proficiency-II, Sem. 1 st 2018 Batch onwards	1181
16	Skill Certificate Course in Medical Lab. Technology Sem. 1 st – 2 nd 2018 Batch onwards	1182

The Item is placed before the Standing Committee of Academic Council for approval please.

**MINUTES OF 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL
HELD ON 26.02.2018**

<p>02.30</p>	<p>TO APPROVE Ph.D. REGISTRATION OF BHARAT KHURANA AND ROHIT BHATIA IN FACULTY OF PHARMACY</p> <p>After successful completion of prescribed Course Work and subsequent acceptance of Research Proposals by DDRC, Ph.D. Candidates Bharat Khurana and Rohit Bhatia under the Faculty of Pharmacy have been issued the provisional registration letters (ANNEXURE-XXX: Pages 1183-1184). The Research Work titles as recommended by DDRC are:</p> <ol style="list-style-type: none"> 1.Design and Development of Novel Drug Delivery Systems of Resveratrol for Treatment of Psoriasis. 2.Design, Synthesis and Evaluation of Coumarin Fused/Tethered Nitrogen containing Heterocycles as Anticancer Agents. <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	<p>Approved.</p>
<p>02.31</p>	<p>TO APPROVE THE REMOVAL OF NEGATIVE MARKING FOR EVALUATION OF Ph.D. ADMISSION TEST</p> <p>A proposal has been received to remove negative marking for evaluation of Ph.D. Admission Test (ANNEX-XXXI: Page 1185).</p> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	<p>Approved.</p>
<p>02.32</p>	<p>TO APPROVE THE STARTING OF NEW NON-AICTE COURSES IN THE SAME CAMPUS BY THE EXISTING AFFILIATED TECHNICAL INSTITUTIONS AS PER NORMS OF THE UNIVERSITY/STATUTORY BODY</p> <p>Existing Technical Institutions affiliated with the University willing to start new Non-AICTE Courses may be allowed to start the Course in the same Campus provided it fulfils all the norms/regulations regarding the infrastructure/faculty and other norms of the University/Statutory Body, without sharing the essential facilities, such as, Class Rooms, Laboratories, etc. with the already approved Technical Institution. However, Common Amenities, such as, Canteen, Auditorium, Playgrounds, Parking, etc. may be shared, provided it caters to all the students of all the Programmes (ANNEXURE-XXXII: 1186-1188 Pages).</p> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	<p>Approved.</p>

**MINUTES OF 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL
HELD ON 26.02.2018**

<p>02.33</p>	<p>TO DISCUSS AND APPROVE B.TECH. (AERONAUTICAL ENGG.) SYLLABUS AS RECEIVED FROM PSCAC, PATIALA FOR 2018 BATCH ONWARDS</p> <p>Punjab State Civil Aviation Council, Patiala has got prepared B.Tech. (Aeronautical Engg.) syllabus from NITTTR, Chandigarh (ANNEXURE-XXXIII: Pages 1189-1378) to be applicable from 2018 Batch. B.Tech First Year. syllabus of all branches of B.Tech. is common as per prevalent practice. B.Tech. 1st year syllabus for 2018 Batch as per guidelines of AICTE is given in ANNEXURE-VII (Pages 958-979). It is recommended that 1st year syllabus as given in ANNEXURE-VII (Pages 958-979) be applicable to B. Tech. (Aeronautical Engg.)</p> <p>The Item is placed before the Standing Committee of Academic Council for discussion and approval please.</p>	<p>Same B.Tech. 1st year syllabus will be followed for all the B.Tech. programmes including B.Tech. (Aeronautical Engg.) programme proposed by Punjab State Council for Civil Aviation, Patiala.</p>
<p>02.34</p>	<p>TO AUTHORISE VICE CHANCELLOR TO TAKE DECISIONS IN CASE OF ANY URGENT ACADEMIC MATTERS</p> <p>It is proposed to authorize the Vice Chancellor to take decisions in case of urgent academic matters, to be ratified later on by BoG.</p> <p>The Item is placed before the Standing Committee of Academic Council for approval please.</p>	<p>Approved.</p>
<p>TABLE AGENDA</p>		
<p>02.35</p>	<p>MRSPTU Ph.D. ADMISSION RELATED MATTERS</p> <p>In addition, it was deliberated and decided that,</p> <ol style="list-style-type: none"> 1. Heads of Departments may get 3 sets of Question Papers prepared in their discipline from the experts of elite institutions/Universities, including IITs, NITs and shall hand over these Question Papers to office of Dean (R&D). One from the available shall be used as a Ph.D. Entrance Test of the MRSPTU. 2. It was also decided that Ph.D. admissions shall be held twice in a year at the start of each academic session, however Ph.D. Admission entrance test shall be conducted only once per year. 3. Furthermore, it was decided that for admission to Ph.D. in Computer Sc & Engg., the existing Ph.D. eligibility qualifications shall also include BE/B.Tech. in any stream of Engg & Tech. <p>The Item is placed before the Standing Committee of Academic Council for consideration and approval please.</p>	<p>Discussed and approved</p>

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

**DEAN ACADEMIC AFFAIRS,
MRSPTU, BATHINDA**

**MINUTES OF 2ND MEETING OF FACULTY OF ENGINEERING & TECHNOLOGY HELD
ON 13.08.2018**



**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)
DEAN ACADEMIC AFFAIRS**

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Ph. 8725072488, 0164-2284298

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Ref. No.: DAA/MRSPTU/2140

Date: 27.9.2018

**MINUTES OF 2ND MEETING OF FACULTY OF ENGINEERING & TECHNOLOGY HELD
ON 13.08.2018**

2nd Meeting of Faculty of Engineering & Technology of Maharaja Ranjit Singh Punjab Technical University, Bathinda was held on 13.08.2018 at 11:00 AM in the Committee Room of GZSCCET, MRSPTU, Bathinda. The following members were present:

- | | |
|--|--------------------|
| 1. Dr. (Prof.) Paramjeet Singh,
Dean Faculty (Engineering & Technology),
Former Professor of Chemical Engineering & Former Registrar,
Panjab University Chd., Former Registrar, Adesh University, Bathinda.
H. No. 2921, Phase-7, Mohali.
(9814469688) pjsingh8399@gmail.com | Chairperson |
| 2. Dr. Ashok Kumar Goel,
Prof. & Head, Deptt. of ECE, GZSCCET, MRSPTU, Bathinda
(8725072491) ashokkgoell@gmail.com | Member |
| 3. Dr. Balwinder Singh,
Prof., Deptt. of Mech. Engg. GZSCCET, MRSPTU, Bathinda
(8872500275) drbwssidhu07@gmail.com | Member |
| 4. Dr. Manjeet Bansal,
Prof. & Head, Deptt. of Civil Engg. GZSCCET, MRSPTU, Bathinda
(9815126102) pushkar5@yahoo.com | Member |
| 5. Dr. Sarbjeet Kaur Bath,
Prof. & Head, Deptt. of Electrical Engg. GZSCCET, MRSPTU, Bathinda
(9463836070) skbath77@gmail.com | Member |
| 6. Dr. Devanand Uttam,
Associate Prof. & Head, Deptt. of Textile Engg. GZSCCET, MRSPTU, Bathinda | Member |
| 7. Dr. Jyoti Saxena,
Prof., Department of ECE, GZSCCET, MRSPTU, Bathinda
(8725072489) jyotianupam@yahoo.com | Member |
| 8. Dr. Sanjiv Kumar Aggarwal,
Prof., Deptt. of Civil Engg., GZSCCET, MRSPTU, Bathinda
(9478022281) sanjiv aggarwal@rediffmail.com | Member |
| 9. Dr. Shaveta Rani,
Prof., Deptt. of CSE, GZSCCET, MRSPTU, Bathinda,
(8284011796) gargshavy@yahoo.com | Member |
| 10. Dr. Bal Krishan,
Prof., Deptt. of Civil Engg., (Structural Engg.), GZSCCET, MRSPTU, Bathinda
(8872320600) balkrishandr@yahoo.com | Member |

**MINUTES OF 2ND MEETING OF FACULTY OF ENGINEERING & TECHNOLOGY HELD
ON 13.08.2018**

- | | |
|---|------------------------------|
| 11. Dr. Kewal S. Panesar,
Prof., Deptt. of Mech Engg, North West Institute of Engineering & Technology,
Dhudike Takhanwadh, Link Rd., Dhudike, Punjab 142053
(9417472592) kewal me@northwest.ac.in | Member |
| 12. Dr. Lakhwinder Singh,
Prof., Deptt. of Electrical Engg., BBSBCET Fatehgarh Sahib
(9814508213, 8872007780) b lakh@yahoo.com | Member |
| 13. Dr. Anupam Kumar,
Prof., Deptt. of Textile Engg. GZSCCET, MRSPTU, Bathinda,
(9417025296) anup28298@yahoo.com | Member |
| 14. Dr. Rajesh Gupta,
Prof., Deptt. of Mech.Engg., GZSCCET, MRSPTU, Bathinda
(8872500261) rg91@rediffmail.com | Member |
| 15. Dr. Rajiv Arora,
Head, Deptt. of Chemical Engineering SBS State Technical Campus,
Moga Road (NH-95), Ferozepur-152004 (Punjab),
(9463385619) rajiv fzr@yahoo.com | Member |
| 16. Dr. Swarnjit Singh,
Prof., Deptt. of ECE, Desh Bhagat Group of Institutions, Ferozepur Road,
Dagru-142048, (Punjab),
(9876409200) sawarnjit@live.ca, dbfgoi@gmail.com | Member |
| 17. Er. Gurpreet Singh Bath,
Associate Prof., Deptt. of Civil Engg., GZSCCET, MRSPTU, Bathinda,
(9417171710) gpsbath66@gmail.com. | Member |
| 18. Dr. D.C. Saxena,
Prof., Deptt. of Food Engg. & Tech., SLIET, Longowal, Sangrur
(9815608859) dcsaxena@yahoo.com | Member |
| 19. Dr. Sandeep Mann,
Principal Scientist (APE) & HOD Transfer of Technology Division,
ICAR-Central Institute of Post-Harvest Engineering & Technology. Ministry of
Agriculture and Farmer's Welfare, Govt. of India. P.O. P.A.U. Ludhiana,
(9463043396) Sandeep_mann 76@yahoo.com | Member |
| 20. Prof. Karanvir Singh,
Chairperson, Board of Studies in Mathematics, MRSPTU, Bathinda,
(8872211150) karanvir776@gmail.com | Special Invitee |
| 21. Er. Namisha Modi,
Department of CSE, GZSCCET, Bathinda,
(9780494584) namisha.2207@gmail.com | Special Invitee |
| 22. Dr. Gursharan Singh,
(8725072488) daa.mrsstu@gmail.com | Dean Academic Affairs |

At the outset agenda items were taken up one by one and the following decisions were arrived at unanimously after due deliberations in the meeting:

**MINUTES OF 2ND MEETING OF FACULTY OF ENGINEERING & TECHNOLOGY HELD
ON 13.08.2018**

Item No.	Description	Decision Taken																																							
02.01	<p>INFORMATION REGARDING 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL HELD ON 26.2.2018</p> <p>It is for information of the members that 2nd Meeting of Standing Committee of Academic Council was held on 26.2.2018. Minutes of this Meeting are enclosed (ANNEXURE-I, Pages 06-22). It was decided that the syllabus be put up in the meeting of Chairpersons of the concerned Boards of Studies. So syllabi of the Programmes covered in the agenda for 2nd meeting of Standing Committee of Academic Council are also included in the agenda for this meeting.</p> <p>The Members of Faculty please note it.</p>	1. Noted.																																							
02.02	<p>APPROVAL OF SYLLABI OF UNDER GRADUATE PROGRAMMES</p> <p>Syllabi of Under Graduate Programmes have been prepared (ANNEXURE-II: Pages 23-591).</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th align="center" colspan="3">TABLE-I</th> </tr> <tr> <th align="center">S.N.</th> <th align="center">ITEM</th> <th align="center">PAGE NO.</th> </tr> </thead> <tbody> <tr> <td align="center">1</td> <td align="center">B.Tech. (Civil Engg.) 5th – 8th Sem. 2016 Batch onwards</td> <td align="center">23-48</td> </tr> <tr> <td align="center">2</td> <td align="center">B.Tech. (Automobile Engg.) 3rd – 6th Sem. 2016 Batch onwards</td> <td align="center">49-79</td> </tr> <tr> <td align="center">3</td> <td align="center">B.Tech. (Electrical & Electronics Engg.) 5th – 8th Sem. 2016 Batch onwards</td> <td align="center">80-130</td> </tr> <tr> <td align="center">4</td> <td align="center">B.Tech. (Electronics & Communications Engg.) 3rd – 8th Sem. 2016 Batch onwards</td> <td align="center">131-190</td> </tr> <tr> <td align="center">5</td> <td align="center">B.Tech. (Electronics & Telecommunications Engg.) 3rd – 8th Sem. 2016 Batch onwards</td> <td align="center">191-250</td> </tr> <tr> <td align="center">6</td> <td align="center">B.Tech. (Electronics & Instrumentation Engg.) 3rd – 8th Sem. 2016 Batch onwards</td> <td align="center">251-303</td> </tr> <tr> <td align="center">7</td> <td align="center">B.Tech. (Information Technology) 5th – 8th Sem. 2016 Batch onwards</td> <td align="center">304-351</td> </tr> <tr> <td align="center">8</td> <td align="center">B.Tech. (Marine Engg.) 3rd – 6th Sem. 2016 Batch onwards</td> <td align="center">352-381</td> </tr> <tr> <td align="center">9</td> <td align="center">B.Tech. (Agriculture Engg.) 5th – 6th Sem. 2016 Batch onwards</td> <td align="center">382-405</td> </tr> <tr> <td align="center">10</td> <td align="center">B.Tech. (Electrical Engg.) 5th – 8th Sem. 2016 Batch onwards</td> <td align="center">406-459</td> </tr> <tr> <td align="center">11</td> <td align="center">B.Tech. (Chemical, Food) 1st Year Syllabus 2018 Batch</td> <td align="center">460-477</td> </tr> </tbody> </table>	TABLE-I			S.N.	ITEM	PAGE NO.	1	B.Tech. (Civil Engg.) 5 th – 8 th Sem. 2016 Batch onwards	23-48	2	B.Tech. (Automobile Engg.) 3 rd – 6 th Sem. 2016 Batch onwards	49-79	3	B.Tech. (Electrical & Electronics Engg.) 5 th – 8 th Sem. 2016 Batch onwards	80-130	4	B.Tech. (Electronics & Communications Engg.) 3 rd – 8 th Sem. 2016 Batch onwards	131-190	5	B.Tech. (Electronics & Telecommunications Engg.) 3 rd – 8 th Sem. 2016 Batch onwards	191-250	6	B.Tech. (Electronics & Instrumentation Engg.) 3 rd – 8 th Sem. 2016 Batch onwards	251-303	7	B.Tech. (Information Technology) 5 th – 8 th Sem. 2016 Batch onwards	304-351	8	B.Tech. (Marine Engg.) 3 rd – 6 th Sem. 2016 Batch onwards	352-381	9	B.Tech. (Agriculture Engg.) 5 th – 6 th Sem. 2016 Batch onwards	382-405	10	B.Tech. (Electrical Engg.) 5 th – 8 th Sem. 2016 Batch onwards	406-459	11	B.Tech. (Chemical, Food) 1 st Year Syllabus 2018 Batch	460-477	<ol style="list-style-type: none"> 1. Syllabi from 1 to 15 approved. 2. Syllabus at 16 of 2018 batch for every branch of B.Tech. is to include 2 hrs./week a non-credit course in 1st semester on Introduction to concerned branch of Engineering. It will have internal evaluation. Student is required to earn at least E-grade in it. Every branch of B.Tech. will include Course in Electronics in 3rd and 4th semester. 3. UG Open Electives Mathematics-I, II, III have been introduced after recommendation by Chairperson BoS in Mathematics. 4. More subjects be included in UG Open Electives-I, II, III.
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ON 13.08.2018**

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<p>02.03</p>	<p>APPROVAL OF SYLLABI OF POST GRADUATE PROGRAMMES</p> <p>Syllabi of Post Graduate Programmes have been prepared (ANNEXURE-III: Pages 591-745).</p> <table border="1"> <thead> <tr> <th colspan="3">TABLE-II</th> </tr> <tr> <th>S. N.</th> <th>ITEM</th> <th>PAGE NO.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>M.Tech. CSE (Sem 1-2) 2018 Batch onwards</td> <td>592-623</td> </tr> <tr> <td>2</td> <td>M.Tech ECE (Micro Electronics Engg.) (Sem 1-4) Syllabus 2016 Batch onwards</td> <td>624-647</td> </tr> <tr> <td>3</td> <td>M.Tech. Electronics & Communication Engg. (Sem 1-4) Syllabus 2016 Batch onwards</td> <td>648-672</td> </tr> <tr> <td>4</td> <td>M.Tech. Production Engg. (Sem 1-4) Syllabus 2016 Batch onwards</td> <td>673-693</td> </tr> <tr> <td>5</td> <td>PG Open Electives-I 2016 Batch onwards</td> <td>694-722</td> </tr> <tr> <td>6</td> <td>PG Open Electives-II 2016 Batch onwards</td> <td>723-746</td> </tr> <tr> <td>7</td> <td>M.Tech. Electrical Engg. (Power System) (Sem 1) 2018 Batch onwards</td> <td>747-760</td> </tr> </tbody> </table> <p>The matter is placed before the Faculty for deliberation and approval.</p>	TABLE-II			S. N.	ITEM	PAGE NO.	1	M.Tech. CSE (Sem 1-2) 2018 Batch onwards	592-623	2	M.Tech ECE (Micro Electronics Engg.) (Sem 1-4) Syllabus 2016 Batch onwards	624-647	3	M.Tech. Electronics & Communication Engg. (Sem 1-4) Syllabus 2016 Batch onwards	648-672	4	M.Tech. Production Engg. (Sem 1-4) Syllabus 2016 Batch onwards	673-693	5	PG Open Electives-I 2016 Batch onwards	694-722	6	PG Open Electives-II 2016 Batch onwards	723-746	7	M.Tech. Electrical Engg. (Power System) (Sem 1) 2018 Batch onwards	747-760	<p>1. Syllabi from 1 to 7 approved.</p>
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02.04	<p>APPROVAL OF CRITERIA FOR ALLOCATION OF MARKS, GRADES & OTHER CRITERIA FOR PG THESIS, PROJECT, SEMINAR.</p> <p>Criteria for allocation of marks, grades & other criteria for PG thesis, project, seminar and professional skills etc. have been proposed.</p> <p>1. Thesis will carry 24 credits and will be evaluated as under:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">S. N.</th> <th style="width: 50%;">Subject</th> <th style="width: 20%;">Internal Marks</th> <th style="width: 20%;">External Marks</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Originality</td> <td>12</td> <td>08</td> </tr> <tr> <td>2.</td> <td>Presentation</td> <td>12</td> <td>08</td> </tr> <tr> <td>3.</td> <td>Contents & Volume of Work</td> <td>18</td> <td>12</td> </tr> <tr> <td>4.</td> <td>Discussion (Contribution of candidate)</td> <td>18</td> <td>12</td> </tr> <tr> <td colspan="2" style="text-align: center;">Total Marks</td> <td style="text-align: center;">60</td> <td style="text-align: center;">40</td> </tr> </tbody> </table> <p>Paper accepted in UGC approved Journals will attract additional 10 Marks in Internal assessment as special incentive subject to the maximum 60 marks in Internal assessment. It is desired that the student should publish one paper in conference/journal.</p> <p>2. Seminar will carry 4 credits. It will be done on any topic within/ outside the curriculum. Its evaluation will be done as under:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">S. N.</th> <th style="width: 50%;">Subject</th> <th style="width: 20%;">Internal Marks</th> <th style="width: 20%;">External Marks</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Depth & coverage of topic</td> <td>40</td> <td>---</td> </tr> <tr> <td>2.</td> <td>Report</td> <td>20</td> <td>---</td> </tr> <tr> <td>3.</td> <td>PPT Presentation</td> <td>20</td> <td>---</td> </tr> <tr> <td>4.</td> <td>Q/A on PPT Presentation</td> <td>20</td> <td>---</td> </tr> <tr> <td colspan="2" style="text-align: center;">Total Marks</td> <td style="text-align: center;">100</td> <td style="text-align: center;">---</td> </tr> </tbody> </table> <p>3. Project will carry 10 credits. Its evaluation will be done as under:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">S. N.</th> <th style="width: 30%;">Subject</th> <th style="width: 15%;">Internal Marks</th> <th colspan="2" style="width: 45%;">External Marks</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Formulation of Problem</td> <td>10</td> <td>Formulation of Problem</td> <td>10</td> </tr> <tr> <td>2.</td> <td>Testing & Analysis</td> <td>20</td> <td>Result & Analysis</td> <td>10</td> </tr> <tr> <td>3.</td> <td>Report</td> <td>10</td> <td>Report</td> <td>10</td> </tr> <tr> <td>4.</td> <td>PPT Presentation and Q/A</td> <td>20</td> <td>Viva-Voca</td> <td>10</td> </tr> <tr> <td colspan="2" style="text-align: center;">Total Marks</td> <td style="text-align: center;">60</td> <td style="text-align: center;">Total Marks</td> <td style="text-align: center;">40</td> </tr> </tbody> </table> <p>The matter is placed before the Faculty for deliberation and approval.</p>	S. N.	Subject	Internal Marks	External Marks	1.	Originality	12	08	2.	Presentation	12	08	3.	Contents & Volume of Work	18	12	4.	Discussion (Contribution of candidate)	18	12	Total Marks		60	40	S. N.	Subject	Internal Marks	External Marks	1.	Depth & coverage of topic	40	---	2.	Report	20	---	3.	PPT Presentation	20	---	4.	Q/A on PPT Presentation	20	---	Total Marks		100	---	S. N.	Subject	Internal Marks	External Marks		1.	Formulation of Problem	10	Formulation of Problem	10	2.	Testing & Analysis	20	Result & Analysis	10	3.	Report	10	Report	10	4.	PPT Presentation and Q/A	20	Viva-Voca	10	Total Marks		60	Total Marks	40	<p>1. Regarding thesis evaluation, discussion was held with chairpersons of various BoS's in Engineering & Technology. It has been decided that,</p> <p>(a) Thesis evaluation will be satisfactory /unsatisfactory, but marks will not be given.</p> <p>(b) At least three members of DRC will internally evaluate the thesis.</p> <p>(c) Thesis will be evaluated in three steps:</p> <p>(i) Presentation of synopsis finalisation of topic and objectives.</p> <p>(ii) Mid-term presentation to review the progress of work.</p> <p>(iii) Thesis Pre-submission presentation to evaluate whether the work done by the student is sufficient and satisfactory for submission of thesis.</p> <p>(d) Decision of this agenda item will be implemented from 2017 Batch onwards.</p> <p>(e) Items at sr. no. 2 & 3 approved.</p>
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<p>02.05</p>	<p>ALLOCATION OF M.TECH. THESIS SUPERVISORS AND CO-SUPERVISORS</p> <ol style="list-style-type: none"> 1. Ph.D. degree holder regular faculty member and M.Tech. faculty members working as Associate Professor will act as supervisors. Assistant Professor having only M. Tech. degree will act as co-supervisor. In case there is only faculty having M. Tech. degree and working as assistant professor, he/she will be eligible to act as M. Tech. thesis supervisor. 2. The department will put up the following information on the notice board of the department. <ol style="list-style-type: none"> a) Specialization wise faculty members. b) Specialization wise students. 3. The students of a particular specialization will be allotted based upon his/her merit to M.Tech. thesis supervisor of respective specialization strictly. 4. After equal distribution of students in each specialization, the remaining students will be allocated in a particular specialization, depending upon the seniority of the faculty member equally. 5. Slot wise allotment of best, medium and poor students, the basis of merit on equal basis shall be done to ensure uniform distribution. If DRC (Departmental Research Committee) of concerned department feels, students may be given their preferred choice(s) of supervisor among each slot may be exercised, limiting to maximum no. of students to be allotted to each supervisor. 6. For any further clarification, concerned DRC may decide on case to case basis and put up the same to Dean Academic Affairs, MRSPTU for approval. 7. It is recommended to start the M.Tech. research project from commencement of third semester in place of fourth semester to ensure better quality of the research work. <p>The matter is placed before the Faculty for deliberation and approval.</p>	<ol style="list-style-type: none"> 1. Regarding allocation of supervisors and co-supervisors, discussion was held with chairpersons of various BoS's in Engineering & Technology. It has been decided that, <ol style="list-style-type: none"> (a) All regular faculty members having Ph.D./M.Tech. degrees will be eligible to act as supervisors. (b) Maximum how many students of a programme can be allotted to a supervisor in a department will depend upon the number of M.Tech. students available in that programme in that department. (c) The students in the order of M.Tech. merit will be asked to exercise their choice for Supervisors. (d) In case of any dispute, decision of Board of Control of the department will be final.
<p>02.06</p>	<p>APPROVAL OF ANTI-PLAGIARISM POLICY FOR PG THESIS AS APPLICABLE FOR Ph.D. THESIS</p> <p>It is proposed that Anti-plagiarism policy as applicable to Ph.D. thesis may be applicable for M.Tech. Thesis from 2017 Batch onwards.</p> <p>The matter is placed before the Faculty for deliberation and approval.</p>	<ol style="list-style-type: none"> 1. The Anti-Plagiarism policy as approved in 1st Academic Council meeting held on 31.5.2017 for Ph.D. Thesis is also to be followed for M.Tech. Thesis from 2017 batch. Anti-Plagiarism software

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		is approved.
02.07	AUTHORIZATION OF VICE CHANCELLOR, MRSPTU BATHINDA TO TAKE DECISIONS IN CASE OF URGENT MATTERS TO BE RATIFIED LATER ON BY MRSPTU ACADEMIC COUNCIL It is proposed to authorize Vice Chancellor, MRSPTU Bathinda to take decisions in case of urgent matters to be ratified later on by Academic Council, MRSPTU, Bathinda. The matter is placed before the Faculty for deliberation and approval.	1. Approved

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

**DEAN ACADEMIC AFFAIRS,
MRSPTU, BATHINDA**

MINUTES OF 2ND MEETING OF FACULTY OF SCIENCES HELD ON 17.09.2018



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)
DEAN ACADEMIC AFFAIRS

www.mrsptu.ac.in

Ph. 8725072488, 0164-2284298

daa.mrsstu@gmail.com

Ref. No.: DAA/MRSPTU/2117

Date: 20.9.2018

MINUTES OF 2ND MEETING OF FACULTY OF SCIENCES HELD ON 17.09.2018

2nd Meeting of Faculty of Sciences of Maharaja Ranjit Singh Punjab Technical University, Bathinda was held on 17.09.2018 at 11:00 AM in the Committee Room of GZSCCET, MRSPTU, Bathinda. The following members were present:


1. **Dr. Geeta Hundal,** Chairperson
Professor, Deptt. of Chemistry, GNDU, Amritsar,
(9501114469) geetahundal@yahoo.com
2. **Dr. Sandeep Kansal,** Member
Professor & Head, Department of Physics,
GZS Campus CET, Dabwali Road Bathinda-151001,
(8725072490) skansal2k1@yahoo.com, head.physics.gzs@gmail.com
3. **Prof. Karanvir Singh,** Member
Head, Department of Applied Mathematics, GZS Campus CET, Dabwali Road,
Bathinda - 151001,
(8872211150) karanvirs786@gmail.com
4. **Dr. Seema Sharma,** Member
Associate Professor & Head, Department of Chemistry, GZS Campus CET,
Bathinda,
(9417114169, 8725072411) harprit6920@gmail.com
5. **Dr. Kawaljit Singh Sandhu,** Member
Associate Professor, Department of Food Science and Technology, MRSPTU,
Bathinda,
(9896268539) kawsandhu@rediffmail.com
6. **Dr. Manoj Bali,** Member
Professor, Baba Hira Singh Bhattal Institute of Engineering & technology,
Lehragaga,
(7087000702, 8054644823) drmanojbali@gmail.com
7. **Dr. Virinder Singh,** Member
Professor, Department of Chemistry, Baba Banda Singh Bahadur
College of Engineering, Fatehgarh Sahib,
(9914349612) virinder.singh@bbsbec.ac.in
8. **Dr. Amritbir Singh,** Member
Professor, Department of Mathematics, Baba Banda Singh Bahadur College
of Engineering, Fatehgarh Sahib,
(9914241230) amritbir.singh@bbsbec.ac.in

Susham Singh
Dean Academic Affairs
20/9/18
Maharaja Ranjit Singh
Punjab Technical University
Bathinda

MINUTES OF 2ND MEETING OF FACULTY OF SCIENCES HELD ON 17.09.2018

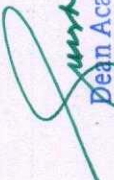
9. **Dr. Lalit Sharma,** **Member**
Associate Professor, Department of Chem., Dept. of Applied Sciences,
Shaheed Bhagat Singh State Technical Campus, Moga Road (NH-95),
Ferozepur-152004,
(9872069500) lalitalit64@rediffmail.com
10. **Dr. Anju Sharma,** **Member**
Assistant Professor, Department of Computer Applications, GZS Campus CET,
Bathinda,
(7888874425) phdanju@gmail.com
11. **Dr. B.S. Bajwa,** **Member**
Professor, Department of Physics, GND University, Grand Trunk Rd, Off NH 1,
Amritsar-143005,
(9914116916) bsbajwa1@gmail.com
12. **Dr. K.N. Chatterjee,** **Member**
Professor & Head, Fashion & Apparel Engineering Research and Consulting,
The Technological Institute of Textile & Sciences, Birla Colony, Bhiwani,
Haryana-127021
(09255176649) kn.chatterjee@gmail.com
13. **Dr. Munish Kumar,** **Special Invitee**
Assistant Professor, Computer Applications Department,
MRSPTU, Bathinda
(8725072425) munishcse@gmail.com
14. **Dr. Puneet Bansal,** **Special Invitee**
Associate Professor, Department of Pharmaceutical Sciences,
MRSPTU, Bathinda
(9876100692) punnubansal79@gmail.com
15. **Dr. Gursharan Singh,** **Member Secretary**
Dean Academic Affairs, MRSPTU, Bathinda
(8725072488, 9417628270) gursharans82@gmail.com

At the outset agenda items were taken up one by one and the following decisions were arrived at unanimously after due deliberations in the meeting:


Dean Academic Affairs
Manaraja Ranjit Singh
Punjab Technical University
Bathinda

MINUTES OF 2ND MEETING OF FACULTY OF SCIENCES HELD ON 17.09.2018

Item No.	Description	Decision Taken																		
02.01	<p>INFORMATION REGARDING 2ND MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL HELD ON 26.2.2018</p> <p>It is for information of the members that 2nd Meeting of Standing Committee of MRSPTU Academic Council was held on 26.2.2018. Minutes of this Meeting are enclosed (ANNEXURE-I, Pages 03-19). Syllabi of the Programmes covered in the agenda for 2nd meeting of Standing Committee of Academic Council are also included in the agenda for this meeting.</p> <p>The Members of Faculty please note it.</p>	1. Noted.																		
02.02	<p>APPROVAL OF SYLLABI OF UNDER GRADUATE PROGRAMMES</p> <p>Syllabi of Under Graduate Programmes have been prepared (ANNEXURE-II: Pages 20-56).</p> <table border="1"> <thead> <tr> <th colspan="3">TABLE-I</th> </tr> <tr> <th>S. N.</th> <th>ITEM</th> <th>PAGE NO.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>B.Sc. Agriculture Syllabus (Sem 4-5) 2016 Batch onwards</td> <td>20-33</td> </tr> <tr> <td>2</td> <td>B.Sc. MLS (Sem 5- 6) Syllabus 2016 Batch onwards</td> <td>34-42</td> </tr> <tr> <td>3</td> <td>B.Sc. Biotechnology (Sem 5-6) Syllabus 2016 Batch onwards</td> <td>43-51</td> </tr> <tr> <td>4</td> <td>B.Sc. (Hons. School) in Mathematics (Sem-1) Syllabus 2018 Batch onwards</td> <td>52-56</td> </tr> </tbody> </table> <p>The matter is placed before the Faculty for deliberation and approval.</p>	TABLE-I			S. N.	ITEM	PAGE NO.	1	B.Sc. Agriculture Syllabus (Sem 4-5) 2016 Batch onwards	20-33	2	B.Sc. MLS (Sem 5- 6) Syllabus 2016 Batch onwards	34-42	3	B.Sc. Biotechnology (Sem 5-6) Syllabus 2016 Batch onwards	43-51	4	B.Sc. (Hons. School) in Mathematics (Sem-1) Syllabus 2018 Batch onwards	52-56	<p>1. Syllabi approved with recommendations that,</p> <p>(a) There should be total around six subjects including labs. From next academic session, some subjects be deleted/merged and renamed wherever number of subjects are more than six.</p> <p>(b) Every theory subject should have 3 lectures and one tutorial.</p> <p>(c) Seminar BMLS1-542 of B.Sc. MLS should of 100 internal marks instead of ext. marks.</p> <p>(d) There is confusion of the subjects of 6th semester B.Sc. MLS. All subjects seem to belong to one subject.</p> <p>(e) Punjabi/History and Culture of Punjab (L T P C/3 0 0 3) be included in 1st semester.</p>
TABLE-I																				
S. N.	ITEM	PAGE NO.																		
1	B.Sc. Agriculture Syllabus (Sem 4-5) 2016 Batch onwards	20-33																		
2	B.Sc. MLS (Sem 5- 6) Syllabus 2016 Batch onwards	34-42																		
3	B.Sc. Biotechnology (Sem 5-6) Syllabus 2016 Batch onwards	43-51																		
4	B.Sc. (Hons. School) in Mathematics (Sem-1) Syllabus 2018 Batch onwards	52-56																		


 Manjara Ranjit Singh
 Dean Academic Affairs
 Punjab Technical University
 Bathinda

(f) Non-credit Subjects like Human Values & Professional Ethics, Environmental Science, Drug Abuse: Problem, Management and Prevention etc. be introduced in different sem.

02.03 APPROVAL OF SYLLABI OF POST GRADUATE PROGRAMMES

Syllabi of Post Graduate Programmes have been prepared (ANNEXURE-III: Pages 57-157).

TABLE-II		
S. N.	ITEM	PAGE NO.
1	M.Sc. (Physics) (Sem 1-4) Syllabus 2018 Batch onwards	57-81
2	M.Sc. (Fashion Technology) (Sem 1-4) Syllabus 2016 Batch onwards	82-97
3	M.Sc. (Fashion Technology) (Sem 1-4) Syllabus 2017 Batch onwards	98-120
4	M.Sc. (Food Technology) (Sem 1-4) Syllabus 2018 Batch onwards	121-144
5	BCA-MCA Dual Degree Programme* Syllabus (Sem 1-2) 2018 Batch onwards	145-157

- Every student will get degree of BCA on successful completion of three years of study

The matter is placed before the Faculty for deliberation and approval.

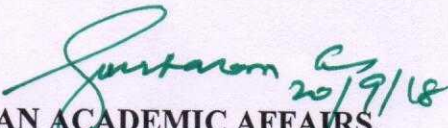
1. In M.Sc. physics, in 4th sem.. There will be Departmental Elective-IV consisting of Advanced Physics lab. and Dissertation (L T P C/0 0 6 3). Each one will have 60 internal marks and 40 external marks.
2. Syllabus at sr. no. 2 approved.
3. For Syllabus at sr. no. 3, from academic 2018-19, MFTE1-107 is to be renamed as Market Trend & Research Study and MFTE1-214 is to be renamed as Design Development & Research Study. MFTE1-316 is to be renamed as Minor Project (Portfolio Making & Showcasing).
4. For Syllabus at sr. no. 4,
 - (a) Term Thesis is to be replaced with Dissertation.
 - b) Every theory subject is to have L T P C/4 0 0 4.

8/16/18
 Dean Academic Affairs
 Maharaja Ranjit Singh
 Punjab Technical University
 Bathinda

MINUTES OF 2ND MEETING OF FACULTY OF SCIENCES HELD ON 17.09.2018

<p>02.04</p>	<p>APPROVAL OF SYLLABI OF SKILL CERTIFICATE PROGRAMMES</p> <p>Syllabi of Skill Certificate Programme has been prepared (ANNEXURE-IV: Pages 158-179).</p> <table border="1"> <thead> <tr> <th colspan="3">TABLE-II</th> </tr> <tr> <th>S. N.</th> <th>ITEM</th> <th>PAGE NO.</th> </tr> </thead> <tbody> <tr> <td align="center">1</td> <td align="center">Skill Certificate in Computer Proficiency Syllabus 2018 Batch onwards</td> <td align="center">158-179</td> </tr> </tbody> </table> <p>The matter is placed before the Faculty for deliberation and approval.</p>	TABLE-II			S. N.	ITEM	PAGE NO.	1	Skill Certificate in Computer Proficiency Syllabus 2018 Batch onwards	158-179	<p>1. Syllabi approved.</p>
TABLE-II											
S. N.	ITEM	PAGE NO.									
1	Skill Certificate in Computer Proficiency Syllabus 2018 Batch onwards	158-179									
<p>02.05</p>	<p>AUTHORIZATION OF VICE CHANCELLOR, MRSPTU BATHINDA TO TAKE DECISIONS IN CASE OF URGENT MATTERS TO BE RATIFIED LATER ON BY MRSPTU ACADEMIC COUNCIL</p> <p>It is proposed to authorize Vice Chancellor, MRSPTU Bathinda to take decisions in case of urgent matters to be ratified later on by Academic Council, MRSPTU, Bathinda.</p> <p>The matter is placed before the Faculty for deliberation and approval.</p>	<p>1. Approved</p>									

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


DEAN ACADEMIC AFFAIRS,
MRSPTU, BATHINDA
 Dear Academic Affairs
 Manjinder Singh
 Punjab Technical University
 Bathinda

MRSPTU BACHELOR OF MANAGEMENT STUDIES (AIRLINES, TOURISM AND HOSPITALITY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

Total Contact Hours = 19

Total Marks = 500

Total Credits = 19

SEMESTER 1 st		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BTA01	Basics of Tourism	4	0	0	40	60	100	4
BTA02	Tourism Products and Services Part-1	4	0	0	40	60	100	4
BTA03	Basics of Management	3	0	0	40	60	100	3
BTA04	Geography of Tourism-1	4	0	0	40	60	100	4
BTA05	Customer Care & Interpersonal Skills	4	0	0	40	60	100	4
Total		19	0	0	200	300	500	19

Total Contact Hours = 20

Total Marks = 500

Total Credits = 20

SEMESTER 2 nd		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BTA06	Tourism Products and Services Part-2	4	0	0	40	60	100	4
BTA07	Tourism Industry Profile	4	0	0	40	60	100	4
BTA08	Tourism Management	4	0	0	40	60	100	4
BTA09	Geography of Tourism-2	4	0	0	40	60	100	4
BTA10	Human Resource Management	4	0	0	40	60	100	4
Total		20	0	0	200	300	500	20

MRSPTU

MRSPTU BACHELOR OF MANAGEMENT STUDIES (AIRLINES, TOURISM AND HOSPITALITY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

Total Contact Hours = 26

Total Marks = 700

Total Credits = 25

SEMESTER 3 rd		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BTA11	Dimensions of International Tourism	4	0	0	40	60	100	4
BTA12	Geography of Tourism-3	4	0	0	40	60	100	4
BTA13	Sales, Marketing and PR in Service Industry	4	0	0	40	60	100	4
BTA14	Business Communication	4	0	0	40	60	100	4
BTA15	Basics of Computer-1 Lab.	0	0	2	60	40	100	1
BTA16	Front Office Operations- Reservations and Registrations	4	0	0	40	60	100	4
BTA17	English-1	4	0	0	40	60	100	4
Total		24	0	2	300	400	700	25

Total Contact Hours = 26

Total Marks = 700

Total Credits = 25

SEMESTER 4 th		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BTA18	Total Quality Management	4	0	0	40	60	100	4
BTA19	Automation in Tourism Industry, Airlines and Hospitality	4	0	0	40	60	100	4
BTA20	Travel Agency and Tour Operations	4	0	0	40	60	100	4
BTA21	Airlines Management	4	0	0	40	60	100	4
BTA22	Basics of Computers-2 Lab.	0	0	2	60	40	100	1
BTA23	Hospitality Management (Focus- F & B, Housekeeping)	4	0	0	40	60	100	4
BTA24	English-2	4	0	0	40	60	100	4
Total		24	0	2	300	400	700	25

Total Contact Hours = 18

Total Marks = 500

Total Credits = 17

MRSPTU BACHELOR OF MANAGEMENT STUDIES (AIRLINES, TOURISM AND HOSPITALITY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

SEMESTER 5 th		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BTA25	Tourism Policy in India	4	0	0	40	60	100	4
BTA26	Resort Management	4	0	0	40	60	100	4
BTA27	Destination Marketing & Management	4	0	0	40	60	100	4
BTA28	Research Methodology and Management Decisions	4	0	0	40	60	100	4
BTA29	Conference & Events Management Lab.	0	0	2	60	40	100	1
Total		16	0	2	220	280	500	17

Total Contact Hours = 30

Total Marks = 100

Total Credits = 15

SEMESTER 6 th		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BTA30	Industrial Training & Project	0	0	30	40	60	100	15
Total		0	0	30	40	60	100	15

Total Credits = 19 + 20 + 25 + 25 + 17 + 15 = 121

MRSPTU

BASICS OF TOURISM

Subject Code: BTA01

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Introduction: Tourism, The relationship between leisure, recreation and tourism
Travel Lingo, Classification of tourism in terms of: Destination visited – International tourism and domestic tourism, Purpose of Visit – Cultural tourism, Business Tourism, VFR, Pilgrimage tourism etc., Mode of travel arrangement – Inclusive travel and Independent travel.

UNIT-II

Motivation of Travel: (Given by McIntosh)

Physical Motivations: travel for sports and adventure, rest and relaxation, health and medical reasons etc.

Cultural Motivations: pilgrimage tourism, cultural curiosity etc.

Interpersonal Motivation: meeting new people, VFR, etc. Status and Prestige motivation: business motivation.

Travel Motivations Given by Grey-Wander lust and SunLust.

UNIT-III

Global Tourism: Description of the development of tourism in the Ancient era, Imperial era (Roman travelers, Greek travelers, Indian travelers), Silk Route and Grand tours, Thomas Cook and the development of tourism, & Present scenario of the tourism industry.

Factors that have led to the Growth of Tourism

Technology and destination development

Changing social patterns

Changing Living standards.

UNIT-IV

Barriers to the Growth of Tourism: Factors existing at the destination: terrorism, & political and social environment, Factors barring a potential tourist from traveling: time, cost, and social barriers.

Domestic Tourism: Definition and Significance of Domestic tourism, Difference between the domestic tourist and International tourist,

Positive and Negative Impacts of Tourism: Economic Impacts, Socio-culture Impacts, Environmental impacts.

UNIT-V

Carrying Capacity: Types of carrying capacity: Physical, biological, Social carrying capacity, Importance of carrying Capacity, Effect of host population on the carrying capacity.

Sustainable and Eco-tourism: Definition of Eco tourism, Benefits and Importance of Eco tourism, Agenda 21, Definition and bodies promoting Sustainable tourism, Principles of Sustainable tourism, Difference between Mass and Green Tourism.

TOURISM PRODUCT AND SERVICES-1

Subject Code: BTA02

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Introduction: Product, Tangible and Intangible products, Difference between Product and service, Tourism Product (5 A's), Accommodation, Accessibility, Attraction, Activities, Amenities.

UNIT-II

Accommodation Sector: Introduction of Hotel Industry in India, Types of Hotels, Five Star Hotels in India, Leading Hotel chains, Budget Hotels, Heritage Hotels.

UNIT-III

Transportation Sector: Introduction of transportation Industry in India, Roadways, National and State Highways, Express Highways, Railways, Various Tourist trains: Palace on wheels, Deccan Odyssey, Fairy Queen, Airways: Domestic Airlines operating in India, Waterways, National waterways.

UNIT-IV

Attractions: Natural Attractions: Mountains, Beaches, Forests, Islands, National parks and Wild Life Sanctuaries, Cultural Attractions: Fairs and Festivals, Paintings, Museums, Historical Monuments, Handicrafts, Cuisines.

UNIT-V

Activities- Sports - Winter and summer sports – Mountaineering, Trekking, Skiing, Skating, **Water Bases Sports:** White water rafting, River Crossing, Angling, Surfing, Kayaking, Boating, Parasailing, - Aero sports: Hand Gliding, hang gliding, Ballooning, Bungee Jumping.

BASICS OF MANAGEMENT

Subject Code: BTA03

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Introduction to Management:

Concept, Nature, functions, process, Traits of a successful manager and managerial role. Management and society: Business ethics and social responsibilities.

UNIT-II

Planning: Nature, purpose, Types and process of planning.

UNIT-III

Organizing:

Concept of organizing and organization. Line & Staff, Span of control. Delegation
Decentralization Organization structure.

UNIT-IV

Directing:

Communication-Process and types of communication, Barriers and principles of effective communication, Motivation- Meaning, Theories – Maslow and Herzberg, Leadership
Co-ordination: Meaning, definition, Principles of co-ordination, Techniques of effective co-ordination

UNIT-V

Leadership:

Concept, Qualities of a successful leader: factors influencing performance of leaders. Styles of leadership, Management Grid. Controlling – Process. Methods and techniques.

GEOGRAPHY OF TOURISM-1

Subject Code: BTA04

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

India: General introduction, states & capitals, physiographic units, seasons and climatic regions & their impacts on tourism. Natural vegetation & wild animals of India & wild life tourism, India: a destination for all reasons & seasons.

UNIT-II

The Northern Mountains: General introduction of the Himalayas & other ranges, their importance for religious, hill station & adventure tourism. A case study of Sri Nagar, Shimla, Nainital, Darjeeling & Gangtok.

UNIT-III

The Central Plains: General introduction of deserts & central plains. Their importance for cultural, religious & adventure tourism. A case study of Amritsar, Jaipur, Delhi, Lucknow, Kolkata.

UNIT-IV

The Peninsula: General features of Indian peninsula with their tourism significance. A case study of Bhopal, Khajuraho, Hyderabad, Bangalore, Ooty

UNIT-V

The Coastal Plains and Islands: General features of coastal regions, their importance for religious, cultural & beach tourism. A case study of Mumbai, Goa, Cochin, Chennai, Andaman & Nicobar.

Recommended Books

1. Ahmad, Aizaz, 'General Geography of India', NCERT, New Delhi.
2. Goh Cheong Long, 'An Economics Atlas of India', Oxford University.
3. 'National Atlas of India', Govt. of India Publication, Calcutta, 1997.
4. 'Atlas of World', Oxford Press, New Delhi.
5. R.L. Singh, 'A Regional Geography', National Geographical Society of India, Varanasi, 1989.
6. 'Manorama Year Book', 2009
7. 'India Year Book 2009', Publication Division. Govt. of India, New Delhi.
8. 'Tourism Planner'.
9. Tour Brochures etc.
10. 'Lonely Planet – India'.
11. Ravi Bhushan Kumar, 'Coastal Tourism & Environment', AOH Publishing Corporation, New Delhi.
12. R.N. Pillai, 'Pilgrimage in India'.
13. M.S. Kohli, 'Mountaineering in India', Vikas Publishing House, New Delhi.

CUSTOMER CARE & INTERPERSONAL SKILLS

Subject Code: BTA05

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Who is a customer? internal customer, external customer

Who is a service provider?

Why are some service providers better than others?

Who is a satisfied/ dissatisfied customer?

What are the consequences of satisfied/ dissatisfied customers?

UNIT-II

What is Quality?
What is customer satisfaction?
What is customer delight?

UNIT-III

Key areas of customer care
The product or the service itself
Sales and promotion of the service
After sales support to the customer
Organizational culture

UNIT-IV

Customer Feedback, feedback tools
Converting Customer care philosophy into everyday action
Developing customer trust and loyalty - online
Grooming and Etiquette
Telephone Handling Skills

UNIT-V

Complaint Management
Transactional Analysis in Customer Care
Customer care in airlines
Customer care in hotels

Case studies and Role Plays

TOURISM PRODUCT OF INDIA

Subject Code: BTA06

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Natural Resources: Wildlife Sanctuaries, National Parks and Natural Reserves in India (Jim Corbett Tiger Reserve, Bharatpur Bird Sanctuary, Valley of Flowers, Kanha, Kaziranga, Sasan Gir, Dachigam, Ranthambhore and Keoladeo Ghana)
Hill Stations: Mussoorie, Srinagar, Shimla, Munnar and Ooty.
Beaches and Islands: Beaches in Goa, Kerala, Orissa. Andman Nicobar & Lakshdweep islands.

UNIT-II

Popular Tourist Resources: Delhi, Agra, Jaipur, Khajuraho, Varanasi, Mumbai, Kolkata, Chennai, Bangalore, Hyderabad, Mahabalipuram, Madurai, Tanjore, Hampi, Ellora, Elephanta, Konark and Fatehpur Sikri
Monuments: Qutub Minar, Atala Mosque (Jaunpur), Kirtistambha (Chittor), Sher Shah Suri's Tomb, Sikandara, Red Fort (Delhi), Taj Mahal, Golden Temple (Amritsar), Hawa Mahal (Jaipur), Bara Imambara (Lucknow).

UNIT-III

Pilgrimage Destinations: Hindu: Charo Dham Yatra, Jyotirlinga Yatra, Devi Yatra Vindhyaachal (U.P.) Kamakhya (Assam), Vaishnavadevi, Kashi, Prayag, Gaya, Ayodhya, Mathura-Vrindavana, Allahabad, Ujjain, Hardwar, Nasik, Gangasagar.
Buddhist: Lumbini, Bodhgaya, Sarnath, Kushinagar, Sharavasti, Sankisa, Vaishali, Rajgriha, Kapilvastu, Nalanda, Sanchi, Ajanta.
Jain: Kashi, Pavapuri, Shatrunjaya, Girnar, Mt. Abu, Sharavanbelgola, Palitana
Muslim: Ajmer Sharif, Nizamuddin (Delhi), Fatehpur Sikri, and some important Mazars.
Sikh: Patna, Nanded, Guru-ka-Tal (Agra), Amritsar.

Saint: Kabir, Tulasi, Raidas, Sankaracharya.

UNIT-IV

Fairs and Festivals: Kumbha, Pushkar, Sonapur, Dadari, Tarnetar, Chhatha, Pongal/Makar-Sankranti, Baishakhi, Meenakshi Kalyanam, Holi, Gangaur, Onam, Durga Puja, Ramalila, Diwali, Kartik Purnima (Dev Deepawali, Guru Parb), Dashahara (Kullu), Rathayatra, Nag Nathaiya (Varanasi), Bhrawafat, Id-ul-Fitr, Easter, Christmas, Carnival (Goa), Burhawa Mangal (Varanasi), Ganga Mahotsava, Taj Mahotsava, Khajuraho Mahotsava and Desert Festival.

UNIT-V

Handicrafts and Handlooms. History of Dance Styles and main Gharanas of North Indian Music. History of Drama in India and its present scenario.

Recommended Books

1. S.P. Gupta, K. Lal, M. Bhattacharya, 'Cultural Tourism in India'. D.K. Print, 2002.
2. M. Dixit and C. Sheela, 'Tourism Products', New Royal Book, 2001.
3. 'Oki Morihiro, Fairs and Festivals', World Friendship Association, Tokyo, 1988.
4. Mitra, Devla, 'Buddhist Architecture', Calcutta.
5. Michell, George, 'Monuments of India', Vol. 1. London.
6. Davies, Philip, 'Monuments of India', Vol. II, London.
7. Brown Percy, 'Indian Architecture (Buddhist and Hindu)', Bombay.
8. Brown Percy, 'Indian Architecture (Islamic period)', Bombay.
9. R.E. Hawkins, 'Encyclopaedia of Indian Natural History'.
10. Vatsayana, Kapila, 'Indian Classical Dance', New Delhi.
11. Swami, Prayaganand, 'History of Indian Music'.
12. Jain, Jyotindra & Arti, Aggrawala, 'National Handicrafts and Handlooms Museum'.
13. H. Mode & S. Chandra, 'Indian Folk Art', Bombay.
14. R.J. Mehta, 'Handicrafts & Industrial Arts of India', New York.
15. Grewal, Bikram, 'Indian Wildlife'.

TOURISM INDUSTRY PROFILE

Subject Code: BTA07

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

Duration: 45 Hrs.

UNIT-1

Introduction To Luxury Railways

Luxury Trains in India

1. Royal Rajasthan on Wheels
2. Golden Chariot
3. Deccan Odessy

UNIT-II

Travel and Tourism Organizations

Chapter 1 - IATA

History, Growth and Development

IATA Goals

IATA Approval Membership

Chapter 2 - UFTAA

Introduction

Membership

Functions

Chapter 3 - FHRAI

Introduction

Membership
Functions

UNIT-III

Travel Agency and Tour Operations Business
Chapter 1 – Kuoni Destination Management, India
Introduction
Principle Services Offered
Chapter 2 – Thomas Cook
Introduction
Principle Services Offered

UNIT-IV

Accommodation Sector
Chapter 1 – Oberoi Hotels
Introduction
Activities of the Group
Oberoi/Philae Nile Cruiser
The Oberoi, New Delhi
The Oberoi Vanyavilas, Ranthambore

UNIT-V

Aviation Industry
Chapter 1 – Jet Airways
Introduction
Products and Services
Chapter-2 Kingfisher Airlines
Introduction
Products and Services

TOURISM MANAGEMENT

Subject Code: BTA08

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Introduction: Definition of management Concept-Development of management- managerial skills of tourism-management of tourism-components of tourism- accommodation- attractions-accessibility-management of environment.

UNIT-II

Management of Tourism Marketing: Segmentation-marketing mix-tour pricing- types of demand and supply and marketing research.

UNIT-III

Nature and Classification of Tourism: Basic nature of tourism, Nature of tourism: Leiper's Model, TGR, TR, TDR, Varied benefits of tourism, Indian concept of classification of tours/tourism.

UNIT-IV

Tourism Planning: Need for tourism planning, Essentials of planning, Eight-point planning process, Aims of tourism planning, Significance of planning.

UNIT-V

Infrastructure of Tourism Management: Structural components, Important tourist services, The seasonal character of tourism, Suggestions for improvement of tourism

Tourism Organizational Set up in India: Structure of department of tourism, NTO & its Functions.

GEOGRAPHY OF TOURISM-2

Subject Code: BTA09

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Brief introduction of continents & oceans. Map reading. Greenwich mean time. International date line. Elements of weather & climate. Climatic zones of the world. Natural vegetation of the world. Main tourist activities in different climatic zones.

UNIT-II

Asia: General geographical features; physiography, climate, vegetation main countries, capitals & their tourist attractions. A Case study of Japan, Singapore, Sri Lanka, Saudi Arabia.

UNIT-III

Europe: General geographical features; physiography, climate, vegetation. Main countries, capitals & their tourist attractions. A Case study of France, United Kingdom, Switzerland, Netherlands

UNIT-IV

Americas: General geographical features of North & South Americas; physiography, climate, vegetation, main countries, capitals & their tourist attractions. A Case study of the U.S.A. (only 5 destinations), Canada, Brazil, Cuba.

UNIT-V

Other Countries: General geographical features of given countries with information about physiography, climate, vegetation & tourist attractions of South Africa, Egypt, Australia, New Zealand.

HUMAN RESOURCE MANAGEMENT

Subject Code: BTA10

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Introduction to Human Resource Management: Definitions, Functions of Personnel Management, Objectives of Personnel Management, Qualities of a Good Personnel Manager.

UNIT-II

Human Resource/Man Power Planning: Definitions, Need of Manpower Planning, Objectives of Hr Planning, Advantages Disadvantages of Manpower Planning, Process/Steps.

UNIT-III

Recruitment: Definition, Sources of Recruitment, Internal Sources of Recruitment & (Advantages, Dis-Advantages), External Sources (Advantages, Disadvantages)
Selection: Definition, steps in Selection Process (Application Blank, Initial Interview of the Candidates, Employment Tests, Interviews, Checking Reference, Physical or Medical Examination, Final Interview & Induction).

UNIT-IV

Training and Development: Training Definition, Importance of Training, The Training Process, Training Methods (On The Job- Job Instruction Training, Job Rotation, Special Assignments) off the job (Vestibule Training), Lecture Method, Conference. Method, Seminar or Team Discussion, Case Study Method Development- Definition, Need, Methods - On The Job -Off The Job

Performance Appraisal: Definition, Objectives, Process, Methods-

-Past Oriented
-Future Oriented

UNIT-V

Job Evaluation: Definition, Objectives, Principles, Methods-Non Analytical, Analytical
Employee Remuneration: Definition, Components, Factors Influencing Employee Remuneration, Concept of Wages.

DIMENSIONS OF INTERNATIONAL TOURISM

Subject Code: BTA11

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Trends and critical issues of World Tourism, Understand the supply and demand of Tourist Travel, Reasons for Tourism Flow patterns, Outline the evolution of International Travel and transport developments that have affected tourism.

UNIT-II

The Role of the State in Tourism

National Tourism Organization
Department of Tourism, India
ITDC
DGCA
AAI
FHRAI

UNIT-III

Travel Retailing

Travel Agency & Tour Operations
Functions of a Travel Agency
Departments of Travel Agency
Package Tours & its Components
Client Handling activities in Travel Agency
Star Cruises: Overview

UNIT-IV

Travel Industry Fairs

Participation Advantages
ITB
WTM
PATA Travel Mart
ICCA

UNIT-V

International Tourism Organizations

Need & Significance for Organizations
UFTAA
WATA
ASTA
WTO
PATA & PATA Chapters
IATA
ICAO
IHA

GEOGRAPHY OF TOURISM-3

Subject Code: BTA12

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

Duration: 45 Hrs.

UNIT-I

Geography of travel and tourism - definitions and concepts
The tourism system - tourism-generating areas, destination areas, transit zones

UNIT-II

The multiple forms tourism - destinations, characteristics, types of tourists, distance travelled, the determinants of demand for tourism - travel propensity and frequency, influence of the economic, demographic, political environment, personal variables, barriers to travel.

UNIT-III

Geography of resources for tourism - the nature of tourist resources at different spatial scales, resources and "unique selling propositions"

UNIT-IV

The importance of climate - climatic variables affecting tourism, the distribution of world climates (zones, regions) and their significance for tourism

UNIT-V

The importance of transport in tourism - spatial interaction between components of the tourist system, transport elements, costs, modes, routes, networks, air and surface transport, Future geography of travel and tourism - some prospects.

SALES & MARKETING IN TOURISM

Subject Code: BTA13

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

Duration: 45 Hrs.

UNIT-I

Marketing- Definition, Marketing Concepts (Need, Want, Demand, TQM, Product, Customer value, Customer satisfaction, Exchange & Transaction, Market), Difference between marketing and Selling, Marketing Orientation (Product concept, Production concept, Selling concept, Marketing concept, Societal marketing concept), Modern marketing concepts (Green marketing, Mobile marketing, Cross-cultural marketing, Web marketing, Tele marketing, Relationship marketing, Buzz marketing)

UNIT-II

Analysis and Selection of Market: Measuring and forecasting tourism demand; Forecasting methods, Managing capacity and demand. Market segmentation and positioning (STP).

UNIT-III

Marketing Mix Elements- 7 P's of marketing –Product (Levels, Classification, Branding, Packaging, PLC) Place (Distribution channels Definition, why use intermediaries? How they add value? Channel functions, Marketing intermediaries in hospitality industry) Price (Definition, Marketing strategies, Initiating price change), Promotion (Definition, Functions, Promotion mix – Advertising, Sales Promotion, Personal Selling, Public Relations), People, Processes, Physical Evidence.

UNIT-IV

Sales Management- Definition, sales person's role, prospect management, buying process, AIDA's theory of selling, personal selling process, closing strategies, function of sales management.

UNIT-V

Public Relations: Definition / Meaning, Need for public relations, The concept of public – internal / external publics, Comparison between advertising, promotion, publicity and pr, PR tools – media / non-media, PR Campaign, PR in Tourism.

BUSINESS COMMUNICATIONS

Subject Code: BTA14

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Introduction: Meaning, Role, Functions, Importance and essentials of Communication in Business Organizations, Process of Business Communication, Communication Models, Barriers to effective communication. Importance of Communication in: Negotiation, Conflict Management

UNIT-II

Classification of Communication: Formal & Informal, Personal, Inter-personal, Group and Mass, Vertical & Horizontal, Upward & Downward, One-way & Two-way, Verbal & Non-verbal, Understanding – proxemics, kinesics.

UNIT-III

Business Correspondence: Principles of Letter Writing, Types of Business Letters – Sales letters, Requests, Response, letters, Complaint letters, Adjustment letters, Inquiry appeals, Resume Writing, Report Writing, Cross Cultural Communication., Importance of Dressing / Manners & Etiquettes in Business Communication.

UNIT-IV

Presentation Skills: What is a presentation – elements of presentation – designing a presentation. Advanced visual support for business presentation- types of visual aid
NEGOTIATIONS SKILLS What is negotiations – nature and need for negotiation – factors affecting negotiation – stages of negotiation process – negotiation strategies.

UNIT-V

Group Communication: Meetings –Planning meetings – objectives – participants – timing – venue of meetings – leading meetings. Media management – the press release-press conference – media interviews Seminars – workshop – conferences. Business etiquettes.

BASICS OF COMPUTER-1 LAB.

Subject Code: BTA15

L T P C
0 0 2 1

UNIT-I

Basic Computing: Computer Fundamentals –Theory -Definitions, Elements of a computer system, -Hardware Features and uses, -Components of a computer.

UNIT-II

Windows Operations: Creating folders/shortcuts/renaming files/deleting files, exploring windows, quick menu

UNIT-III

Office Work: The study and use of typical micro-computer storage software packages such as word processor, spreadsheet and MS Office (Word, Excel, PowerPoint, Access and Outlook Express).

UNIT-IV

Internet: E-mail and electronic highway, Internet.

UNIT-V

Computer Presentation: Introduction to a statistical package (SPSS), Presentation Graphic Tools. Multimedia technology. Role of Computers in Travel and Tourism.

Recommended Books

1. T. Lucey, 'Management Information Systems', D.P. Publications.
2. Clark A, Small Business Computer Systems, Hodder & Stoughton, **1987**.
3. L.K. Parkinson & S.T. Parkinson, 'Using the Micro-computer in Marketing', McGraw Hill, **1987**.
4. B. Braham, 'Computer System in Hotel & Catering Industry', Cassell, **1988**.

FRONT OFFICE OPERATIONS

Subject Code: BTA16

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Front Office Operations: Terminology, Front office functions: Information, Reservations, Reception, Lobby, Cashiering, Night Auditor, Telephones, Emergencies. Front office's interaction with other departments.

UNIT- II

Reservation System and Procedure: Manual Reservation, Automated Reservation, Central Reservation Office, Individual Reservations, Group Reservations, Walk-ins, Reservation Holder, Room Assignment.

UNIT- III

Determining Room Availability and Assignment: Terminology (room revenue, corporate traveler, no-show, due-out, turn-away, walk-in, group booking, stay-over, full-house management, run of the house, occupancy rate, blocked rooms, yield management, and guaranteed payment)

UNIT-IV

Registration Procedure: Registration Card / Form, Payment Method, Rooming, Housekeeping Report, Special Situation, Special Guests, Reports, Overbooking.

UNIT-V

Cashier and Billing Procedures: Terminology (source documents, voucher, department journal, folio, posting, city ledger, cash sheet, petty cash, float, and point of-sale), Billing procedures, Guest Accounting cycle, Charges, Late Charges, Cashier's Responsibilities, Payment.

Night Auditor: Purpose of Hotel Night Audit, Elements necessary for completing night audit, Manual and Automatic Posting, Process of Night Auditing.

Recommended Books

1. Robert Woods, Jack Ninemeier, David Hayes, & Michele Austin, 'Professional Front Office Management', **2007**. Pearson/Prentice Hall, ISBN 0-13-170069-3.
2. Sudhir Andrew, 'Front Office Operations'.

ENGLISH-1

Subject Code: BTA17

L T P C
4 0 0 4

Duration: 45 Hrs.

Grammar

1. Articles, Parts of Speech, Tenses, Voice
2. Direct and Indirect Narration, Transformation of Sentences, Idioms and
3. Proverbs

4. Common Errors in English
5. Vocabulary
6. Punctuation
7. Story Construction
8. Paragraph Writing

TOTAL QUALITY MANAGEMENT

Subject Code: BTA18

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

Duration: 45 Hrs.

UNIT-I

Origin of the Quality Movement, Historical Development of the Quality Movement, Concept of Total Quality Management, The Quality Gurus, The Baldrige Quality Award, Total Quality Management, Key Elements of TQM.

UNIT-II

The Total Quality Management Tool Kit, Definition of the Seven Statistical Tools, Pareto Diagrams, Cause & Effects Diagram, Histograms, Control Charts, Scatter Diagram, Graphs, Check Sheets

UNIT-III

Quality Aspects in a Service Organization, Why Service organizations are different? What matters most to customers? Managing Quality in Service organizations, Quality Control, Just- in-time concept, Deming's Principle.

UNIT-IV

Human Resource Development and Quality Management, Role of HRD, Training and development, Changes related to performances and its measurement, Importance of Frontline staff, building a Quality organization, Organizing and implementing- Total Quality Management, Roles in organizational transition to TQM.

UNIT-V

Small groups and Employee involvement, Teams for TQM., Quality Circles, Benchmarking, Educating the customers about Quality, ISO Series, Obstacles to TQM

AUTOMATION IN TOURISM INDUSTRY, AIRLINES & HOSPITALITY

Subject Code: BTA19

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

Duration: 45 Hrs.

UNIT-I

Automation in the tourism industry:

An Introduction

Importance of Information Technology in Tourism

Automation in the hotel, airlines and travel business

UNIT-II

IATA:

Importance

Role

History

UNIT-III

Introduction to CRS:

The need for a CRS system

History of the CRS system

Use of the CRS by Airlines and Travel Agents

Benefits and importance of the CRS system to the Travel trade
Introduction to Amadeus
Basic commands applicable to Amadeus+ Practical

UNIT-IV

Ticketing Process:

Components of an electronic ticket
Types of tickets: Manual ticket/ Automated Ticket/e-ticket
Ticket coupons
Difference between I ticket and e-ticket
What are Special fare?
Various kinds of special fares

UNIT-V

Billing and Settlement Plan (BSP)

What is BSP?
Advantages of BSP to travel Agents
Describe various stages of BSP operations
A short introduction to Standard Traffic Documents (STD)

TRAVEL AGENCY AND TOUR OPERATIONS

Subject Code: BTA20

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

Duration: 45 Hrs.

UNIT-1

ITINERARY PLANNING

Itinerary and its importance
Types of Itineraries
Factors to keep in mind while designing an Itinerary
Itineraries for Inbound and domestic tourists: Golden triangle, Rajasthan tour, Kerala tour
Popular outbound Itineraries of Singapore, Malaysia, Thailand, Europe Tour, Australia Tour

UNIT-II

PACKAGE TOURS

Package tour and its components
Practical components of a standard package tour
Designing & Costing of a package tour

UNIT-III

VISAS

Difference between Passport and Visa
Types of Passport & Visa
Preparing Visa cases
Formalities required for Various Visas like: Schengen, Dubai and Far East

UNIT-IV

FOREX

Basic overview of FOREX
Forex Terminology- TCs, Cash currency, BTQ, LERMS

UNIT-V

HOW TO SET UP A TRAVEL AGENCY

IATA Rules and Regulations.

CASE STUDY DISCUSSION

(Including the profile of the company, area of specialization, Tag Lines, CEOs and Top shots)

Thomas Cook
La Passage to India
Travelguru.com

AIRLINES MANAGEMENT

Subject Code: BTA21

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

History of Aviation, Types of Aircrafts, Airline Terminology

UNIT-II

Cabin Crew, Announcements, Airport Jobs

UNIT-III

Airport Codes, Airline Codes, Phonetic Alphabet

UNIT-IV

Airport Lounges, How airports work, Baggage Handling, Airport Security

UNIT-V

World Organizations (IATA, ICAO, DGCA)

Case Study Discussions:

Jet Airways, Kingfisher, Indian Airlines

British Airways, Fly Emirates, Singapore airlines.

BASICS OF COMPUTERS–II LAB.

Subject Code: BTA22

L T P C
0 0 2 1

MS-Word: Starting Word, new documents, entering text, changing text, aligning, underlining, and justifying text. Use of tabs. Tables – creation, adding rows and columns, splitting, and combining cells, Borders. Saving, closing, and operating documents. Adding headers and footers. Print preview, and printing a document.

Mail Merge: creating main document, letter, envelope and data source. Adding and removing fields from data source.

Power Point (Presentation Software): Basic concept of presentation software. Standard, formatting, and drawing toolbars in PowerPoint and their use. Creating and opening a presentation. Creating, deleting, opening, and copying slides. Closing and saving a presentation. Use of slide sorter, adding header/footer. Use of master slides and colour box. Use of animation features. Inserting pictures, resizing pictures. Inserting organization chart. Use of auto content wizard.

Excel: Its structure and capabilities, drawing toolbars. Selection of cells, entering and editing data and text, entering formulae. Operating Excel: concept of workbook and worksheet, serial fill, formatting text in cells and on the worksheet. Entering and pasting formulas, creating a chart. Excel Functions: max, min, date, count.

Internet: A brief history of origin of internet. Various applications of Internet such as email, information gathering, searching, chatting, downloading etc. Use of search engines, internet explorer and e-mail messages. Netiquettes. Use of internet in various fields.

HOSPITALITY MANAGEMENT (F&B, HOUSEKEEPING)

Subject Code: BTA23

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

Duration: 45 Hrs.

UNIT-I

The Food & Beverage Service Industry: Introduction to the Food & Beverage Industry, Classification of Catering Establishments (Commercial & Non-Commercial), Introduction to Food & Beverage Operations (Types of F & B Outlets).

UNIT-II

Types of Food & Beverage Service: Table Service –English / Silver, American, French, Russian, Self Service – Buffet & Cafeteria, Specialized Service – Gueridon, Tray, Trolley, Lounge, Room etc., Single Point Service – Take Away, Vending Kiosks, Food Courts & Bars, Automats, Mis-en-place & Mis-en-scene.

UNIT-III

Food & Beverage Service Personnel: Food & Beverage Service Organization, Structure - Job Descriptions & Job Specifications, Attitudes & Attributes of Food & Beverage personnel, competencies, Basic Etiquettes, Interdepartmental relationship.

UNIT-IV

Organizing The Housekeeping Department

1. Housekeeping Personnel
2. Organizational structure of a large Hotel (Chart)
3. Importance of Job Description of Housekeeping Personnel
4. Job Description of:
 - # Executive Housekeeper
 - # Housekeeping Supervisor
 - # Uniform/ Linen room supervisor
 - # Night Supervisor, Room Attendant etc.

UNIT-V

Housekeeping terms, Importance & Functions of Housekeeping

House Keeping Areas – Front-of-the-house and Back-of-the-house areas, Guest Rooms, Public

Areas, Maids Room, Indoor and Outdoor Areas, Co-ordination with other Departments like Front Office, Engineering, F & B, Kitchen, Security, Purchase, HRD, Accounts.

ENGLISH-2

Subject Code: BTA24

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

Duration: 45 Hrs.

Precis Writing, Letter writing, Essays.

Recommended Books

C.M. Sharma, 'Twelve Short Stories', Oxford University Press.

Reading Comprehension

-Listening Skills

-Speaking-Extempo, Art of public speaking, Presentation, Group Discussions

- Inspirational Stories: Great Industry Personalities

TOURISM POLICY IN INDIA

Subject Code: BTA25

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

Duration: 45 Hrs.

UNIT-I

Tourism Planning in India

Concept, Need, Objective of tourism planning
Five Key Steps in Tourism Planning Process
Three Level Tourism Planning
Product life cycle and their applicability in tourism planning
Urban and rural tourism planning
Eleventh Five Year Plan an Overview
Role of state and local tourism organizations in tourism planning

UNIT-II

Policy Formulation in India

Concept of Policy,
Formulating tourism policy
India's National Tourism Policy, 1982 and 2002
National Tourism Action Plan, 1992
Role of government, public and private sectors

UNIT-III

Tourism Scenario in India

Introduction to present scenario of tourism
Brief History of Tourism in India
Recognition of tourism as an Industry by Government
Investment opportunities and government policy for investment in hotel/tourism industry.
Sources of funding.
TFCI: Tourism Finance Corporation of India (TFCD)-Aims, Objectives, Organization and Functions

UNIT-IV

International Agreements:(An Introduction)

Chicago Convention, Warsaw Convention, Open Sky Policy, Bermuda Convention, Euro Agreement, Schengen Agreement

UNIT-V

CASE-STUDY:

Rajasthan Tourism Development Corporation Tourism Planning and Policy
Uttaranchal Tourism
Himachal Tourism
J&K Tourism
Kerala,
Madhya Pradesh

RESORT MANAGEMENT

Subject Code: BTA26

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

Duration: 45 Hrs.

UNIT-I

Resort Concept: Characteristics of Resort Management as opposed to Hotel Management, Historical Perspective, Indian Scenario.

UNIT-II

Resort Planning: Preliminary Consideration in Resort Planning and Development and Phases of Resort Planning and Development. Trends and factors in Developed Tourist Markets leading to growth of Resort Concept.

UNIT-III

Factors Affecting Rate: Basic Elements of a Resort Complex: Loading facilities, landscaping, Dining and drinking facilities, Family Oriented Services, shops and services, Entertainment; Use of Community Resources.

UNIT-IV

Resort Management: Resort Management and Sales Promotion: Research and Analysis: The environment, current market, properly analysis,

UNIT-V

Market segmentation and potential guest markets, Tools of marketing, Advertising, Promotion and Publicity.

DESTINATION MARKETING AND MANAGEMENT

Subject Code: BTA27

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

Duration: 45 Hrs.

UNIT-I

Case Studies: Golden Triangle, Pilgrimage Tourism, Cultural Tourism

UNIT-II

Adventure Tourism, Incentive Travel, Health Tourism

UNIT-III

Wildlife Tourism, Educational Tourism, Agro-Tourism/Rural Tourism, Beach Tourism, Golf Tourism

UNIT-IV

Introduction to Destination marketing, Environment of Destination, Destination marketing plan, Consumer buying Behavior

UNIT-V

Destination Product, Destination Pricing, Distribution Channel, Promotion I, Promotion II

RESEARCH METHODOLOGY AND MANAGEMENT DECISIONS

Subject Code: BTA28

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

Duration: 45 Hrs.

1. Introduction to Research Methodology
2. Defining the Research Problem
3. Research Design
4. Sampling Design
5. Methods and Techniques of Data Collection
6. Processing and Analysis of Data
7. Data Presentation and Analysis
8. Report Writing and Presentation
9. Role of Information Technology in Research

CONFERENCE AND EVENT MANAGEMENT

Subject Code: BTA29

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Event Management: Role of events for promotion of tourism, Types of Events- Cultural, festivals, religious, business etc. Need of event management, key factors for best event management.

UNIT-II

Event Planning, Event Marketing, Event Evaluation.

UNIT-III

Management of Conference at Site, Trade shows and exhibitions, principal purpose, types of shows, benefits, major participants, organization and membership, evaluation of attendees. Convention/exhibition facilities; Benefits of conventions facilities, Inter-related venues, Project planning and development.

UNIT-IV

Budgeting a Conference Exhibition: Use of Budget preparation, Estimating, fixed and variable costs, cash flow, sponsorship and subsidies. Registration, Seating Arrangements, Documentation, interpreting press relation, Computer Graphics, Teleconferencing, Recording and Publishing Proceedings; Interpretation and language.

UNIT-V

Role of travel Agency in the management of conferences. Hotel Convention Service Management: Human Resources Management Transportation, Group Fares, Airline Negotiation, Extra Services, Cargo Transportation. History and function of ICCA, Role of ICCA, Roles and function of ICIB.

INDUSTRIAL TRAINING & PROJECT

Subject Code: BTA30

L T P C
0 0 30 15

Industrial Training & Project with close monitoring by the ITFT.

MRSPTU BACHELOR OF MANAGEMENT STUDIES (AIRLINES, TOURISM AND HOSPITALITY) (3 YRS.) SYLLABUS (SEMS. 1-4) 2017 BATCH ONWARDS

SEMESTER 1 st		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BHOM1-101	Basics of Tourism	4	0	0	40	60	100	4
BHOM1-102	Geography for Tourism	4	0	0	40	60	100	4
BHOM1-103	Indian Society and Culture	3	0	0	40	60	100	3
BHOM1-104	Business Communication	3	0	0	40	60	100	3
BHOM1-105	Principles of Management	3	0	0	40	60	100	3
BHOM1-106	Accounting for Managers	3	0	0	40	60	100	3
BHOM1-107	Event Management Report	2	0	0	100	0	100	2
Total		22	0	0	340	360	700	22

**During first semester student will organise/participate in an event field trip will be after first semester*

SEMESTER 2 nd		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BHOM1-208	Components of Tourism	4	0	0	40	60	100	4
BHOM1-209	Tourism Products of India: Art and Architecture	4	0	0	40	60	100	4
BHOM1-210	Legal Environment for Tourism	4	0	0	40	60	100	4
BHOM1-211	Introduction of Statistics	3	0	0	40	60	100	3
BHOM1-212	Business Economics	3	0	0	40	60	100	3
BHOM1-213	Environment Studies	2	0	0	0	100	100	2
BHOM1-214	Field Trip Report	2	0	0	100	0	100	2
Total		22	0	0	300	400	700	22

***Leadership Development Camp (Adventure Tour) will be after second semester or during third semester*

MRSPTU BACHELOR OF MANAGEMENT STUDIES (AIRLINES, TOURISM AND HOSPITALITY) (3 YRS.) SYLLABUS (SEMS. 1-4) 2017 BATCH ONWARDS

SEMESTER 3 rd		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BHOM1-315	Travel Agency & Tour Operation	4	0	0	40	60	100	4
BHOM1-316	Dimensions of International Tourism	4	0	0	40	60	100	4
BHOM1-317	Computer Applications	2	0	0	40	60	100	2
BHOM1-318	Computer Applications (Lab.)	0	0	2	60	40	100	1
BHOM1-319	Front Office Operations- Reservation & Registration	4	0	0	40	60	100	4
BHOM1-320	English Language	2	0	0	40	60	100	2
BHOM1-321	Tourism Transportation	4	0	0	40	60	100	4
BHOM1-322	Tourism Products of India (Regional)	4	0	0	40	60	100	4
Total		24	0	2	340	460	800	25

SEMESTER 4 th		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BHOM1-423	Hospitality Management (focus on F&B and H.K.)	4	0	0	40	60	100	4
BHOM1-424	Airlines Management	4	0	0	40	60	100	4
BHOM1-425	Foreign Language (French)	3	0	0	40	60	100	3
BHOM1-426	Human Resource Management	3	0	0	40	60	100	3
BHOM1-427	Tourism Geography (world)	4	0	0	40	60	100	4
BHOM1-428	Tourism Policy & Planning	4	0	0	40	60	100	4
BHOM1-429	Sales, Marketing & P.R. in Tourism Industry	3	0	0	40	60	100	3
Total		25	0	0	280	420	700	25

BASICS OF TOURISM

Subject Code: BHOM1-101

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

Duration: 45 Hrs.

Course Objectives:

This course shall introduce learner to tourism's growth and development. The course also highlights the role of tourism as an economic intervention and its significance in economy; Course discusses the global nature of tourism, tourism product and emerging trends in tourism industry. It is also important to appreciate the future of tourism.

UNIT-I (12 Hrs.)

Historical Development, Transportation advances, the Concept of Tourism, Definition and meaning of tourist, traveller, visitor, excursionist & transit visitor, International tourist & Domestic Tourist, Typologies of Tourists.

UNIT-II (12 Hrs.)

Concept of demand & supply in tourism, factors affecting demand and supply in tourism. Tourism Product, Features of Tourism Product, Types of Tourism Product (TOPs, ROPs, BTEs), Difference of tourism product from other consumer products.

UNIT-III (11 Hrs.)

Tourism paradigms – Eco tourism, Green tourism, Alternate tourism, Heritage tourism, sustainable tourism, cultural tourism

UNIT-IV (10 Hrs.)

Factors inhibiting growth of tourism, travel industry in the 21st century, future tourism scenario.

Recommended Books

1. A.K. Bhatia, 'International Tourism: Fundamental and Practice', Sterling Publisher, New Delhi.
2. E.L. Hudman and D.E. Hawkins, 'Tourism in Contemporary Society: An Introductory Text, New Jersey, Prentice Hall.
3. K.K. Kamra and M. Chand, 'Basics of Tourism: Theory, Operation and Practice', Knishka Delhi.
4. D.E. Lundberg, The Tourist Business. New York: Van Nostrand.
5. Reinhold Mill, R.C. and A.M. Morrison, 'The Tourism System', Prentice Hall, New Jersey.
6. Robert McIntosh, W. Goeldner, R. Charles, 'Tourism: Principles, Practices and Philosophies, John Wiley and Sons Inc., New York, 1990.
7. P.N. Seth, 'Successful Tourism Management', Sterling Publisher, New Delhi.

GEOGRAPHY FOR TOURISM

Subject Code: BHOM1-102

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

Duration: 45 Hrs.

Course Objectives:

Geography is the basic edifice of tourism. The knowledge of geography shall give an extra edge to the students in designing the itineraries for the travellers, suggesting them various destinations to the clients for their travel etc.

UNIT-I (12 Hrs.)

Importance of Geography in Tourism: Geography and Tourism Interface, Geography- Locational Aspects: Latitude, Longitude, Location of Places, Map Reading, International Date Line, Time Zones.

UNIT-II (10 Hrs.)

Geography-Physical and Human Aspects: Relief, Climate, Flora & Fauna, Economy, Population, Transportation & Communication.

UNIT-III (12 Hrs.)

Case Studies of selected Indian States: Himachal Pradesh, Rajasthan, Uttar Pradesh and North Eastern Hill States (Relief, Climate, Natural Vegetation, Wildlife, Economy, Transportation, Fairs & Festivals, Important Tourist Centres of each State).

UNIT-IV (11 Hrs.)

Case Studies of selected Indian States: Madhya Pradesh Orissa, Kerala & Tamil Nadu (Relief, Climate, Natural Vegetation, Wildlife, Economy, Transportation, Fairs & Festivals, Important Tourist Centres of each State).

Recommended Books

1. B.G. Boniface and Chris Cooper, 'The Geography of Travel and Tourism Oxford', Butterworth Heinemann.
2. C.M. Hall and J. Page Stephen, 'The Geography of Tourism and Recreation: Environment, Place & Space', Routledge, London.
3. Pearce Douglas, 'Tourism Today: A Geographical Analysis', Longman, New York.
4. R.L. Singh, 'India- A Regional Geography', Varanasi: National Geographical Society of India.
5. N.P. Seth, 'Successful Tourism Management', Sterling Publisher, New Delhi.
6. Sarina Singh et. al., 'India', Lonely Planet Publications.

INDIAN SOCIETY AND CULTURE

Subject Code: BHOM1-103

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

Duration: 40 Hrs.

Course Objectives:

It is the Indian society and culture, which is the main tourist product of India. A thorough knowledge about this is required for any tourism professional, so that it can be utilised in future. This course will brief learner about the core understanding of Indian society, culture and various religions in India

UNIT-I (10 Hrs.)

Structure of Indian Society, Dharma, Varnashrama, development of caste system in India, Rites and Rituals, Multiplicity of Indian culture, unity in diversity, main characteristics of Indian culture

UNIT-II (10 Hrs.)

Major Religions of India

1. Hinduism, Buddhism, Jainism
2. Islam, Christianity and Sikhism

UNIT-III (10 Hrs.)

Fairs and Festivals of India

1. Ganapati-puja, Diwali, Holi, Dussehara, Puja-Navaratra, Pongal, Onam, Id, Muharram, Gurpurab, Christmas
2. Kullu-Dussehra, Maghi Mela, Baisakhi, Pushkar, Kumbh-Haridwar, Allahabad, Kurukshetra-Solar Eclipse

UNIT-IV (10 Hrs.)

1. Indian Cuisine, Traditional Dresses and Ornaments.
2. Dance and Music of India.

Recommended Books

1. V.S. Agrawal, 'The Heritage of Indian Art', Govt. of India Publication.
2. A.L. Basham, 'The Wonder that was India', Tapling Publishing Co., New York.
3. Tadgell Christopher, 'The History of Architecture in India', Penguin, New Delhi.
4. Daljeet and P.C. Jain, 'Indian Miniature Paintings', Brijwasi Art Press.
5. Dalmia Yashodhra, 'Contemporary Indian Art: Other Remedies', Marg Publisher, Mumbai.

6. Jagannathan Shankutala, 'Hinduism-An Introduction', Vakils, Feffer and Simon, Mumbai.
7. Keya John, 'India: A History', Harper Collins.
8. Pattanaik Devdutt, 'A Handbook of Hindu Mythology', Penguin Global.
9. Thapar Romila and Percival Spear, 'History of India', Orient Longman, New Delhi.

BUSINESS COMMUNICATION

Subject Code: BHOM1-104

L T P C
3 0 0 3

Duration: 40 Hrs.

Course Objectives:

The primary objective of Business Communication is to introduce the student to various forms of written and oral communication that are necessary in real-life business situations, perfecting verbal and non-verbal communication skills. Further this course will try to develop overall personality of students

UNIT-I (10 Hrs.)

Meaning, types, barriers and mechanism of communication, Non-verbal communication, organizational setting of business communication, Face to face conversation.

UNIT-II (10 Hrs.)

Professional use of telephone, interviews, group discussion and presentations

UNIT-III (10 Hrs.)

Customer care, appropriate mannerism, handling customers, nature of complaint, handling objections, responding to a complaint & negotiation, resolving conflict

UNIT-IV (10 Hrs.)

Basic personality traits-dress, address, gestures and manners; self-evaluation and development-identification of strength & weaknesses; overcoming hesitation & fear of facing public; corrective & developmental exercises- confidence building, mock interviews, role plays.

Recommended Books

1. Lynn Vander Wagen, 'Communication, Tourism & Hospitality', Hospitality Press Pvt. Ltd.
2. M.D. Jitendra, 'Organizational Communication', Rajat Publications.
3. Jon & Lisa Burton, 'International Skills in Travel & Tourism', Longman Group Ltd.
4. Rayon, V. Lesikar, John D. Petit, J.R. Richard, D. Irwin, 'Business Communication', INC.

PRINCIPLES OF MANAGEMENT

Subject Code: BHOM1-105

L T P C
3 0 0 3

Duration: 40 Hrs.

Course Objectives: This is the basic introductory course for learners of business management. This course helps learners to use management skills and techniques in all routine managerial activities in all aspects of businesses effectively and efficiently. Besides, the awareness about manager's role in handling the individuals in an organization will also be the focus of course

UNIT-I (10 Hrs.)

Introduction: Concept of Management, Scope, Functions and Principles of Management, Evolution of Management Thought

UNIT-II (10 Hrs.)

Planning: Process of Planning, Objectives: Policy & Procedures, Forecasting & Decision Making.

UNIT-III (10 Hrs.)

Organizing: Meaning, Importance, Patterns of Organization, Life & Staff relationship, Centralization & decentralization, Staffing: Nature & scope of Staffing, Manpower planning, Selection & Training, Performance & Appraisal

UNIT-IV (10 Hrs.)

Directing: Nature & scope of directing, Motivation & Leadership, Communication. Controlling: Concept of Managerial Control, Responsibilities of Managers

Recommended Books

1. R. Srinivasan and S.A. Chunawalia, 'Management Principles & Practice', Himalaya Publishing House, New Delhi.
2. L.M. Prasad, 'Principles & Practice of Management', Sultan Chand & Sons, New Delhi.
3. Koontz Harold and Heinz Weihrich, 'Management', Mc Graw Hill.
4. Burton and Thakur, 'Management Today- Principles and Practices', Tata McGraw Hill.

ACCOUNTING FOR MANAGERS

Subject Code: BHOM1-106

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

Duration: 40 Hrs.

Course Objectives:

The course intends to give learners an understanding of the accounting procedures in an organization. It will help to students to understand and apply the concepts of accounting to solve business problems.

UNIT-I (10 Hrs.)

Accounting-Meaning, Objectives: Classification, Accounting Equation, Accounting concepts and conventions, Profit and Loss Account and Balance Sheet

UNIT-II (10 Hrs.)

Finance & Financial Management: Meaning, aims, Nature, Scope, Objectives: and functions of financial management. Sources of finance, Statement of Changes in Financial position – Funds flow Analysis. Cash Flow Analysis – Ratio analysis.

UNIT-III (10 Hrs.)

Working Capital Management: Significance, Classification, Theory and Planning of Working Capital, estimating need for working capital, Techniques of Forecasting Working capital requirements.

UNIT-IV (10 Hrs.)

Cost Accounting, Cost Sheet/Tender/Marginal Costing & Break even Analysis, Budgetary Control.

Recommended Books

1. M. Pandey, Financial Management, Vikas Publishing, New Delhi.
2. M.Y. Khan, 'Financial Management', Tata Mc. Grand Hill Publishing Co. Ltd., New Delhi.
3. R.K. Sharma and Shashi K. Gupta, 'Management Accounting', Kalyani Publisher, Ludhiana.
4. R.L. Gupta, 'Booking keeping & Accounting', Sultan Chand, New Delhi.
5. T.S. Grewal, 'Introduction to Accounting', S. Chand.
6. Khan and Jain, 'Cost Accountancy', Tata McGraw Hill.

EVENT MANAGEMENT REPORT

Subject Code: BHOM1-107

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

Duration: 40 Hrs.

Course Objectives:

The objective of this course is to enable students to

- a) Develop and relate theory to practice
- b) Help themselves in making an informed career choice after exposure to the actual work environment
- c) Observing the systems, processes, interactions and human relations

Evaluation: Student presentations would be organised based on their reports. Presentations would be organized according to a predetermined schedule. A panel of teachers would evaluate the presentations, draft reports and participations. They would give students feedback on their reports. Based on feedback, students would submit a final report which would be evaluated by an internal examiner, nominated by the University, out of 50 points.

COMPONENTS OF TOURISM

Subject Code: BHOM1-208

L T P C
4 0 0 4

Duration: 45 Hrs.

Course Objectives:

This course will brief learners about the various components of tourism, enabling them to understand the concept of tourism in detail. In this course learner will try to relate tourism with its core sectors. This knowledge will be helpful in shaping a future tourism professional.

UNIT-I (12 Hrs.)

Approaches to study tourism: Product, Institutional, Managerial, Geographical and Economic Approach; Concept of interdisciplinary approach to study tourism; Travel Motivation: Categorization of tourists according to their motive of travel; S.C. Plog's Psychographic classification of tourist Motivations. Components of the tourism System.

UNIT-II (12 Hrs.)

Tourism Product; Tourism market- a basket of goods and services; Various types of Tourism Attractions; Linkages between the major components of Tourism Industry.

UNIT-III (11 Hrs.)

Transport as a Component of Tourism, Different types of transportations (Rail, Road, Water and Air); Travel Business through the ages.

UNIT-IV (10 Hrs.)

Accommodations Industry, Meaning of Accommodation, Types of Accommodation; Accommodation industry through the ages.

Recommended Books

1. R.A. Cook, L.J. Yale and J.J. Marqua, 'Tourism: The Business of Travel, New Jersey', Prentice Hall of India.
2. S. Medlik, 'Managing Tourism', Oxford, Butterworth Heinemann.
3. R.C. Mill and A.M. Morrison, 'The Tourism System', New Jersey, Prentice Hall of India.
4. J.R. Walker, 'Introduction to Hospitality', New Jersey, Prentice Hall of India.
5. P.N. Seth, 'Successful Tourism Management', Sterling Publisher, New Delhi.

TOURISM PRODUCT OF INDIA: ART AND ARCHITECTURE

Subject Code: BHOM1-209

L T P C
4 0 0 4

Duration: 45 Hrs.

Course Objectives:

A thorough knowledge about the various product offered in tourism is a must for a tourism professional who shall be, in the future involved in the product development and in product sales & marketing.

UNIT-I (10 Hrs.)

Elements of Indian Art; (Dance, Music, Literature, Cinema, Handicrafts).

UNIT-II (11 Hrs.)

Indian Sculptures: Ancient, Medieval and Modern; Evolution through the ages; Main tourist centres in India.

UNIT-III (12 Hrs.)

Indian Architecture: Ancient, Medieval and Modern; growth and development through the ages; Different style of architecture in India - Hindu, Buddhist and Islamic.

UNIT-IV (12 Hrs.)

Indian Paintings: Ancient, Medieval and Modern; Various schools of Paintings; Important Museums, Art Galleries and Libraries of India.

Recommended Books

1. V.S. Agrawal, 'The Heritage of Indian Art', Govt. of India Publication.
2. A.L. Basham, 'The Wonder that was India', Tapling Publishing Co., New York.
3. Tadgell Christopher, 'The History of Architecture in India', Penguin, New Delhi.
4. Daljeet and P.C. Jain, 'Indian Miniature Paintings', Brijwasi Art Press.
5. Dalmia Yashodhra, 'Contemporary Indian Art: Other Remedies', Marg Publisher, Mumbai.
6. Jagannathan Shankutala, 'Hinduism-An Introduction', Vakils, Feffer and Simon, Mumbai.
7. Key John, 'India: A History', Harper Collins.
8. Pattanaik Devdutt, 'A Handbook of Hindu Mythology', Penguin Global.
9. Thapar Romila and Percival Spear, 'History of India', Orient Longman, New Delhi.

LEGAL ENVIRONMENT FOR TOURISM

Subject Code: BHOM1-210

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

Duration: 45 Hrs.

Course Objectives:

A thorough knowledge about legal and regulatory environment for tourism is needed for any tourism professional. This knowledge is required for entrepreneurial and vocational endeavours.

UNIT-I (11 Hrs.)

Indian Contract Act, 1972, Contract of Indemnity and Guarantee, Contract of Agency; Partnership Act 1932, Sale of Goods 1930.

UNIT-II (10 Hrs.)

Companies Act 1956: Nature and Types of Companies, Formation, Memorandum and Articles of Associations Prospectus.

UNIT-III (12 Hrs.)

Negotiable Act 1881: Nature and types Negotiation and Assignment, Types of Negotiable Instrument, Cheques, Letter of Credit, Traveller letter of Credit, Commercial, Letter of Credit.

UNIT-IV (12 Hrs.)

Consumer Protection Act and Tourism, FEMA; Important regulations related with tourism and hospitality business.

Recommended Books

1. S.S. Malik, 'Ethical, Legal and Regulatory Aspects of Tourism Business', Delhi.
2. M. Rahul Sajani, 'Indian Tourism Business – A Legal Perspective'.
3. N.D. Kapoor, 'Mercantile Law', S. Chand and Co.
4. M.C. Kuchhal, 'Mercantile Law' Vikas Publishing House.
5. V.K. Batra & Kalra, 'Mercantile Law', Tata McGraw Hill.

INTRODUCTION TO STATISTICS

Subject Code: BHOM1-211

L T P C
3 0 0 3

Duration: 40 Hrs.

Course Objectives:

The objective of this course is to make the student acquaint with the basic knowledge of statistics, enabling them to appreciate and implement this knowledge in developing business strategies. The objective of this course is also to acquaint the participants with concepts and techniques used in statistics

UNIT-I (10 Hrs.)

Statistics: Definitions, Importance, uses in Business, Conducting Statistical Enquiry, Classification & Tabulation, Graphical Presentations, Frequency Distribution; Measures of Central Tendency, Measures of Variation, Skewness.

UNIT-II (09 Hrs.)

Correlation Analysis & Regression Analysis

UNIT-III (10 Hrs.)

Theory of Index Numbers: Meaning & Uses, Methods of Construction, Test of Consistency, Fixed & Chain Base, Wholesale & Consumer price index

UNIT-IV (10 Hrs.)

Time Series Analysis: Components, Trends, Least Square Methods, Moving Average & Ratio-&-Trend Methods

Recommended Books

1. S.P. Gupta, 'Statistical Methods', Sultan Chand & Sons, New Delhi.
2. C.R. Reddy, 'Quantitative Methods for Management', Himalaya Publishing House.
3. V.K. Kapoor, 'Statistics', Sultan Chand & Sons, New Delhi.

BUSINESS ECONOMICS

Subject Code: BHOM1-212

L T P C
3 0 0 3

Duration: 40 Hrs.

Course Objectives:

Most of managerial decision making has to have economic considerations. It is therefore important for a manager to understand the concepts of economics and refer to same in managing, planning and controlling. The objective of this course is to acquaint the participants with concepts and techniques used in economics both at micro and macro levels.

UNIT-I (10 Hrs.)

Concepts of Economics: Wealth Oriented View, Welfare View, Scarcity View, Development View, Nature, Scope and Application of Managerial Economics

UNIT-II (10 Hrs.)

Economics of Consumer Analysis: Law of Diminishing Marginal utility, Law of substitution & Consumer Surplus; Demand Analysis, Law of Demand, Determinants of Demand, Elasticity of Demand, Demand forecasting.

UNIT-III (10 Hrs.)

Economics of Production Analysis: Return to scale, Law of Returns and Production Function, Concept of Profit and Break-even Analysis.

UNIT-IV (10 Hrs.)

Concept of Price Determination: Price determination under perfect, imperfect, monopoly & oligopoly.

Recommended Books

1. O.P. Chopra, 'Managerial Economics', Tata MC Graw Hill.
2. P.L. Mehta, 'Managerial Economics', Sultan Chand, New Delhi.
3. H.S. Agarwal, 'Micro Economics', Ane Books.

4. Jeoldean, 'Managerial Economics', Prentice Hall of India.

ENVIRONMENT STUDIES

Subject Code: BHOM1-213

L T P C
2 0 0 2

Duration: 29 Hrs.

Course Objectives:

The knowledge of environmental studies is the need of hour these days. It is pre-requisite for every young professional to understand and appreciate this knowledge, so that he/she can use that knowledge in practice throughout his/her life

UNIT-I (8 Hrs.)

Environment Concept: Introduction, concept of biosphere-lithosphere, hydrosphere, atmosphere; Natural resources-their need and types; principles and scope of Ecology; concepts of ecosystem, population, community, biotic interactions, biomes, ecological succession.

Atmosphere: Parts of atmosphere, components of air; pollution, pollutants, their sources, permissible limits, risks and possible control measures.

Hydrosphere: Types of aquatic systems. Major sources (including ground water) and uses of water, problems of the hydrosphere, fresh water shortage; pollution and pollutants of water, permissible limits, risks and possible control measures.

Lithosphere: Earth crust, Soil-a life support system, its texture, types, components, pollution and pollutants, reasons of soil erosion and possible control measures.

UNIT-II (8 Hrs.)

Forests: Concept of forests and plantations, types of vegetation and forests, forests, factors governing vegetation, role of trees and forests in environment, various forestry programmes of the Govt. of India, Urban forests, Chipko Andolan.

Conservation of Environment: The concepts of conservation and sustainable development, why to conserve, aims and Objectives: of conservation, policies of conservation; conservation of life support systems-soil, water, air, wildlife, forests.

Management of Solid Waste: Merits and demerits of different ways of solid waste management-open, dumping, landfill, incineration, resource reduction, recycling and reuse, vermicomposting and vermiculture, organic farming.

UNIT-III (8 Hrs.)

Indoor Environment: Pollutants and contaminants of the in-house environment; problems of the environment linked to urban and rural lifestyles; possible adulterants of the food; uses and harms of plastics and polythene; hazardous chemicals, solvents and cosmetics.

Global Environmental Issues: Global concern, creation of UNEP; Conventions on climate change, Convention on biodiversity; Stratospheric ozone depletion, dangers associated and possible solutions.

Indian Laws on Environment: Indian laws pertaining to Environmental protection: Environment (Protection) Act, 1986; General information about Laws relating to control of air, water and noise pollution. What to do to seek redressal.

UNIT-IV (05 Hrs.)

Biodiversity: What is biodiversity, levels and types of biodiversity, importance of biodiversity, causes of its loss, how to check its loss; Hotspot zones of the world and Indian, Biodiversity Act, 2002.

Noise and Microbial Pollution: Pollution due to noise and microbes and their effects.

Human Population and Environment: Population growth and family welfare programme, Human Health, HIV/AIDS, Human rights.

Social Issues: Environmental Ethics: Issues and possible solution, problems related to lifestyle, sustainable development; Consumerisms and waste generation.

Local Environmental Issues: Environmental problems in rural and urban areas. Problem of congress grass & other weeds, problems arising from the use of pesticides and weedicides, smoking etc.

FIELD TRIP REPORT

Subject Code: BHOM1-214

L T P C
2 0 0 2

Course Objectives:

The objective of this course is to enable students to

- Develop and relate theory to practice
- Help themselves in making an informed career choice after exposure to the actual work environment
- Observing the systems, processes, interactions and human relations in the organization
- Get an opportunity to understand the expectations of industry
- Prepare themselves for final placements.

Evaluation: After the first semester students will undertake a trip to any popular itinerary in India and during the semester they would be submitting a report of the same. Student presentations would be organised based on their reports. Presentations would be organized according to a predetermined schedule. A panel of teachers would evaluate the presentations, draft reports and participations. They would give students feedback on their reports. Based on feedback, students would submit a final report, which would be evaluated by an internal examiner, nominated by the University, out of 100 points.

TRAVEL AGENCY AND TOUR OPERATIONS

Subject Code: BHOM1-315

L T P C
4 0 0 4

Duration: 45 Hrs.

Course Objectives:

The course aims to train the students in making travel plans (domestic and international) and designing of package tours.

UNIT-I

Itinerary Planning: Itinerary and its importance Types of Itineraries, Factors to keep in mind while designing an Itinerary, Itineraries for Inbound and domestic tourists: Golden triangle, Rajasthan tour, Kerela tour Popular Outbound Itineraries of Singapore, Malaysia, Thailand, Europe Tour, Australia Tour.

UNIT-II

Package Tours: Package tour and its components, Practical components of a standard package tour Designing & Costing of a package tour.

UNIT-III

Visas: Difference between Passport and Visa Types of Passport & Visa, Preparing Visa cases Formalities required for Various Visas like: Schengen, Dubai and Far East.

UNIT-IV

FOREX: Basic overview of FOREX.

Forex Terminology- TCs, Cash currency, BTQ, LERMS.

Recommended Books

- Mohinder Chand, 'Travel Agency Management', Anmol, Delhi.
- Chunk, James, Dexter & Boberg, 'Professional Travel Agency Management. Prentice Hall Publication'.
- Fay Betsy, 'Essentials of Tour Management', New Jersey: Prentice Hall Publication.
- J.M. Negi, 'Travel Agency and Tour Operation: Concepts and Principles', Kanishka Publishers & Distributors, New Delhi.

DIMENSIONS OF INTERNATIONAL TOURISM

Subject Code: BHOM1-316

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

Duration: 45 Hrs.

Course Objectives:

The course will provide in depth understanding to the learner regarding various agency of tourism in India and World. Students will also be exposed to the trends and issues of world tours.

UNIT-I

Trends and critical issues of World Tourism, Understand the supply and demand of Tourist Travel, Reasons for Tourism Flow patterns, Outline the evolution of International Travel and transport developments that have affected tourism.

UNIT-II

The Role of the State in Tourism: National Tourism Organization Department of Tourism, India ITDC, DGCA, AAI, FHRAI.

UNIT-III

Travel Retailing: Travel Agency & Tour Operations Functions of a Travel Agency Departments of Travel Agency Package Tours & its Components, Client Handling activities in Travel Agency Star Cruises: Overview.

UNIT-IV

Travel Industry Fairs: Participation Advantages ITB, WTM, PATA Travel Mart ICCA
International Tourism Organizations: Need and Significance for organizations, UFTAA, WATA, ASTA, WTO, PATA & PATA Chapters, IATA, ICAO, IHA.

Recommended Books

1. A.K. Bhatia, 'International Tourism: Fundamental and Practice', Sterling, Delhi.
2. Jon & Lisa Burton, 'International Skills in Travel & Tourism', Longman Group Ltd.
3. P. Jones and A. Pizam, 'The International Hospitality Industry: Organizational and Operational Issues', John Wiley, New York.

COMPUTER APPLICATIONS

Subject Code: BHOM1-317

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

Duration: 26 Hrs.

Course Objectives:

Student will be exposed to the theoretical aspect of basic computer application and various graphical tools.

UNIT-I

Basic Computing: Computer Fundamentals –Theory -Definitions, Elements of a computer system, -Hardware Features and uses, -Components of a computer.

UNIT-II

Windows Operations: Creating folders/shortcuts/renaming files/deleting files, exploring windows, quick menu.

UNIT-III

Office Work: The study and use of typical micro-computer storage software packages such as word processor, spreadsheet and MS Office (Word, Excel, PowerPoint, Access and Outlook Express).

UNIT-IV

Computer Presentation: Introduction to a statistical package (SPSS), Presentation Graphic Tools. Multimedia technology. Role of Computers in Travel and Tourism. E-mail and electronic highway, Internet.

Recommended Books

1. R.K. Taxali, 'PC Software Made Simple', Tata McGraw Hill.

2. V. Raganeman, 'Fundamental of Computers', Prentice Hall India.
3. V. Raganeman, 'Analysis & Designing Information System', Prentice Hall India.

COMPUTER APPLICATIONS LAB.

Subject Code: BHOM1-318

L T P C
0 0 2 1

Course Objectives:

The student will be give practical exposure of MS office.

UNIT-I

MS-Word: Starting Word, new documents, entering text, changing text, aligning, underlining, and justifying text. Use of tabs. Tables – creation, adding rows and columns, splitting, and combining cells, Borders. Saving, closing, and operating documents. Adding headers and footers. Print preview, and printing a document.

UNIT-II

Power Point (Presentation Software): Basic concept of presentation software. Standard, formatting, and drawing toolbars in PowerPoint and their use. Creating and opening a presentation. Creating, deleting, opening, and copying slides. Closing and saving a presentation. Use of slide sorter, adding header/footer. Use of master slides and colour box. Use of animation features. Inserting pictures, resizing pictures. Inserting organization chart. Use of auto content wizard.

UNIT-III

Excel: its structure and capabilities, drawing toolbars. Selection of cells, entering and editing data and text, entering formulae. Operating Excel: concept of workbook and worksheet, serial fill, formatting text in cells and on the worksheet. Entering and pasting formulas, creating a chart. Excel Functions: max, min, date, count.

UNIT-IV

Mail Merge: creating main document, letter, envelope and data source. Adding and removing fields from data source.

Internet: A brief history of origin of internet. Various applications of Internet such as email, information gathering, searching, chatting, downloading etc. Use of search engines, internet explorer and e-mail messages. Netiquettes. Use of internet in various fields.

Recommended Books

1. R.K. Taxali, 'PC Software Made Simple', Tata McGraw Hill.
2. V. Raganeman, 'Fundamental of Computers', Prentice Hall India.
3. V. Raganeman, 'Analysis & Designing Information System', Prentice Hall India.

FRONT OFFICE OPERATIONS - RESERVATION & REGISTRATION

Subject Code: BHOM1-319

L T P C
4 0 0 4

Duration: 45 Hrs.

Course Objectives:

The course aims to provide the basic understanding to the learners about basic front office operations and procedure.

UNIT-I

Front Office Operations: Terminology, Front office functions: Information, Reservations, Reception, Lobby, Cashiering, Night Auditor, Telephones, Emergencies. Front office's interaction with other departments.

UNIT-II

Reservation System and Procedure: Manual Reservation, Automated Reservation, Central Reservation Office, Individual Reservations, Group Reservations, Walk- ins, Reservation Holder, Room Assignment.

Registration Procedure: Registration Card/Form, Payment Method, Rooming, Housekeeping Report, Special Situation, Special Guests, Reports, Overbooking.

UNIT-III

Determining Room Availability and Assignment: Terminology (room revenue, corporate traveller, no-show, due-out, turn-away, walk-in, group booking, stay-over, full-house management, run of the house, occupancy rate, blocked rooms, yield management and guaranteed payment).

UNIT-IV

Cashier and Billing Procedures: Terminology (source documents, voucher, department journal, folio, posting, city ledger, cash sheet, petty cash, float, and point of-sale), Billing procedures, Guest Accounting cycle, Charges, Late Charges, Cashier's Responsibilities, Payment.

Night Auditor: Purpose of Hotel Night Audit, Elements necessary for completing night audit, Manual and Automatic Posting, Process of Night Auditing.

Recommended Books

1. J.R. Walker, 'Introduction to Hospitality', Prentice Hall, New Jersey.
2. U. Jones and S. Newton, 'Hospitality and Catering - A Closer Look', Cassel, Herndon.
3. James Socrates Bardi, 'Hotel Front Office Management', 4th Edn., Wiley, New York.

ENGLISH LANGUAGE

Subject Code: BHOM1-320

L T P C

Duration: 26 Hrs.

2002

Course Objectives:

The primary objective of English Language is to introduce the student to various forms of written and oral communication that are necessary in real-life business situations, perfecting verbal and non-verbal communication skills. Further this course will try to develop overall personality of students.

UNIT-I

Grammar: Articles, Parts of Speech, Tenses, Voice, Direct and Indirect Narration, Transformation of Sentences, Idioms and, Proverbs, Common Errors in English, Vocabulary, Punctuation, Story Construction.

UNIT-II

Precis Writing, Business Letter writing, Report Writing, Resume Writing, Paragraph Writing, Email Writing.

UNIT-III

Speaking-Extempore, Art of public speaking, Presentation, Group Discussions, Mastering Stage fear, Interview Skills.

UNIT-IV

Social and Business etiquettes, Manners and Accent, E-communication techniques.

Recommended Books

1. Wagen, Lynn Vander, 'Communication, Tourism & Hospitality', Hospitality Press Pvt. Ltd.
2. M.D. Jitendra, 'Organizational Communication', Rajat Publications. Jon & Lisa.
3. Burton, 'International Skills in Travel & Tourism', Longman Group Ltd.
4. Rayon, V. Lesikar, John D. Petit, J.R. Richard D. Irwin, 'Business Communication', INC.

TOURISM TRANSPORTATION

Subject Code: BHOM1-321

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

Duration: 45 Hrs.

Course Objectives:

The learner will learn the functions of transport, organizations and systems.

UNIT-I

Evolution of tourist transport system Importance of transport in tourism. Marketing of passenger transportation. Patterns of demand for tourist transportation, characteristics of supply and marketing strategies. Different Transport mode selection methods.

UNIT-II

Functions ICAO, IATA, DGCA, AAI and Open Sky Policy, Freedoms of air and other policies in Indian aviation sector – Role of airlines in tourism promotion: recent policies regarding airlines, case studies of Air India, Jet Airlines, Sahara airlines, Go-airways, Indigo, and Air Deccan.

UNIT-III

Surface Transport System Approved tourist transport operators, car hire companies including Rent-a-car and tour coach companies, Rail transport system Major Railway System of World (British Rail, Euro Rail, Japanese Rail and Amtrak Orient Express). Special trains & packages for tourists in India, Indrail pass, special schemes and packages available, major tourist trains (Palace on Wheels, Royal Orient, Fairy Queen, Deccan Odyssey and toy trains).

UNIT-IV

Water Transport System an overview, Cruise ships, ferries, hovercraft and boats. Terms used in water transport, operational and marketing strategies of Star Cruise, Ocean Odyssey, Queens Mary, Major water based leisure practices and their future in India.

Recommended Books

1. IATA, 'ABC (red and blue)'.
2. IATA, 'Travel Information Manual (TIM)'.
3. Mohinder Chand, 'Travel Agency Management'.
4. Anmol, Chunk, James, Dexter & Boberg, 'Professional Travel Agency Management', Prentice Hall, Delhi.
5. D.L. Foster, 'The Business of Travel Agency Operations and Management', McGraw Hill, Singapore.
6. Fay Betsy, 'Essentials of Tour Management', Prentice Hall, New Jersey.
7. J.M. Negi, 'Travel Agency and Tour Operation: Concepts and Principles', Kanishka Publishers & Distributors, New Delhi.

TOURISM PRODUCTS OF INDIA (REGIONAL)

Subject Code: BHOM1-322

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

Duration: 45 Hrs.

Course Objectives:

Nature is the basic component of tourism. The knowledge of natural places shall give an extra edge to the students in designing the itineraries for the travellers, suggesting them various destinations to the clients for their travel etc.

UNIT-I

Punjab as Tourist Destination: History, Geography & Ecology, Demography, Places of interest, Gardens of Chandigarh. Case studies of CITCO and Rock Garden.

UNIT-II

Punjab Architecture: Important features of Le Corbusier's Master Plan, Capitol Complex (Assembly, Secretariat, High Court), Museums in Punjab, Edict of

Chandigarh.

UNIT-III

Features of Punjabi Culture: Dresses, Cuisine, Dances, Literature, Language & Sikhism.

UNIT-IV

Popular tourist itineraries of region, Case studies of Anandpur Sahib, Amritsar, Patiala, Dharmshala, Haridwar, Rishikesh, Kurukshetra.

Recommended Books

1. V.S. Agrawal, 'The Heritage of Indian Art', Govt. of India Publication.
2. A.L. Basham, 'The Wonder that was India', Tapling Publishing Co., New York.
3. Christopher Tadgell, 'The History of Architecture in India', Penguin, New Delhi.
4. Daljeet and P.C. Jain, 'Indian Miniature Paintings', Brijwasi Art Press.
5. Dalmia Yashodhra, 'Contemporary Indian Art: Other Remedies', Marg Publisher, Mumbai.

HOSPITALITY MANAGEMENT (FOCUS ON F&B AND H.K.)

Subject Code: BHOM1-423

L T P C
4 0 0 4

Duration: 45 Hrs.

Course Objectives:

The course aims to familiarize learners with hotel F&B Service and Housekeeping Operations.

UNIT-I

The Food & Beverage Service Industry: Introduction to the Food & Beverage Industry, Classification of Catering Establishments (Commercial & Non- Commercial), Introduction to Food & Beverage Operations (Types of F&B Outlets).

Food & Beverage Service Personnel: Food & Beverage Service Organization, Structure - Job Descriptions & Job Specifications, Attitudes & Attributes of Food & Beverage personnel, competencies, Basic Etiquettes, Interdepartmental relationship.

UNIT-II

Types of Food & Beverage Service -Table Service –English / Silver, American, French, Russian, Self Service – Buffet & Cafeteria, Specialized Service – Gueridon, Tray, Trolley, Lounge, Room etc., Single Point Service – Take Away, Vending Kiosks, Food Courts & Bars, Automats, Mis-en-place & Mis-en-scene.

UNIT-III

Organising the Housekeeping Department: Housekeeping Personnel, Organizational structure of a large Hotel (Chart), Importance of Job Description of Housekeeping Personnel, Job Description of: Executive Housekeeper, Housekeeping Supervisor, Uniform/ Linen room supervisor, Night Supervisor, Room Attendant etc.

UNIT-IV

Housekeeping terms, Importance & Functions of Housekeeping, House Keeping Areas – Front-of-the-house and Back-of-the-house areas, Guest Rooms, Public Areas, Maids Room, Indoor and Outdoor Areas, Co-ordination with other Departments like Front Office, Engineering, F & B, Kitchen, Security, Purchase, HRD, Accounts.

Recommended Books

1. Sudhir Andrews, 'Hotel Operation Manuals', Tata McGraw Hill.
2. K.S. Chon and Raymond, T. Sparrowe, 'Welcome to Hospitality', Thomson Asia, Singapore.
3. Dennis R. Lillicrap. & John. A. Cousins, 'Food & Beverage Service', ELBS.
4. U. Jones and S. Newton, 'Hospitality and Catering- A Closer Look', Cassel, Herndon.
5. P. Jones and A. Pizam, 'The International Hospitality Industry: Organizational and Operational Issues', John Wiley, New York.

6. James Socrates Bardi, 'Hotel Front Office Management', 4th Edn., Wiley, New York.
7. Raghubalan, 'Hotel Housekeeping Operations & Management', Oxford University Press.

AIRLINES MANAGEMENT

Subject Code: BHOM1-424

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

Duration: 45 Hrs.

Course Objectives:

The Course Aims to provide learners the basic understanding of airlines management in terms of Aviation History, how airports function and familiarization with major air carriers.

UNIT-I

History of Aviation, Types of Aircrafts, Airline Terminology, Cabin Crew, Announcements, Airport Jobs.

UNIT-II

Airport Codes, Airline Codes, Phonetic Alphabet.

UNIT-III

Airport Lounges, How airports work, Baggage Handling, Airport Security World Organizations (IATA, ICAO, DGCA).

UNIT-IV

Jet Airways, Kingfisher, Indian Airlines, British Airways, Fly Emirates, Singapore Airlines.

Recommended Books

1. John G. Wensveen, 'Air Transportation: A Management Perspective', Ashgate Publishing, Ltd.
2. Anne Graham, 'Managing Airports: An International Perspective', Routledge.
3. Stephen Page, 'Transport for Tourism', Prentice Hall, College Div.

FOREIGN LANGUAGE (FRENCH)

Subject Code: BHOM1-425

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

Duration: 38 Hrs.

Course Objectives:

The students will learn the basics of French language.

UNIT-I

Conjugation of verbs from the text to be put in present tense only.....

UNIT-II

A series of exercises covering the grammar.

UNIT-III

Translation of sentences from the text form French to English and English to French.

UNIT-IV

Demanding of a Service: A simple dialogue to be formed between two persons for any of the following situations: reserving of train tickets, room booking, giving directions to reach a place, taking a phone call, ordering food, fixing a date.....

Recommended Books

1. A. Monnerie, 'Bienvenue En France', Tome I.
2. G. Mauger, 'Cours de Langue et de Civilisation Francaise Book', I Chapters 1-14 only.

HUMAN RESOURCE MANAGEMENT

Subject Code: BHOM1-426

L T P C
3 0 0 3

Duration: 38 Hrs.

Course Objectives:

The course aims to inculcate the basic knowledge of marketing the hospitality products effectively and efficiently to the clients of service industry.

UNIT-I

Introduction to Human Resource Management: Definitions, Functions of Personnel Management, Objectives: of Personnel Management, Qualities of a Good Personnel Manager.

Human Resource/Man Power Planning: Definitions, Need of Manpower Planning, Objectives: of Hr Planning, Advantages Disadvantages of Manpower Planning, Process/Steps.

Recruitment: Definition, Sources of Recruitment, Internal Sources of Recruitment & (Advantages, Dis-advantages), External Sources (Advantages, Dis-advantages).

UNIT-II

Selection: Definition, Steps in Selection Process (Application Blank, Initial Interview of the Candidates, Employment Tests, Interviews, Checking Reference, Physical or Medical Examination, Final Interview & Induction).

UNIT-III

Training and Development: Training Definition, Importance of Training, the Training Process, Training Methods (On the Job- Job Instruction Training, Job Rotation, Special Assignments).

Off the Job (Vestibule Training, Lecture Method, Conference Method, Seminar Or Team Discussion, Case Study Method Development-Definition, Need, Methods -On the Job -Off the Job.

UNIT-IV

Performance Appraisal: Definition, Objectives: Process, Methods- -Past Oriented -Future Oriented

Job Evaluation: Definition, Objectives: Principles, Methods-Non Analytical, Analytical. Employee Remuneration- Definition, Components, Factors Influencing Employee Remuneration, Concept of Wages.

Recommended Books

1. David K. Hayes, Jack D. Ninemeier, 'Human Resources Management in the Hospitality Industry'.

TOURISM GEOGRAPHY (WORLD)

Subject Code: BHOM1-427

L T P C
4 0 0 4

Duration: 45 Hrs.

Course Objectives:

Learner will be able to identify and understand the physical features of different continents and oceans of the world with their tourist attractions.

UNIT-I

Brief introduction of continents & oceans. Map reading. Greenwich mean time. International date line. Elements of weather & climate. Climatic zones of the world. Natural vegetation of the world. Main tourist activities in different climatic zones.

UNIT-II

Asia: General geographical features; physiography, climate, vegetation main countries, capitals & their tourist attractions. A Case study of Japan, Singapore, Sri Lanka, Saudi Arabia.

UNIT-III

Europe: General geographical features; physiography, climate, vegetation. Main countries, capitals & their tourist attractions. A Case study of France, United Kingdom, Switzerland, Netherlands. **Americas:** Physiography, climate, vegetation, main countries, capitals & their tourist attractions. A Case study of the U.S.A. (only 5 destinations), Canada, Brazil, Cuba. **Americas:** General geographical features of North & South.

UNIT-IV

Other Countries: General geographical features of given countries with information about physiography, climate, vegetation & tourist attractions of South Africa, Egypt, Australia, New Zealand.

Recommended Books

1. B.G. Boniface and Chris Cooper, 'The Geography of travel and Tourism', Butterworth Heinemann, Oxford.
2. C.M. Hall and Stephen, J. Page, 'The Geography of Tourism and Recreation. Environment, Place & Space', Pearce Douglas, London.
3. 'Tourism Today - A Geographical Analysis', Longman, New York.
4. R.L. Singh, 'India - A Regional Geography', National Geographical Society of India, Varanasi.
5. Sarina Singh et. al., 'Lonely Planet', Publications, India.

TOURISM POLICY & PLANNING

Subject Code: BHOM1-428

L T P C

Duration: 45 Hrs.

4 0 0 4

Course Objectives:

To develop an understanding of the basic concepts of tourism planning for public and private sector community and regional tourism development and community participation. To explore the interrelationships between resource management and tourism planning and development.

UNIT-I

Concept, need, objective, institutional framework of public tourism policy. The role of govt., public and private sector in formulation of tourism policy. Policy making bodies and its process at national levels. Involvement of local community in tourism development.

UNIT-II

An outline of L.K. Jha Committee - 1963, National Tourism Policy - 1982, National Committee Report - 2002, National Action Plan on Tourism - 1992, The latest policy document on tourism.

UNIT-III

Tourism Planning at International, national, regional, state and local level. Tourism and Five-Year Plans in India with special reference to 11th Five-Year Plan.

UNIT-IV

Background & process of tourism planning. Techniques of plan formulation. Planning for tourism destinations - Objectives: methods and factors influencing planning. Destination life cycle concept. Incentives & concessions extended for tourism projects and sources of funding.

Recommended Books

1. Chib, Som Nath, 'Essays on Tourism', Cross Section Publication, New Delhi.
2. Chunk Y. Gee, C. James & Dexter J.L. Choy, 'Travel Industry', Van Nostrand Reinhold, New York.
3. Peter E. Murphy, 'Tourism: A Community Approach', Methuen, New York.

SALES, MARKETING & P.R. IN TOURISM INDUSTRY

Subject Code: BHOM1-429

L T P C

Duration: 35 Hrs.

3 0 0 3

Course Objectives:

The learner will be familiarized with the concept of sales, marketing and public relations in the hospitality and tourism industry.

UNIT-I

Marketing: Definition, Marketing Concepts (Need, Want, Demand, TQM, Product, Customer value, Customer satisfaction, Exchange & Transaction, Market), Difference between marketing and Selling, Marketing Orientation (Product concept, Production concept, Selling concept, Marketing concept, Societal marketing concept), Modern marketing concepts (Green marketing, Mobile marketing, Cross-cultural marketing, Web marketing, Tele marketing, Relationship marketing, Buzz marketing).

UNIT-II

Analysis and Selection of Market: Measuring and forecasting tourism demand; Forecasting methods, Managing capacity and demand. Market segmentation and positioning (STP).

UNIT-III

Sales Management: Definition, sales person's role, prospect management, buying process, AIDA's theory of selling, personal selling process, closing strategies, function of sales management.

Public Relations: Definition / Meaning, Need for public relations, The concept of public – internal/external publics, Comparison between advertising, promotion, publicity and pr, PR tools – media / non-media, PR Campaign, PR in Tourism.

UNIT-IV

Marketing Mix Elements: 7 P's of marketing – Product (Levels, Classification, Branding, Packaging PLC), Place (Distribution channels Definition, why use intermediaries? How they add value? Channel functions, Marketing intermediaries in hospitality industry) Price (Definition, Marketing strategies, Initiating price change), Promotion (Definition, Functions, Promotion mix – Advertising, Sales Promotion, Personal Selling, Public Relations), People, Processes, Physical Evidence.

Recommended Books

1. 'Philip Kotler Marketing for Hospitality Industry', Pearson New International.
2. Manjula Chaudhary, 'Tourism Marketing', Oxford University Press.
3. Prakash Mathur, 'Sales and Marketing Management', Isha Books.

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

SEMESTER 1 st		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BHOM3-101	Basics of Food Production - I	3	0	0	40	60	100	3
BHOM3-102	Basics of Food & Beverage Service – I	3	0	0	40	60	100	3
BHOM3-103	Basics of Front Office - I	3	0	0	40	60	100	3
BHOM3-104	Basics of House Keeping - I	3	0	0	40	60	100	3
BHOM3-105	Communication-I	2	0	0	40	60	100	2
BHOM3-106	Basics of Computers	2	0	0	40	60	100	2
BHOM3-107	Food Science & Nutrition	2	0	0	40	60	100	2
BHOM3-108	Basics of Food Production – I Lab.	0	0	2	60	40	100	1
BHOM3-109	Bakery-I Lab.	0	0	2	60	40	100	1
BHOM3-110	Basics of Food & Beverage Service – I Lab.	0	0	2	60	40	100	1
BHOM3-111	Basics of House Keeping – I Lab.	0	0	2	60	40	100	1
BHOM3-112	Fundamentals of Computers Lab.	0	0	2	60	40	100	1
Total		18	0	10	580	620	1200	23

SEMESTER 2 nd		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BHOM3-213	Food Production-II	3	0	0	40	60	100	3
BHOM3-214	Food & Beverage Service-II	3	0	0	40	60	100	3
BHOM3-215	Front Office-I	3	0	0	40	60	100	3
BHOM3-216	House Keeping-II	3	0	0	40	60	100	3
BHOM3-217	Hotel Engineering	2	0	0	40	60	100	2
BHOM3-218	Communication-II	2	0	0	40	60	100	2
BHOM3-219	Human Values and Professional Ethics	3	0	0	40	60	100	3
BHOM3-220	Food Production-II Lab.	0	0	2	60	40	100	1
BHOM3-221	Bakery-II Lab.	0	0	2	60	40	100	1
BHOM3-222	Food & Beverage Service-II Lab.	0	0	2	60	40	100	1
BHOM3-223	Front Office-I Lab.	0	0	2	60	40	100	1
BHOM3-224	House Keeping-II Lab.	0	0	2	60	40	100	1
Total		19	0	10	580	620	1200	24

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

SEMESTER 3 rd		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BHOM3-325	Food Production-III	3	0	0	40	60	100	3
BHOM3-326	Food & Beverage Service-III	3	0	0	40	60	100	3
BHOM3-327	Front Office-II	3	0	0	40	60	100	3
BHOM3-328	Accommodation Operation-I	3	0	0	40	60	100	3
BHOM3-329	Food & Beverage Controls	3	0	0	40	60	100	3
BHOM3-330	Communication-III	2	0	0	40	60	100	2
BHOM3-331	Food Production-III Lab.	0	0	2	60	40	100	1
BHOM3-332	Food & Beverage Service-III Lab.	0	0	2	60	40	100	1
BHOM3-333	Front Office-II Lab.	0	0	2	60	40	100	1
BHOM3-334	Accommodation Operation- I Lab.	0	0	2	60	40	100	1
BHOM3-335	GD & Seminar Lab.	0	0	2	60	40	100	1
Total		17	0	10	540	560	1100	22

SEMESTER 4 th		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BHOM3-436	Food Production-IV	3	0	0	40	60	100	3
BHOM3-437	Food & Beverage Service-IV	3	0	0	40	60	100	3
BHOM3-438	Front Office-III	3	0	0	40	60	100	3
BHOM3-439	Accommodation Operation-II	3	0	0	40	60	100	3
BHOM3-440	Facility Planning	2	0	0	40	60	100	2
BHOM3-441	Principles of Management-I	3	0	0	40	60	100	3
BHOM3-442	Food Production-IV Lab.	0	0	2	60	40	100	1
BHOM3-443	Food & Beverage Service-IV Lab.	0	0	2	60	40	100	1
BHOM3-444	Front Office-IV Lab.	0	0	2	60	40	100	1
BHOM3-445	Accommodation Operation-II	0	0	2	60	40	100	1
BHOM3-446	Computer and MIS Lab.	0	0	2	60	40	100	1
Total		17	0	10	520	580	1100	22

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

SEMESTER 5 th		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BHOM3-547	Food Production-V	3	0	0	40	60	100	3
BHOM3-548	Food & Beverage Service-V	3	0	0	40	60	100	3
BHOM3-549	Front Office-V	3	0	0	40	60	100	3
BHOM3-550	Accommodation Operation-III	3	0	0	40	60	100	3
BHOM3-551	Human Resource Management	2	0	0	40	60	100	2
BHOM3-552	Principles Of Management-II	2	0	0	40	60	100	2
BHOM3-553	Hotel Accountancy	2	0	0	40	60	100	2
BHOM3-554	F&B Management	2	0	0	60	40	100	2
BHOM3-555	Food Production-V Lab.	0	0	2	60	40	100	1
BHOM3-556	Bakery-III Lab.	0	0	2	60	40	100	1
BHOM3-557	Food & Beverage Service-V Lab.	0	0	2	60	40	100	1
BHOM3-558	Accommodation Operation-III Lab.	0	0	2	60	40	100	1
Total		20	0	8	580	620	1200	24

SEMESTER 6 th		Marks				Credits
Subject Code	Subject Name	External			Internal	
		50	50	50	50	200
BHOM3-659	20 Weeks Industrial Exposure Training	Training Report	Training Report	Viva Voce	Log Book	20
Total		50	50	50	50	200

20 Weeks Industrial Training

Each candidate will have to prepare a log book and training report of the day to day activities of his 20 Weeks on the job training duly supported by charts, diagrams, photos and tables. The report will be submitted in duplicate copy to the head of department within one month of the completion of the training supported by the certificate of competent authority of the training institute for the evaluation by a panel of experts comprising of one internal and one external. The viva-voce of the 6th semester would be based on the training report as well as other applied assignments, the candidate has undertaken during on the job training.

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

COURSE		Contact Hrs.			MARKS			CREDITS
		L	T	P	INTERNAL	EXTERNAL	TOTAL	
BTIT 701	Building Enterprise Applications	3	1	-	40	60	100	
BTCS 601	Simulation and Moduling	3	1	-	40	60	100	
BTIT 502	Elective-I	3	1	-	40	60	100	
BTIT 607	Building Enterprise Applications lab	-	-	4				
BTCS607	Simulation and Moduling lab	-	-	4				
BTXXX	Elective-I	3	1	-	40	60	100	
	Training-III							
	Project-I							

MRSPTU

BASICS OF FOOD PRODUCTION-I

Subject Code: BHOM3-101

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

Duration: 38 Hrs.

Objectives and Expected Outcomes:

To develop knowledge and interest in the science and art of cuisine and food fundamentals in the hotel and Catering industry. To develop skills in meal planning, preparation of basic dishes using different types of ingredients. The student should be able to understand basic methods of cooking and ingredients used both in Indian and Continental Cookery.

UNIT-I

Introduction to the Art of Cookery:

- Culinary History- Development of the Culinary Art from the middle ages to modern cookery.
- Modern hotel kitchen
- Nouvelle Cuisine,
- Cuisine Minceur
- Indian Regional Cuisine
- Popular International Cuisine (An Introduction) of French, Italian and Chinese Cuisine.

UNIT-II

Aims & Objectives of Cooking Food:

- a) Classification – Cooking Materials and their uses.
- b) Foundation ingredients – meaning, action of heat n carbohydrates, fats, proteins, minerals and vitamins.
- c) Fats and oils – meaning & examples of fats & oils, quality for shortenings, commonly used fats and oils and their sources & uses.
- d) Raising agent- functions of raising agents, chemical raising agents & yeast. Eggs- uses of eggs in cooking, characteristics of fresh eggs, deterioration of eggs, storage of eggs.
- e) Salts - uses.
- f) Liquid- water, stock, milk, fruit juices etc. Uses of liquid.
- g) Flavouring & Seasoning – uses & example.
- h) Sweetening agents - uses & examples.
- i) Thickening agent.

Preparation of Ingredients:

- a) Washing, peeling scraping, paring,
- b) Cutting – terms used in vegetables cutting, julienne, brunoise mecedoine, jardinière, paysanne- grating.
- c) Grinding, Mashing, Sieving, Milling, Steeping, centrifuging, emulsification evaporation. Homogenization.
- d) Methods of mixing foods.

UNIT-III

Equipment used in Kitchen:

- a) Types of Kitchen Equipment – Diagrams, Uses, Maintenance, Criteria for Selection.

Kitchen Organization:

- a) Main Kitchen & Satellite Kitchen
- b) Duties & responsibilities of each staff.
- c) Cooking fuels - uses & advantage of different types of cooking fuels.

Methods of Cooking Food:

- a) Transference of heat to food by radiation, conduction & convection- magnetrons waves meaning. Boiling, poaching, stewing, braising, steaming, baking, roasting, grilling, frying, paper bag, microwave, pot rousing- explanations with examples.

UNIT-VI

Stocks, Glazes, Sauces and Soups:

- a) Meaning uses and types of stocks, points observed while making stock. Recipes for I liter of white, brown and fish stock.
- b) Glazes -meaning & uses.
- c) Sauces -meaning, qualities of a good sauce, types of sauces -proprietary sauce and mother sauce. Recipe for I lit Béchamel, Veloute, Espagnole, Tomato & Hollandaise. Derivatives of mother sauces. (only name, no recipes). Recipes for known International Sauces & their uses.
- d) Soups -classification of soups, meaning of each type with examples.

Basic Preparations:

- a) Mise-en-place for Bouquet Garni, mirepoix, duxelle paste, batters, marinades and gravies.

Recommended Books

1. Krishna Arora, 'Theory of Cookery'.

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

2. Thangam Philip, 'Modern Cookery'.
3. Montagne, 'Larousse Gastronomique'.
4. Arvind Saraswat, 'Professional Chef'.
5. Parvinder Bali, 'Food Production Operation'.

BASICS OF FOOD & BEVERAGE SERVICE-I

Subject Code: BHOM3-102

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

Duration: 37 Hrs.

Objective/s and Expected Outcomes

To develop knowledge of the students about hotel/ restaurants organization and an understanding of the auxiliary departments, different menus, principles of table laying. The student should imbibe the knowledge of Kitchen & restaurant brigade. They should have vital knowledge of auxiliary departments. They should be able to plan different menus, lay tables for different services.

UNIT-I

Introduction to the Food and Beverage Service Industry

- a) The evolution of catering industry, scope for caterers in the industry
- b) Relationship of the catering industry to other industries.
- c) Types of Catering Establishments- Sectors
- d) Introduction to the Food and Beverage operations.

Food and Beverage Service Areas in a Hotel

- a) Restaurants and their subdivisions, Coffee Shop, Room Service, Bars, Banquets, Discotheques, Grill Room, Snack Bar, Executive Lounges, Business Centers and Night Club
- b) **Back Areas:** Still Room, Wash-up, Hot-Plate, Plate Room, Kitchen Stewarding

UNIT-II

Food and Beverage Equipment

- a) Operating equipment, Requirements, Criteria for selection quantity and types.
- b) Classification of crockery/ cutlery/ glassware/ hollowware/ flatware/ special equipment upkeep and maintenance of equipment.
- c) Furniture
- d) Linen
- e) Disposables

Food and Beverage Service Personnel

- a) Staff organization- the principal staff of different types of restaurants.
- b) Duties & responsibilities of the service staff.
- c) Duties and responsibilities of service staff – Job Descriptions and Job Specifications.
- d) Attitude and Attributes of Food and Beverage Service Personnel - personal hygiene, punctuality, personality attitude towards guests, appearance, salesmanship, sense of urgency, customer satisfaction.
- e) Basic Etiquettes for catering staff.
- f) Interdepartmental relationship.

UNIT-III

Menus and Covers

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- a) Introduction
- b) Cover- definition; different layouts.
- c) Menu Planning, considerations and constraints
- d) Menu Terms
- e) Menu Design
- f) French Classical Menu
- g) Classical Foods and its Accompaniments with cover
- h) Indian Regional dishes, accompaniments and service.

Types of Meals

- a) Breakfast – Introduction, Types, Service methods, a la carte, and TDH setups.
- b) Brunch
- c) Lunch
- d) Hi- tea
- e) Supper
- f) Dinner

UNIT-IV

Food and Beverage Service Methods

- a) Table Service – Silver/English, Family, American, Butler/ French, Russian
- b) Self Service - Buffet and Cafeteria Service
- c) Specialized Service – Gueridon, Tray, Trolley, Lounge, Room etc.
- d) Single Point Service- Takeaway, Vending, Kiosks, Food Courts, Bars, Automats

Control Methods

- a) Billing methods – Duplicate and Triplicate system, KOTs and BOTs, Computerized KOTs
- b) Necessity and functions of a control system, F&B Control cycle and monitoring
- c) Food and Beverage Terminology related to the course.

Recommended Books

- 1. Denis Lillicrap, 'Food & Beverage Service'.
- 2. Vijay Dhawan, 'Food & Beverage Service'.
- 3. Rao J. Suhas, 'Food & Beverage Service'.

BASICS OF FRONT OFFICE –I

Subject Code: BHOM3-103

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

Duration: 37 Hrs.

Objectives and Expected Outcomes

To understand the general setup of front Office in small, medium and large hotels. Planning for layout of the front office, equipment, tools etc. Students should gain knowledge of various sections and functions of front office and their procedures. They should be able to Hand various tools and equipment of the front office.

UNIT-I

Tourism

- a) Meaning – definition and measurement of tourism.
- b) Classification – recreation, leisure, adventure, sports, health etc.
- c) Socio – economic benefits of tourism.
- d) Adverse effects of tourism.
- e) Basic components and infrastructure.

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

f) Itinerary, passport and visa – Basic information.

The Hospitality Industry

- a) History and development of lodging industry – International.
- b) History and development of lodging industry – India.
- c) Defining the term – Hotel.
- d) Reasons for travel.

UNIT-II

Classification of Hotels

- a) Based on Size, Location, and Length of Stay.
- b) Levels of Service, Ownerships and Affiliations.
- c) Referral Hotels, Franchise and management contracts.
- d) Chain Hotels.
- e) Target Markets.
- f) Alternate Lodging facilities.

UNIT-III

Organizational Structure of Hotels

- a) Small.
- b) Medium.
- c) Large.
- d) Lobby Arrangements
- e) Basic Layout and Design.
- f) Handling VIPs.
- g) Duty Rota and work schedules
- h) Uniformed Service.

Front Office Personnel

- a) Departmental Hierarchy.
- b) Attitude and Attributes and Salesmanship.
- c) Job Descriptions and Job Specifications of Front Office Personnel.

UNIT-IV

Front Office Operations

- a) The Front Desk- Equipment in use
- b) The Guest Room- Types and Status Terminology.
- c) Key Controls.
- d) Tariff plans.
- e) Types of rates.

Front Office Responsibilities

- a) Communication – internal and interdepartmental.
- b) Guest services – basic information.
- c) Guest history – maintenance and importance.
- d) Relationship marketing.
- e) Emergency situations.

Recommended Books

1. Sudhir Andrews, 'Front Office Training Manual'.
2. Kasavana & Brooks, 'Managing Front Office Operations'.
3. Ahmed Ismail, 'Front Office – Operations and Management', Thomson Delmar.
4. Michael Kasavana & Cahell, 'Managing Computers in Hospitality Industry'.

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

5. Colin Dix & Chris Baird, 'Front Office Operations'.
6. Jatashankar R. Tewari, 'Hotel Front Office Operation and Management'.

BASICS OF HOUSE KEEPING-I

Subject Code: BHOM3-104

L T P C

Duration: 37 Hrs.

3 0 0 3

Objectives and Expected Outcomes

To emphasize the role of housekeeping as a department in the hotel and the importance of a clean, comfortable, attractive and safe atmosphere aiming at ultimate guest satisfaction. The student should be able to fix the position and the value of each housekeeping staff in the hotel organization. The Student should become familiar with the equipment and agents needed in the housekeeping department. He/She should also become through with all the practices and procedures.

UNIT-I

Introduction

- a) Introduction to housekeeping department.
- b) Meaning, Definition & Importance of Housekeeping Department
- c) Role of Housekeeping in hospitality industry

Lay out & Organizational Structure

- a) Layout of Housekeeping department
- b) Organizational Structure of Housekeeping department (Small, Medium & large)
- c) Interdepartmental relationship (emphasis on Front office & Maintenance)
- d) Relevant sub section

UNIT-II

Staffing in Housekeeping Department

- a) Role of key personnel in Housekeeping department
- b) Job description & Job specification of Housekeeping staff (Executive Housekeeper, Deputy housekeeper, Floor supervisor, Public area supervisor, Night supervisor, Room attendant, House man, Head gardener.

Planning Work of Housekeeping Department

- a) Identifying Housekeeping department
- b) Briefing & Debriefing
- c) Control desk (importance, role, coordination)
- d) Role of Control Desk during emergency
- e) Duty Rota & work schedule
- f) Files with format used in Housekeeping department.

UNIT-III

Hotel Guest Room

- a) Types of room-definition
- b) Standard layout (single, double, twin, suit)
- c) Difference between Smoking & Non Smoking room's
- d) Barrier free room's
- e) Furniture / Fixture / Fitting / Soft Furnishing /Accessories / Guest Supplies /Amenities in a guest room
- f) Layout corridor& floor Pantry

UNIT-IV

Cleaning Science

- a) Characteristics of good cleaning agent
- b) Application of cleaning agent
- c) Types of cleaning agent
- d) Cleaning products
- e) Cleaning equipment
- b) Classification and types of equipment with Diagram's (Mops, dusters, pushers, mechanical squeeze, vacuum cleaner, shampooing machine) with their care and uses.

Recommended Books

- 1. Sudhir Andrews, 'Hotel Housekeeping Training Manual'.
- 2. Grace Brigham, 'Housekeeping for Hotels, Hostels and Hospitals'.
- 3. Joan C. Branson & Margaret Lennox, 'Hotel Hostel and Hospital Housekeeping', ELST.
- 4. Margaret Kappa & Aleta Nitschke, 'Managing Housekeeping Operations'.
- 5. Sudhir Andrews, 'Hotel House Keeping', Tata McGraw Hill.
- 6. Tucker Schneider, 'The Professional Housekeeper', VNR.
- 7. G. Raghubalan, 'Hotel House Keeping Operation & Management'.

COMMUNICATION-I

Subject Code: BHOM3-105

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

Duration: 26 Hrs.

Objectives and Expected Outcomes

This course is designed to improve the grammar, correct their pronunciations and improve communication skills for proper conversation. Students are expected to learn the basics of the language and refine their pronunciation and communication skills.

UNIT-I

Grammar

- a) Voice
- b) Narration
- c) Tenses
- d) Correction of sentences
- e) Singular, Pleural, Genders
- f) Do as directed involving 'neither, nor' 'no sooner than', transformation of sentences.

UNIT-II

Essay writing (up to 500 words.)

- a) Topics to be given from current events, social issues.
- b) Topics related to the hotel industry.

UNIT-III

Comprehension of an Unseen Passage

Paragraph Writing:

- a) Expansion of a given idea.
- b) Expansion up to 250 words

UNIT-IV

Rapid Reading

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- a) Newspaper Reading
- b) Magazine Reading
- c) Hotel Journal Reading

Recommended Books

- 1. Wren & Martin, 'English Grammar'.
- 2. Hotel Journals
- 3. Magazines

BASICS OF COMPUTERS

Subject Code: BHOM3-106

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

Duration: 26 Hrs.

Objectives and Expected Outcomes

The basic objective of the course is to introduce the students to the world of computers and computer technology. Introduce students to the basic concepts of operating systems, World Processing, Database, presentations & Networking. The student will be able to understand the basics of computers and use the windows application.

UNIT-I

Computer Fundamentals –Theory

- a) Information concepts and processing
- b) Definition
- c) Need, Quality and value of Information
- d) Data processing concepts

Elements of a Computer System

- a) Definitions
- b) Characteristics of Computers
- c) Classification of Computers
- d) Limitations.

UNIT-II

Hardware Features and Uses

- a) Components of Computer
- b) Generation of Computers
- c) Primary and secondary storage concepts
- d) Data entry devices.
- e) Data output devices

UNIT-III

Software Concepts

- a) System Software
- b) Application Software
- c) Language Classification
- d) Compilers and interpreters

UNIT-IV

Operating System / Environment – Theory

- a) Basics of MS-DOS
- b) Internal Commands
- c) External Commands

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Introduction to Windows

- a) GUI/Features
- b) What are Windows and Windows 95
- c) Parts of a typical window and their functions

Recommended Books

- 1. 'Fundamental of Computers', Prentice Hall India.
- 2. Lonnie. E. Moseley, 'Mastering Microsoft Office', BPB Publications

FOOD SCIENCE & NUTRITION

Subject Code: BHOM3-107

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

Duration: 26 Hrs.

UNIT-I

Carbohydrates

- a) Introduction
- b) Effect of cooking (gelatinization and retro-gradation)
- c) Factors affecting texture of carbohydrates (oufflés of cho gel & dextrinization)
- d) Uses of carbohydrates in food preparation

Fats & Oils

- a) Classification (based on the origin and degree of saturation)
- b) Autoxidation (factors and prevention measures)
- c) Flavour reversion
- d) Refining, hydrogenation & winterization
- e) Effect of heating on fats & oils with respect to smoke point
- f) Commercial uses of fats (with oufflés on shoryening value of different fats)

UNIT-II

Proteins

- a) Basic structure and properties
- b) Type of proteins based on their origin (plant/animal)
- c) Effect of heat on proteins (denaturation, coagulation)
- d) Functional oufflés s of proteins (gelation, emulsification, formability, viscosity)
- e) Commercial uses of proteins in different food preparations (like egg gels, oufflés gels, cakes, confectionary items, meringues, oufflés, custard, soups, curries etc.)

Basic Aspects

- a) Definition of the terms health, nutrition and nutrients
- b) Importance of food – (physiological, psychological and social function of food) in maintaining good health
- a) Classification of nutrients

Energy

- a) Definition of energy and units of its measurements (kcal)
- b) Energy contribution from macronutrients (carbohydrates proteins and fats)
- c) Factors affecting energy requirements
- d) Concept of bmr, sda, thermodynamic action of food
- e) Dietary sources of energy

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f) Concept of energy balance and the health hazards associated with underweight, overweight

UNIT-III

Macro Nutrients

a) Carbohydrates

- i) Definition
- ii) Classification (mono, di and polysaccharides)
- iii) Dietary sources
- iv) Functions
- v) Significance of dietary fibre (prevention/treatment of diseases)

b) Lipids

- i) Definition
- ii) Classifications saturated and unsaturated fats
- iii) Dietary sources
- iv) Functions
- v) Significance of fatty acids (pufas, mufas, sfas, efa) in maintaining health
- vi) Cholesterol-dietary sources and the concept of dietary and blood cholesterol

c) Proteins

- i) Definition
- ii) Classification based upon amino acid composition
- iii) Dietary sources
- iv) Functions
- (ii) Methods of improving quality of protein in food (special emphasis on soya proteins and whey proteins)

UNIT-IV

Micro Nutrients

a) Vitamins

- i) Definitions and classification (water and fats soluble vitamins)
- ii) Food sources, function and significance of
- iii) Fat soluble vitamin (vitamin a, d, e, k)
- iv) Water soluble vitamins (vitamins c, thiamine, riboflavin, niacin, cyahocobalamin, folic acid)

b) Minerals

- i) Definition and classification (major and minor)
- ii) Food sources, functions and significance of calcium, iron, sodium, iodine & fluorine

d) Water

- i) Definition
- ii) Dietary sources (visible, invisible)
- iii) Functions of water
- iv) Role of water in maintaining health (water balance)

Recommended Books

1. Roday Sunetra, 'Food Science & Nutrition'.

BASICS OF FOOD PRODUCTION-I LAB.

Subject Code: BHOM3-108

L T P C

0 0 2 1

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

(Demonstration by instructor and applications by students)

1.

- a) Equipment - Identification, Description, Uses & handling
- b) Hygiene - Kitchen etiquettes, Practices & knife handling
- c) Safety and security in kitchen

2.

- a) Vegetables - classification
- b) Cuts - julienne, jardinière, macedoines, brunoise, payssane, mignonnete, dices, cubes, shred, mirepoix
- c) Preparation of salad dressings

3.

- a) Basic Cooking methods and pre-preparations
- b) Blanching of Tomatoes and Capsicum
- c) Preparation of concasse
- d) Boiling (potatoes, Beans, Cauliflower, etc.)
- e) Frying - (deep frying, shallow frying, sautéing)
- f) Aubergines, Potatoes, etc.
- g) Braising - Onions, Leeks, Cabbage
- h) Starch cooking (Rice, Pasta, Potatoes)

4.

- a) Stocks - Types of stocks (White and Brown stock)
- b) Fish stock
- c) Emergency stock
- d) Fungi stock

5. Sauces - Basic Mother Sauces

- a) Béchamel
- b) Espagnole
- c) Veloute
- d) Hollandaise
- e) Mayonnaise
- f) Tomato

6. Egg cookery - Preparation of Variety of Egg Dishes

- a) Boiled (Soft & Hard)
- b) Fried (Sunny side up, Single fried, Bull's Eye, Double fried)
- c) Poaches
- d) Scrambled
- e) Omlette (Plain, Stuffed, Spanish)
- f) En cocotte (eggs benedict)

7. Simple Salads & Soups

- a) Cole slaw,
- b) Potato salad,
- c) Beet root salad,
- d) Green salad,
- e) Fruit salad,

8. Simple Egg Preparations

- a) Scotch egg,

- b) Assorted omelletes,
- c) Oeuf Floretine
- d) Oeuf Benedict
- e) Oeuf Farci
- f) Oeuf Portugese
- g) Oeuf Deur Mayonnaise

9. Simple Potato Preparations

- a) Baked potatoes
- b) Mashed potatoes
- c) French fries
- d) Roasted potatoes
- e) Boiled potatoes
- f) Lyonnaise potatoes
- g) Allumettes

10. Vegetable Preparations

- a) Boiled vegetables
- b) Glazed vegetables
- c) Fried vegetables
- d) Stewed vegetables.

BAKERY-I LAB.

Subject Code: BHOM3-109

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

(Demonstration by instructor and applications by students)

1. Equipment

- a) Identification
- b) Uses and handling
- c) Ingredients - Qualitative and quantitative measures

2. Bread Making

- a) Demonstration & Preparation of Simple and enriched bread recipes
- b) Bread Loaf (White and Brown)
- c) Bread Rolls (Various shapes)
- d) French Bread
- e) Brioche

3. Simple Cakes

- a) Demonstration & Preparation of Simple and enriched Cakes, recipes
- b) Sponge, Genoise, Fatless, Swiss roll
- c) Fruit Cake
- d) Rich Cakes
- e) Dundee
- f) Madeira

4. Simple Cookies

- a) Demonstration and Preparation of simple cookies like
- b) Nan Khatai
- c) Golden Goodies

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- d) Melting moments
 - e) Swiss tart
 - f) Tri colour biscuits
 - g) Chocolate chip
 - h) Cookies
 - i) Chocolate Cream Fingers
 - j) Bachelor Buttons.
- 5. Hot/Cold desserts**
- a) Caramel Custard,
 - b) Bread and Butter Pudding
 - c) Queen of Pudding
 - d) Soufflé – Lemon / Pineapple
 - e) Mousse (Chocolate Coffee)
 - f) Bavaroise
 - g) Diplomat Pudding
 - h) Apricot Pudding
 - i) Steamed Pudding - Albert Pudding, Cabinet Pudding.

BASICS OF FOOD & BEVERAGE SERVICE-I LAB.

Subject Code: BHOM3-110

L T P C

0 0 2 1

- 1. Food Service areas – Induction & Profile of the areas
 - 2. Ancillary F&B Service areas – Induction & Profile of the area
 - 3. Familiarization of F&B Service equipment
 - 4. Care & Maintenance of F&B Service equipment
- 5. Cleaning/polishing of EPNS items by**
- a) Plate Powder method
 - b) Polivit method
 - c) Silver Dip method
 - d) Burnishing Machine
- 6. Basic Technical Skills**
- a) Task-01: Holding Service Spoon & Fork
 - b) Task-02: Carrying a Tray / Salver
 - c) Task-03: Laying a Table Cloth
 - d) Task-04: Changing a Table Cloth during service
 - e) Task-05: Placing meal plates & Clearing soiled plates
 - f) Task-06: Stocking Sideboard
 - g) Task-07: Service of Water
 - h) Task-08: Using Service Plate & Crumbing Down
 - i) Task-09: Napkin Folds
 - j) Task-10: Changing dirty ashtray
 - k) Task-11: Cleaning & polishing glassware
- 7. Tea – Preparation & Service**
- 8. Coffee - Preparation & Service**

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9. Juices & Soft Drinks - Preparation & Service
a) Mocktails- Juices, Soft drinks, Mineral water, Tonic water
10. Cocoa & Malted Beverages – Preparation & Service

BASICS OF HOUSE KEEPING-I LAB.

Subject Code: BHOM3-111

L T P C

0 0 2 1

1. Sample Layout of Guest Rooms

- a) Single room
- b) Double room
- c) Twin room
- d) Suite

2. Guest Room Supplies and Position

- a) Standard room
- b) Suite
- c) VIP room special amenities

3. Cleaning Equipment (Manual and Mechanical)

- a) Familiarization
- b) Different parts
- c) Function
- d) Care and maintenance

4. Public Area Cleaning (Cleaning Different Surface)

Wood

- a) polished
- b) painted
- c) Laminated

Silver/EPNS

- a) Plate powder method
- b) Polivit method
- c) Proprietary solution (Silvo)

Brass

- a) Traditional/ domestic 1 Method
- b) Proprietary solution 1 (brasso)

Glass

- a) Glass cleanser
- b) Economical method (newspaper)

Floor - Cleaning and Polishing of Different Types

- a) Wooden
- b) Marble
- c) Terrazzo/ mosaic etc.

Wall - Care and Maintenance of different Types and Parts

- a) Skirting
- b) Dado
- c) Different types of paints (distemper Emulsion, oil paint etc.)

Maid's Trolley

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- a) Contents
 - b) Trolley setup
- Familiarizing with different Types of Rooms, Facilities and Surfaces**

- a) Twin/ double
- b) Suite
- c) Conference etc.

FUNDAMENTALS OF COMPUTERS-I LAB.

Subject Code: BHOM3-112

L T P C

0 0 2 1

1. Windows Operations

- a) Creating Folders
- b) Creating Shortcuts
- c) Copying Files/Folders
- d) Renaming Files/Folders
- e) Deleting Files
- f) Exploring Windows
- g) Quick Menus

2. MS-OFFICE 2007/MS-WORD

Creating a Document

- a) Entering Text
- b) Saving the Document
- c) Editing a Document already saved to Disk
- d) Getting around the Document
- e) Find and Replace Operations
- f) Printing the Document

Formatting a Document

- a) Justifying Paragraphs
- b) Changing Paragraph Indents
- c) Setting Tabs and Margins
- d) Formatting Pages and Documents
- e) Using Bullets and Numbering
- f) Headers/Footers
- g) Pagination

Special Effects

- a) Print Special Effects, E.g. Bold, Underline, Superscripts, Subscript
- b) Changing Fonts
- c) Changing Case

Cut, Copy and Paste Operation

- a) Marking Blocks
- b) Copying and Pasting a Block
- c) Cutting and Pasting a Block
- d) Deleting a Block
- e) Formatting a Block
- f) Using Find and Replace in a Block

Using MS-Word Tools

- a) Spelling and Grammar
- b) Mail Merge
- c) Printing Envelops and Labels

Tables

- a) Create
- b) Delete
- c) Format

Graphics

- a) Inserting Clip arts
- b) Symbols (Border/Shading)
- c) Word Art

Print Options

- a) Previewing the Document
- b) Printing a whole Document
- c) Printing a Specific Page
- d) Printing a selected set
- e) Printing Several Documents
- f) Printing More than one Copies

3. MS Office 2007/MS-Excel

- a) How to use Excel
- b) Starting Excel
- c) Parts of the Excel Screen
- d) Parts of the Worksheet
- e) Navigating in a Worksheet
- f) Getting to know mouse pointer shapes

Creating a Spreadsheet

- a) Starting a new worksheet
- b) Entering the three different types of data in a worksheet
- c) Creating simple formulas
- d) Formatting data for decimal points
- e) Editing data in a worksheet
- f) Using AutoFill
- g) Blocking data
- h) Saving a worksheet
- i) Exiting excel

Making the Worksheet Look Pretty

- a) Selecting cells to format
- b) Trimming tables with Auto Format
- c) Formatting cells for:
 - i) Currency
 - ii) Comma
 - iii) Percent
 - iv) Decimal
 - v) Date

- d) Changing columns width and row height
- e) Aligning text
 - i) Top to bottom
 - ii) Text wrap
 - iii) Re ordering Orientation
 - iv) F Using Borders

Going Through Changes

- a) Opening workbook files for editing
- b) Undoing the mistakes
- c) Moving and copying with drag and drop
- d) Copying formulas
- e) Moving and Copying with Cut, Copy and Paste
- f) Deleting cell entries
- g) Deleting columns and rows from worksheet
- h) Inserting columns and rows in a worksheet
- i) Spell checking the worksheet

Printing the Worksheet

- a) Previewing pages before printing
- b) Printing from the Standard toolbar
- c) Printing a part of a worksheet
- d) Changing the orientation of the printing
- e) Printing the whole worksheet in a single page
- f) Adding a header and footer to a report
- g) Inserting page breaks in a report
- h) Printing the formulas in the worksheet

Additional Features of a Worksheet

- a) Splitting worksheet window into two four panes
- b) Freezing columns and rows on-screen for worksheet title
- c) Attaching comments to cells
- d) Finding and replacing data in the worksheet
- e) Protecting a worksheet
- f) Function commands

Maintaining Multiple Worksheet

- a) Moving from sheet in a worksheet
- b) Adding more sheets to a workbook
- c) Deleting sheets from a workbook
- d) Naming sheet tabs other than sheet 1, sheet 2 and so on
- e) Copying or moving sheets from one worksheet to another

Creating Graphics/Charts

- a) Using Chart wizard
- b) Changing the Chart with the Chart Toolbar
- c) Formatting the chart's axes
- d) Adding a text box to a chart
- e) Changing the orientation of a 3-D chart
- f) Using drawing tools to add graphics to chart and worksheet
- g) Printing a chart with printing the rest of the worksheet data

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

Excel's Database Facilities

- a) Setting up a database
- b) Sorting records in the database

Internet & E-mail – PRACTICAL

FOOD PRODUCTION-II

Subject Code: BHOM3-213

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

Duration: 37 Hrs.

Objectives and Expected Outcomes

To develop knowledge and interest in the science and art of Indian cuisine with emphasis on different regional cuisine, Indian spices, masalas, ethnic eating traditions and Indian Cooking. The students should have full knowledge of regional cuisine of India. They should be able to prepare menus for various food outlets.

UNIT-I

Food Commodities

- a) Classification with examples and uses in Cookery
- b) Game- meaning- types with examples
- c) Fruits- kinds with examples.
- d) Nuts- names of nuts commonly used in cooking.
- e) Cream- types, description and their uses.
- f) Yogurt- types
- g) Cereals- types and uses.
- h) Pulses used in Indian cooking
- i) Herbs- uses of herbs
- j) Spices & condiments- uses of different spices and condiments
- k) Coloring and Flavoring Agents: Name, Types and Uses.

UNIT-II

Basic Indian Masalas & Gravies

- a) Garam masala, pulao masala, curry powder, sambhar powder, rasam powder, chaat masala, tandoori marination white, red, green and yellow gravies.

Indian Regional Cuisine

- a) A detailed study on North and South Indian Regional Cuisine: Goa, Kashmir, Andhra Pradesh, Karnataka, Tamil Nadu, Bengal, Assam, Gujarat, Punjab, Rajasthan etc., as regarding ingredients used, traditional preparation methods, utensils and accompaniments.

UNIT-III

Meat Cookery

- a) Fish -classification with examples selection & cuts of fish, cooking of fish.
- b) Poultry- selection of poultry classification bases on size, uses of each type.
- c) Butchery -selection, cuts size and uses of lamb, mutton, beef, veal & pork
- d) Bacon, Ham, Gammon and Steaks -Description of steaks from sirloin & fillet.

UNIT-IV

Vegetable Cookery

- a) Vegetables -classification of vegetables, importance of vegetables in diet, cooking of vegetables.
- b) Retention of color, flavor, and nutrients while cooking.

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- c) Potatoes - Styles of presenting potatoes and their description.
- d) Storage -Principles of Vegetable Storage.

Quantity Food Production

- a) Introduction to Large scale commercial cooking.
- b) Layout of a large kitchen, staff hierarchy and production workflows

Recommended Books

1. Krishna Arora, 'Theory of Cookery'.
2. Thangam Philip, 'Modern Cookery'.
3. Montagne, 'Larousse Gastronomique'.
4. Arvind Saraswat, 'Professional Chef'.
5. Parvinder Bali, 'Food Production Operation'.

FOOD AND BEVERAGE SERVICE-II

Subject Code: BHOM3-214

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

Duration: 37 Hrs.

UNIT-I

MEALS & MENU PLANNING:

- a) Origin of Menu
- b) Objectives of Menu Planning
- c) Types of Menu
- d) Courses of French Classical Menu
 - i) Sequence
 - ii) Examples from each course
 - iii) Cover of each course
 - iv) Accompaniments
- e) French Names of dishes
- f) Types of Meals
 - i) Early Morning Tea
 - ii) Breakfast (English, American Continental, Indian)
 - iii) Brunch
 - iv) Lunch
 - v) Afternoon/High Tea
 - vi) Dinner
 - vii) Supper

UNIT-II

PREPARATION FOR SERVICE

- a) Organizing Mise-en-scene
- b) Organizing Mise en place

TYPES OF FOOD SERVICE

- a) Silver service
- b) Pre-plated service
- c) Cafeteria service
- d) Room service
- e) Buffet service
- f) Gueridon service

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g) Lounge service

UNIT-III

SALE CONTROL SYSTEM

- a) KOT/Bill Control System (Manual)
 - i) Triplicate Checking System
 - ii) Duplicate Checking System
 - iii) Single Order Sheet
 - iv) Quick Service Menu & Customer Bill
- b) Making bill
- c) Cash handling equipment
- d) Record keeping (Restaurant Cashier)

UNIT-IV

NON-ALCOHOLIC BEVERAGES

Classification (Nourishing, Stimulating and Refreshing Beverages)

a) Tea

- i) Origin & Manufacture
- ii) Types & Brands

b) Coffee

- i) Origin & Manufacture
- ii) Types & Brands

c) Juices and Soft Drinks

- i) Service of Juices & Soft Drinks
- ii) Brand Names of Juices, Soft Drinks, Mineral Water, Tonic Water
- iii) Cocoa & Malted Beverages
- iv) Origin & Manufacture

d) Tobacco

- i) History
- ii) Processing for Cigarettes, Pipe Tobacco & Cigars
- iii) Cigars –Shapes /Sizes/Colours
- iv) Storage of Cigarettes & Cigars

e) Table Cheeses

- i) Introduction
- ii) Types
- iii) Production
- iv) Brands and Service
- v) Storage

Recommended Books

1. Denis Lillicrap, 'Food & Beverage Service'.
2. Vijay Dhawan, 'Food & Beverage Service'.
3. Rao J. Suhas, 'Food & beverage Service'.

FRONT OFFICE - I

Subject Code: BHOM3-215

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

Duration: 37 Hrs.

UNIT-I

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

Tariff Structure

- a) Basis of charging
- b) Plans, competition, customer's profile, standards of service & amenities
- c) Hubbart formula
- d) Different types of tariffs
 - i) Rack Rate
 - ii) Discounted Rates for Corporates, Airlines, Groups & Travel Agents

Front Office and Guest Handling

- a) Introduction to guest cycle
- b) Pre arrival
- c) Arrival
- d) During guest stay
- e) Departure
- f) After departure

UNIT-II

Reservations

- a) Importance of reservation
- b) Modes of reservation
- c) Channels and sources (FITs, Travel Agents, Airlines, GITs)
- d) Types of reservations (Tentative, confirmed, guaranteed etc.)
- e) Systems (non-automatic, semi-automatic fully automatic)
- f) Cancellation
- g) Amendments
- h) Overbooking

UNIT-III

Room Selling Techniques

- a) Up selling
- b) Discounts

Arrivals

- a) Preparing for guest arrivals at Reservation and Front Office
- b) Receiving of guests
- c) Pre-registration
- d) Registration (non-automatic, semi-automatic and automatic)
- e) Relevant records for FITs, Groups, Air crews & VIPs

UNIT-IV

During the Stay Activities

- a) Information services
- b) Message and Mail Handling
- c) Key Handling
- d) Guest special Requests
- e) Hospitality desk
- f) Complaints handling
- g) Guest handling
- h) Guest history

Front Office Co-ordination

- c) With other departments of hotel

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

Recommended Books

1. Sudhir, Andrews, 'Front Office Training Manual'.
2. Kasavana & Brooks, 'Managing Front Office Operations'.
3. Ahmed Ismail, 'Front Office – Operations and Management', Thomson Delmar.
4. Michael Kasavana & Cahell, 'Managing Computers in Hospitality Industry'.
5. Colin Dix & Chris Baird, 'Front Office Operations'.
6. Jatashankar R. Tewari, 'Hotel Front Office Operation and Management'.

HOUSE KEEPING-II

Subject Code: BHOM3-216

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

Duration: 37 Hrs.

UNIT-I

Housekeeping Supervision

- a) Importance of Inspection
- b) Checklist for Inspection
- c) Typical Areas usually neglected where special attention is required.
- d) Self-Supervision Techniques for Cleaning Staff
- e) Degree of Discretion / Delegation to Cleaning Staff

UNIT-II

Linen/Uniform/Tailor Room

- a) Layout
- b) Types of Linen, Sizes, and Linen Exchange Procedure
- c) Selection of Linen
- d) Storage Facilities and Conditions
- e) Par Stock: Factors affecting Par Stock, Calculation of Par Stock
- f) Discard Management
- g) Linen Inventory System
- h) Uniform Designing: Importance, Types, Characteristics, Selection, Par Stock
- i) Function of Tailor Room
- j) Managing Inventory
- k) Par level of linen, uniform, guest loan items, machines & equipment, cleaning supplies & guest supplies
- l) Indenting from stores.

UNIT-III

Cleaning Procedure & Frequency Schedules

a) Guest Room

- i) Prepare to clean
- ii) Clean the guest room (bed making)
- iii) Replenishment of Supplies & linen
- iv) Inspection
- v) Deep cleaning
- vi) Second service
- vii) Turn down service

b) Public Area

- i) Lobby, Lounge, Corridors, Pool area, Elevators, Health club, F&B outlet, Office areas.

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ii) V.I.P. Handling

Special Cleaning Programme

- a) Daily, Weekly, Fortnightly and Monthly Cleaning
- b) Routine cleaning, spring cleaning, deep Cleaning.

UNIT-IV

Floor Operations

- a) Rules on the Guest Floor
- b) Key Handling Procedure - types of keys (grand master, floor master, sub master or section or pass key, emergency key, room keys, offices and store keys), computerized key cards, key control register- issuing, return, changing of lock, key belts, unusual occurrences.
- a) Cleaning of Different Types of Floor Surfaces
- b) Special Services - babysitting, second service, freshen up service, valet service.

Care and Cleaning of Metals

- a) Brass, Copper, Silver, EPNS, Bronze, Gun Metal, Chromium pewter, Stainless Steel, Types of tarnish, cleaning agents and methods used.

Recommended Books

- 1. Sudhir Andrews, 'Hotel Housekeeping Training Manual'.
- 2. Grace Brigham, 'Housekeeping for Hotels, Hostels and Hospitals'.
- 3. Joan C Branson & Margaret Lennox, 'Hotel Hostel and Hospital Housekeeping', ELST.
- 4. Margaret Kappa & Aleta Nitschke, 'Managing Housekeeping Operations'.
- 5. Sudhir Andrews, 'Hotel House Keeping', Tata McGraw Hill.
- 6. Tucker Schneider, 'The Professional Housekeeper', VNR.
- 7. G. Raghubalan, 'Hotel House Keeping Operation & Management'.

MRSPTU

HOTEL ENGINEERING

Subject Code: BHOM3-217

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

Duration: 26 Hrs.

UNIT-I

Hotel Maintenance Management

- a) Introduction & Scope in Hotels
- b) Classification and Types
- c) Maintenance Programmes.

Engineering Department

- a) Organization & Setup of the Department
- b) The Staff – Duties and Responsibilities
- c) Requirement of Engineering Workshops.

UNIT-II

Fuels

- a) Types of Fuels available
- b) Gases
- c) Precautions while using them - Heat Parts, BTU, Thermal & Calorific values

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- d) Calculation of heat requirements, Fuel Requirement
- e) Principle of Bunsen burner
- f) Construction of an Industrial Gas Range: Parts & Functions, striking back, causes and remedies of problems.

Electricity

- a) Meaning and use,
- b) Advantage as a type of energy, conductors and nonconductors,
- c) Meaning of ampere, volt, ohm and their relationship, ohm's law,
- d) AC & DC- their differences, advantages and disadvantages, signs and signals, closed and open circuits, causes and dangers, importance of earthing.
- b) General layout of circuits including service entrance, distribution panel boards, calculation of power requirements, meter reading

UNIT-III

Water Management System

- a) Sources of water and its quality
- b) Methods of removal of hardness, description of cold water
- b) Supply from mains and wells, calculations of water requirements and capacity of storage, systems.

Sanitary Systems

- a) Sinks, basins
- b) Water closet, bidets and their fittings
- c) Use of water traps and water seals, water pipes and soil pipes

UNIT-IV

Transport Systems

- a) Passenger elevators, freight elevators
- b) Dumb waiters
- c) Escalators and sidewalks - their operation and maintenance.

Fire Prevention & Protection.

- a) Different types of fires
- b) Fire alarms
- c) Different types of extinguishers
- d) Fire hazards.

Recommended Books

1. N.C. Goyal & K.C. Goyal, 'Textbook of Hotel Maintenance'.
2. Sujit Ghosal, 'Hotel Engineering'.

COMMUNICATION-II

Subject Code: BHOM3-218

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

Duration: 26 Hrs.

UNIT-I

Business Communication

- a) Need
- b) Purpose
- c) Nature
- d) Models

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e) Barriers to communication

f) Overcoming the barriers

Listening on the Job

a) Definition

b) Levels and types of listening

c) Listening barriers

d) Guidelines for effective listening

e) Listening computerization and note taking

UNIT-II

Effective Speaking

a) Restaurant and hotel English

b) Polite and effective enquiries and responses

c) Addressing a group

d) Essential qualities of a good speaker

e) Audience analysis

f) Defining the purpose of a speech, organizing the ideas and delivering the speech

UNIT-III

Non Verbal Communication

a) Definition, its importance and its inevitability

b) Kinesics: Body movements, facial expressions, posture, eye contact etc.

c) Proxemics: The communication use of space

d) Paralanguage: Vocal behaviour and its impact on verbal communication

e) Communicative use of artifacts – furniture, plants, colours, architects etc.

UNIT-IV

Speech Improvement

a) Pronunciation, stress, accent

b) Important of speech in hotels

c) Common phonetic difficulties

d) Connective drills exercises

e) Introduction to frequently used foreign sounds

Using the Telephone

a) The nature of telephone activity in the hotel industry

b) The need for developing telephone skills

c) Developing telephone skills

Recommended Books

1. Wren & Martin, 'English Grammar'.

2. Hotel Journals

3. Magazines

HUMAN VALUES & PROFESSIONAL ETHICS

Subject Code: BHOM3-219

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

Duration: 37 Hrs.

UNIT-I

Course Objectives

To help the students to discriminate between valuable and superficial in the life. To help develop

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the critical ability to distinguish between essence and form, or between what is of value and what is superficial, in life - this ability is to be developed not for a narrow area or field of study, but for everyday situations in life, covering the widest possible canvas. To help students develop sensitivity and awareness; leading to commitment and courage to act on their own belief. It is not sufficient to develop the discrimination ability, it is important to act on such discrimination in a given situation.

Expected Outcomes

Knowingly or unknowingly, our education system has focused on the skill aspects (learning and doing) - it concentrates on providing to its students the skills to do things. In other words, it concentrates on providing "How to do" things. The aspects of understanding "What to do" or "Why something should be done" is assumed. No significant cogent material on understanding is included as a part of the curriculum. A result of this is the production of graduates who tend to join into a blind race for wealth, position and jobs. Often it leads to misuse of the skills; and confusion and wealth that breeds chaos in family, problems in society, and imbalance in nature. This course is an effort to fulfill our responsibility to provide our students this significant input about understanding. This course encourages students to discover what they consider valuable. Accordingly, they should be able to discriminate between valuable and the superficial in real situations in their life. It has been experimented at IITTH, IITK and UPTU on a large scale with significant results.

UNIT-I

1. Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

- Understanding the need, basic guidelines, content and process for Value Education.
- Self-Exploration—what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration.
- Continuous Happiness and Prosperity- A look at basic Human Aspirations
- Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority
- Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- Method to fulfill the above human aspirations: understanding and living in **harmony** at various levels

UNIT-II

2. Understanding Harmony in the Human Being - Harmony in Myself!

- Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
- Understanding the needs of Self ('I') and 'Body' - *Sukh* and *Suvidha*
- Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
- Understanding the characteristics and activities of 'I' and harmony in 'I'
- Understanding the harmony of I with the Body: *Sanyam* and *Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail
- Programs to ensure *Sanyam* and *Swasthya*

UNIT-III

3. Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

- Understanding harmony in the Family- the basic unit of human interaction
- Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfillment to ensure *Ubhay-tripti*; Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship

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- c) Understanding the meaning of *Vishwas*; Difference between intention and competence
- d) Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship
- e) Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva* as comprehensive Human Goals
- f) Visualizing a universal harmonious order in society- Undivided Society (*Akhand Samaj*), Universal Order (*Sarvabhaum Vyawastha*) - from family to world family!

4. Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

- a) Understanding the harmony in the Nature
- b) Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature
- c) Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all pervasive space
- d) Holistic perception of harmony at all levels of existence

UNIT-IV

5. Implications of the above Holistic Understanding of Harmony on Professional Ethics

- a) Natural acceptance of human values
- b) Definitiveness of Ethical Human Conduct
- c) Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
- d) Competence in professional ethics:
 - i) Ability to utilize the professional competence for augmenting universal human order
 - ii) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems
 - iii) Ability to identify and develop appropriate technologies and management patterns for above production systems.
- e) Case studies of typical holistic technologies, management models and production systems
- f) Strategy for transition from the present state to Universal Human Order:
 - i) At the level of individual: as socially and ecologically responsible engineers, technologists and managers
 - ii) At the level of society: as mutually enriching institutions and organizations

Recommended Books

1. R.R. Gaur, R. Sangal, G.P. Bagaria, 'A Foundation Course in Value Education', **2009**.
2. Ivan Illich, 'Energy & Equity', The Trinity Press, Worcester, and HarperCollins, USA, **1974**.
3. E.F. Schumacher, 'Small is Beautiful: a study of economics as if people mattered', Blond & Briggs, Britain, **1973**,
4. A. Nagraj, 'Jeevan Vidya ek Paricha', Divya Path Sansthan, Amarkantak, **1998**.
5. Sussan George, 'How the Other Half Dies', Penguin Press, **1976, Reprinted 1986, 1991**.
6. P.L. Dhar, R.R. Gaur, 'Science and Humanism', Commonwealth Publishers, **1990**.
7. A.N. Tripathy, 'Human Values', New Age International Publishers, **2003**.
8. Subhas Palekar, 'How to Practice Natural Farming', Pracheen (Vaidik) Krishi Tantra Shodh, Amravati, **2000**.
9. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 'Limits to Growth – Club of Rome's Report', Universe Books, **1972**.
10. E.G. Seebauer & Robert L. Berry, 'Fundamentals of Ethics for Scientists & Engineers', Oxford University Press, **2000**.

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

11. M. Govindrajran, S. Natrajan & V.S. Senthil Kumar, 'Engineering Ethics (including Human Values)', Eastern Economy Edn., Prentice Hall of India Ltd.
12. B.P. Banerjee, 'Foundations of Ethics and Management', Excel Books, 2005.
13. B.L. Bajpai, 'Indian Ethos and Modern Management', New Royal Book Co., Lucknow, 2004, Reprinted 2008.

FOOD PRODUCTION-II LAB.

Subject Code: BHOM3-220

L T P C

0 0 2 1

1.

- a) Meat – Identification of various cuts, Carcass demonstration
- b) Preparation of basic Cuts-Lamb and Pork Chops, Tornado, Fillet, Steaks and Escalope
- c) Fish-Identification & Classification
- d) Cuts and Folds of fish
- e) Identification, Selection and processing of Meat, Fish and poultry.
- f) Slaughtering and dressing

2. Preparation of Menu

- a) **Salads & soups-** waldrof salad, Fruit salad, Russian salad, salade nicoise,
- b) Cream (Spinach, Vegetable, Tomato),
- c) Puree (Lentil, Peas Carrot)
- d) International soups

3. Chicken, Mutton and Fish Preparations-

- a) Fish orly, a la anglaise, colbert, meuniere, poached, baked
- b) Entrée-Lamb stew, hot pot, shepherd's pie, grilled steaks & lamb/Pork chops, Roast chicken, grilled chicken, Leg of Lamb, Beef

4. Simple Potato Preparations- Basic potato dishes

5. Vegetable Preparations- Basic vegetable dishes

6. Indian Cookery: Rice dishes, Breads, Main course, Basic Vegetables, Paneer Preparations.

BAKERY-II LAB.

Subject Code: BHOM3-221

L T P C

0 0 2 1

1. PASTRY: Demonstration and Preparation of dishes using varieties of Pastry

- a) Short Crust – Jam tarts, Turnovers
- b) Laminated – Palmiers, Khara Biscuits, Danish Pastry, Cream Horns
- c) Choux Paste – Eclairs, Profiteroles

2. COLD SWEET

- a) Honeycomb mould
- b) Butterscotch sponge
- c) Coffee mousse
- d) Lemon sponge
- e) Trifle
- f) Blancmange
- g) Chocolate mousse

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

h) Lemon soufflé

3. HOT SWEET

a) Bread & butter pudding

b) Caramel custard

c) Albert pudding

d) Christmas pudding

4. INDIAN SWEETS

Simple ones such as gajjar halwa, kheer

FOOD & BEVERAGE SERVICE-II LAB.

Subject Code: BHOM3-222

L T P C

0 0 2 1

1. TABLE LAY-UP & SERVICE

a) Task-01: A La Carte Cover

b) Task-02: Table d" Hote Cover

c) Task-03: English Breakfast Cover

d) Task-04: American Breakfast Cover

e) Task-05: Continental Breakfast Cover

f) Task-06: Indian Breakfast Cover

g) Task-07: Afternoon Tea Cover

h) Task-08: High Tea Cover

2. TRAY/TROLLEY SET-UP & SERVICE

a) Task-01: Room Service Tray Setup

b) Task-02: Room Service Trolley Setup

3. PREPARATION FOR SERVICE (RESTAURANT)

a) Organizing Mise-en-scene

b) Organizing Mise-en-Place

c) Opening, Operating & Closing duties

4. PROCEDURE FOR SERVICE OF A MEAL

a) Task-01: Taking Guest Reservations

b) Task-02: Receiving & Seating of Guests

c) Task-03: Order taking & Recording

d) Task-04: Order processing (passing orders to the kitchen)

e) Task-05: Sequence of service

f) Task-06: Presentation & Enchasing the Bill

g) Task-07: Presenting & collecting Guest comment cards

h) Task-08: Seeing off the Guest

5. SOCIAL SKILLS

a) Task-01: Handling Guest Complaints

b) Task-02: Telephone manners

c) Task-03: Dining & Service etiquettes

6. SERVICE OF TOBACCO

a) Cigarettes & Cigars

FRONT OFFICE-I LAB.

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

Subject Code: BHOM3-223

L T P C

0 0 2 1

- a) Basic Manners and Attributes for Front Office Operations.
- b) Communication Skills – verbal and non-verbal.
- b) Preparation and study of Countries – Capitals & Currency, Airlines & Flag charts, Credit Cards, Travel Agencies etc.
- a) Telecommunication Skills.
- b) Forms & formats related to Front office.
- c) Hotel visits – WTO sheets.
- d) Identification of equipment, work structure and stationery.
- e) Procedure of taking reservations – in person and on telephones.
- f) Converting enquiry into valid reservations.
- g) Role play – Check-in / Check – out / Walk-in / FIT / GIT / etc.; VIP / CIP / H.G etc.
- h) Suggestive selling.

HOUSE KEEPING-II LAB.

Subject Code: BHOM3-224

L T P C

0 0 2 1

Servicing guest room (checkout/ occupied and vacant) ROOM

- a) Task 1- open curtain and adjust lighting
- b) Task 2-clean ash and remove trays if any
- c) Task 3- strip and make bed
- d) Task 4- dust and clean drawers and replenish supplies
- e) Task 5-dust and clean furniture, clockwise or anticlockwise
- f) Task 6- clean mirror
- g) Task 7- replenish all supplies
- h) Task 8-clean and replenish minibar
- i) Task 9-vaccum clean carpet
- j) Task 10- check for stains and spot cleaning

BATHROOM

- a) Task 1-disposed soiled linen
- b) Task 2-clean ashtray
- c) Task 3-clean WC
- d) Task 4-clean bath and bath area
- e) Task 5-wipe and clean shower curtain
- f) Task 6- clean mirror
- g) Task 7-clean tooth glass
- h) Task 8-clean vanitory unit
- i) Task 9- replenish bath supplies
- j) Task 10- mop the floor

BED MAKING SUPPLIES (DAY BED/NIGHT BED)

- a) Step 1-spread the first sheet (from one side)
- b) Step 2-make miter corner (on both corner of your side)

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- c) Step 3- spread second sheet (upside down)
- d) Step 4-spread blanket
- e) Step 5- Spread crinkle sheet
- f) Step 6- make two folds on head side with all three (second sheet, blanket and crinkle sheet)
- g) Step 7- tuck the folds on your side
- h) Step 8- make miter corner with all three on your side
- i) Step 9- change side and finish the bed in the same way
- j) Step 10- spread the bed spread and place pillow

RECORDS

- a) Room occupancy report
- b) Checklist
- c) Floor register
- d) Work/maintenance order
- e) Lost and found
- f) Maid's report
- g) Housekeeper's report
- h) Log book
- i) Guest special request register
- j) Record of special cleaning
- k) Call register
- l) VIP list
- m) Floor linen book/ register

MINIBAR MANAGEMENT

- a) Issue
- b) stock taking
- c) checking expiry date

HANDLING ROOM LINEN/GUEST SUPPLIES

- a) Maintaining register/ record
- b) Replenishing floor pantry
- c) stock taking

GUEST HANDLING

- a) Guest request
- b) Guest complaints

FOOD PRODUCTION-III

Subject Code: BHOM3-325

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

Duration: 37 Hrs.

**QUANTITY FOOD PRODUCTION
UNIT-I**

Equipment

- a) Equipment required for mass/volume feeding
- b) Heating and Cooling equipment
- c) Care and maintenance of this equipment
- d) Modern developments in equipment manufacture

UNIT-II

Menu Planning

- a) Basic principles of menu planning – recapitulation
- b) Points to consider in menu planning for various volume feeding outlets such as Industrial, Institutional, Mobile Catering Units.
- c) Planning menus for School/college students, Industrial workers, Hospitals, Outdoor parties, Theme dinners, Transport facilities, cruise lines, airlines, railway
- d) Nutritional factors for the above

UNIT-III

Indenting

- a) Principles of Indenting for volume feeding
- b) Portion sizes of various items for different types of volume feeding
 - i) Modifying recipes for indenting for large scale catering
 - ii) Practical difficulties while indenting for volume feeding

Planning

Principles of planning for quantity food production with regard to

- a) Space allocation
- b) Equipment selection
- c) Staffing

UNIT-IV

Volume Feeding

- a) **Institutional and Industrial Catering**
 - i) Types of Institutional & Industrial Catering
 - ii) Problems associated with this type of catering
 - iii) Scope for development and growth
- b) **Hospital Catering**
 - i) Highlights of Hospital Catering for patients, staff, visitors
 - ii) Diet menus and nutritional requirements
- c) **Off Premises Catering**
 - i) Reasons for growth and development
 - ii) Menu Planning and Theme Parties
 - iii) Concept of a Central Production Unit
 - iv) Problems associated with off-premises catering
- d) **Mobile Catering**
 - i) Characteristics of Rail, Airline (Flight Kitchens and Sea Catering), Branches of Mobile Catering
- e) **Quantity Purchase & Storage**
 - i) Introduction to purchasing
 - ii) Purchasing system
 - iii) Purchase specifications
 - iv) Purchasing techniques
 - v) Storage

Recommended Books

1. Quantity Food Production
2. Taste of India
3. Flavours of India

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4. Heritage of India
5. Prashad
6. Cooking Delights of the Maharajas
7. Parvinder Bali, 'Food Production Operation'.

FOOD & BEVERAGE SERVICE-III

Subject Code: BHOM3-326

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

Duration: 37 Hrs.

ALCOHOLIC BEVERAGES

Wines

- a) Introduction & definition wines
- b) Classification
 - i) Table Wines
 - ii) Sparkling Wines
 - iii) Fortified Wines
 - iv) Aromatized Wines
- c) Structure & Parts of Grape
- d) How to read a Wine label?
- e) Terminology of wine
- f) Types of soil suitable for wine production
- g) Wine making steps:
 - i) Still/Table Wines
 - ii) Sparkling Wines
- h) Types and examples of fortified & aromatized wines.
- i) Wine diseases
- j) Wines in Detail – (France, Germany, Italy, Australia)
 - i) Regions
 - ii) Sub Regions (only of France)
 - iii) Grape variety used for both Red & White wines
 - iv) Wine Laws
 - v) Brand names of Wines from each region & sub region
 - vi) Brand names of:
 1. Spain,
 2. Portugal,
 3. South Africa
 4. India
 5. California
 6. U.S.A
 7. Chile
 8. New Zealand
- k) Food and Wine Harmony
- l) Wine Glasses and Equipment
- m) Storage and Service of Wine

Beers

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- a) Introduction
- b) Ingredients used
- c) Production
- d) Types and Brands, Indian and international
- e) Service of bottled, canned and draught beers

Other Fermented and Brewed Beverages (In Brief)

- a) Sake
- b) Cider
- c) Perry
- d) Alcohol free wines

Recommended Books

1. Denis Lillicrap, 'Food & Beverage Service'.
2. Vijay Dhawan, 'Food & Beverage Service'.
3. Rao J. Suha, 'Food & Beverage Service'.

FRONT OFFICE-III

Subject Code: BHOM3-327

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

Duration: 37 Hrs.

UNIT-I

Computer Application in Front Office Operation

- a) Fidelio
- b) Amadeus

Front office (Accounting)

- a) Accounting fundamentals
- b) Guest and non-guest accounts
- c) Accounting system
(Non-automated, semi-automated and fully automated)

UNIT-II

Check out Procedures

- a) Guest accounts settlement
- b) Cash and credit
- c) Indian currency and foreign currency
- d) Transfer of guest accounts
- e) Express check out

UNIT-III

Control of Cash and Credit Night Auditing

- a) Functions
- b) Audit procedures (Non automated, semi-automated and fully automated)

UNIT-IV

Front office and guest safety and security

- a) Importance of security systems
- b) Safe deposit
- c) Key control
- d) Emergency situations (Accident, illness, theft, fire, bomb)

French

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- a) Expressions de politesse et les commander et Expressions d'encouragement
- b) Basic conversation related to Front Office activities such as
 - i) Reservations (personal and telephonic)
 - ii) Reception (Doorman, Bell Boys, Receptionist etc.)
 - iii) Cleaning of Room & change of Room etc.

Recommended Books

- 1. Sudhir Andrews, 'Front Office Training Manual'.
- 2. Kasavana & Brooks, 'Managing Front Office Operations'.
- 3. Ahmed Ismail, 'Front Office – Operations and Management', Thomson Delmar.
- 4. Michael Kasavana & Cahell, 'Managing Computers in Hospitality Industry'.
- 5. Colin Dix & Chris Baird, 'Front Office Operations'.
- 6. Jatashankar R. Tewari, 'Hotel Front Office Operation and Management'.

ACCOMMODATION OPERATION-I

Subject Code: BHOM3-328

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

Duration: 37 Hrs.

UNIT-I

Laundry

- a) Commercial and On-site Laundry
- b) Flow process of Industrial Laundering-OPL
- c) Stages in the Wash Cycle
- d) Laundry Equipment and Machines
- e) Layout of the Laundry
- f) Laundry Agents
- g) Dry Cleaning
- h) Guest Laundry/Valet service
- i) Stain removal

UNIT-II

Flower Arrangement

- a) Flower arrangement in Hotels
- b) Equipment and material required for flower arrangement
- c) Conditioning of plant material
- d) Styles of flower arrangements
- e) Principles of design as applied to flower arrangement

Indoor Plants

- a) Selection and care

UNIT-III

Routine Systems and Records of Housekeeping Department

- a) Reporting Staff placement
- b) Room Occupancy Report
- c) Guest Room Inspection
- d) Entering Checklists, Floor Register, Work Orders, Log Sheet.
- e) Lost and Found Register and Enquiry File
- f) Maid's Report and Housekeeper's Report
- g) Handover Records

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- h) Guest's Special Requests Register
- i) Record of Special Cleaning
- j) Call Register
- k) VIP Lists

UNIT-IV

Inter Departmental Relationship

- a) With Front Office
- b) With Maintenance
- c) With Security
- d) With Stores
- e) With Accounts
- f) With Personnel
- g) Use of Computers in House Keeping department

Recommended Books

1. Sudhir Andrews, 'Hotel Housekeeping Training Manual'.
2. Grace Brigham, 'Housekeeping for Hotels, Hostels and Hospitals'.
3. Joan C Branson & Margaret Lennox, 'Hotel Hostel and Hospital Housekeeping', ELST.
4. Margaret Kappa & Aleta Nitschke, 'Managing Housekeeping Operations'.
5. Sudhir Andrews, 'Hotel House Keeping', Tata McGraw Hill.
6. Tucker Schneider, 'The Professional Housekeeper', VNR.
7. G. Raghubalan, 'Hotel House Keeping Operation & Management'.

MRSPTU

FOOD & BEVERAGE CONTROLS

Subject Code: BHOM3-329

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

Duration: 37 Hrs.

UNIT-I

Food Cost Control

- a) Introduction to Cost Control
- b) Define Cost Control
- c) The Objectives and Advantages of Cost Control
- d) Basic costing
- e) Food costing

UNIT-II

Food Control Cycle

- a) Purchasing Control
- b) Aims of Purchasing Policy
- c) Job Description of Purchase Manager/Personnel
- d) Types of Food Purchase

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- e) Quality Purchasing
- f) Food Quality Factors for different commodities
- g) Definition of Yield
- h) Tests to arrive at standard yield
- i) Definition of Standard Purchase Specification
- j) Advantages of Standard Yield and Standard Purchase Specification
- k) Purchasing Procedure
- l) Different Methods of Food Purchasing
- m) Sources of Supply
- n) Purchasing by Contract
- o) Periodical Purchasing
- p) Open Market Purchasing
- q) Standing Order Purchasing
- r) Centralized Purchasing
- s) Methods of Purchasing in Hotels
- t) Purchase Order Forms
- u) Ordering Cost
- v) Carrying Cost
- w) Economic Order Quantity
- x) Practical Problems

Receiving Control

- a) Aims of Receiving
- b) Job Description of Receiving Clerk/Personnel
- c) Equipment required for receiving
- d) Documents by the Supplier (including format)
- e) Delivery Notes
- f) Bills/Invoices
- g) Credit Notes
- h) Statements
- i) Records maintained in the Receiving Department
- j) Goods Received Book
- k) Daily Receiving Report
- l) Meat Tags
- m) Receiving Procedure
- n) Blind Receiving
- o) Assessing the performance and efficiency of receiving department
- p) Frauds in the Receiving Department
- q) Hygiene and cleanliness of area

UNIT-III

Storing & Issuing Control

- a) Storing Control
- b) Aims of Store Control
- c) Job Description of Food Store Room Clerk/personnel
- d) Storing Control
- e) Conditions of facilities and equipment
- f) Arrangements of Food

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- g) Location of Storage Facilities
- h) Security
- i) Stock Control
- j) Two types of foods received – direct stores (Perishables/nonperishables)
- k) Stock Records Maintained Bin Cards (Stock Record Cards/Books)
- l) Issuing Control
- m) Requisitions
- n) Transfer Notes
- o) Perpetual Inventory Method
- p) Monthly Inventory/Stock Taking
- q) Pricing of Commodities
- r) Stock taking and comparison of actual physical inventory and Book
- s) Value
- t) Stock levels
- u) Practical Problems
- v) Hygiene & Cleanliness of area

UNIT-IV

Production Control

- a) Aims and Objectives
- b) Forecasting
- c) Fixing of Standards
 - i) Definition of standards (Quality & Quantity)
 - ii) Standard Recipe (Definition, Objectives and various tests)
 - iii) Standard Portion Size (Definition, Objectives and equipment used)
 - iv) Standard Portion Cost (Objectives & Cost Cards)
- d) Computation of staff meals

Sales Control

- a) Sales – ways of expressing selling, determining sales price, Calculation of selling price, factors to be considered while fixing selling price
- b) Matching costs with sales
- c) Billing procedure – cash and credit sales
- d) Cashier's Sales summary sheet

COMMUNICATION-III

Subject Code: BHOM3-330

L T P C
2 0 0 2

Duration: 26 Hrs.

Non-verbal Communication

- a) Definition, its importance and its inevitability
- b) **Kinesics:** Body movements, facial expression, posture, eye contact etc.
- c) **Protemies:** The communication use of space
- d) **Paralanguage:** Vocal behaviour and its impact on verbal communication
- e) Communicative use of artifacts-furniture, plants, colours, architects etc.

Speech Improvement

- a) Pronunciation, stress accent

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- b) Importance of speech in hotels
- c) Common phonetic difficulties
- d) Connective drill exercises
- e) Introduction to frequently used foreign sounds

Using the Telephone

- a) The nature of telephone activity in the hotel industry
- b) The need for developing telephone skills
- c) Developing telephone skills

FOOD PRODUCTION-III LAB.

Subject Code: BHOM3-331

L T P C

0 0 2 1

Regional Cuisine----Quantity Food Kitchen

- a) Awadh
- b) Bengal
- c) Goa
- d) Gujrat
- e) Hyderabad
- f) Kashmiri
- g) Maharashtra
- h) Punjabi
- i) Rajasthan
- j) South India (Tamil Nadu, Karnataka, Kerala)

MRSPTU

FOOD & BEVERAGE SERVICE-III LAB.

Subject Code: BHOM3-332

L T P C

0 0 2 1

Service of Wines, Beer

Regional Cuisine – Practical

- a) Menu Writing of Regional dishes
- b) Table Laying of Regional dishes
- c) Service of Regional dishes

FRONT OFFICE-III LAB.

Subject Code: BHOM3-333

L T P C

0 0 2 1

Suggested Tasks on Fidelio:

- a) Hotel function keys
- b) Create and update guest profiles
- c) Make FIT reservation

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- d) Send confirmation letters
- e) Printing registration cards
- f) Make an Add-on reservation
- g) Amend a reservation
- h) Cancel a reservation-with deposit and without deposit
- i) Log onto cashier code
- j) Process a reservation deposit
- k) Pre-register a guest
- l) Put message and locator for a guest
- m)Put trace for guest
- n) Check in a reserved guest
- o) Check in day use
- p) Check –in a walk-in guest
- q) Maintain guest history
- r) Issue a new key
- s) Verify a key
- t) Cancel a key
- u) Issue a duplicate key
- v) Extend a key
- w)Programme keys continuously
- x) Re-programme keys
- y) Programme one key for two rooms

Suggestive List of Tasks for Front Office Operation System

- a) How to make a reservation?
- b) How to create and update guest profiles?
- c) How to update guest folio?
- d) How to print guest folio?
- e) How to make sharer reservation?
- f) How to feed remarks in guest history?
- g) How to add a sharer?
- h) How to make add on reservation?
- i) How to amend a reservation?
- j) How to cancel a reservation?
- k) How to make group reservation?
- l) How to make a room change on the system?
- m)How to log on cashier code?
- n) How to close a bank at the end of each shift?
- o) How to put a routing instruction?
- p) How to process charges in?
- q) How to process a guest check out?
- r) How to check out a folio
- s) How to process deposit for arriving guest?
- t) How to process deposit for in house guest?
- u) How to check room rate variance report?
- v) How to process part settlements?
- w)How to tally allowance for the day at night?

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- x) How to tally paid outs for the day at night?
- y) How to tally fore?

ACCOMMODATION OPERATION-I LAB.

Subject Code: BHOM3-334 **L T P C**
0 0 2 1

1. Layout of Linen and Uniform Room/Laundry
2. Laundry Machinery and Equipment
3. Stain Removal
4. Flower Arrangement
5. Selection and Designing of Uniforms

GD & SEMINAR LAB.

Subject Code: BHOM3-335 **L T P C**
0 0 2 1

Each student is required to participate in the seminar and group discussions session. The topics of the seminars would be based on the theory subjects of the programme as well as condition of the market for the hospitality students as well as other problems related to travel and tourism operation. Forever at the time of examination each student would be given a topic of seminar and group discussion well in advance on the basis of seminar presentation and active participation in group discussion. Internal and external examiner will award marks separately and average marks will be finally awarded to each student.

FOOD PRODUCTION-IV

Subject Code: BHOM3-436 **L T P C** **Duration: 37 Hrs.**
3 0 0 3

UNIT-I

LARDER

1. LAYOUT & EQUIPMENT

- a) Introduction of Larder Work
- b) Definition
- c) Equipment found in the larder
- d) Layout of a typical larder with equipment and various sections

2. TERMS & LARDER CONTROL

- a) Common terms used in the Larder and Larder control
- b) Essentials of Larder Control
- c) Importance of Larder Control
- d) Devising Larder Control Systems
- e) Leasing with other Departments
- f) Yield Testing

3. DUTIES AND RESPONSIBILITIES OF THE LARDER CHEF

- A. Functions of the Larder
- B. Hierarchy of Larder Staff
- C. Sections of the Larder
- D. Duties & Responsibilities of larder Chef

UNIT-II

CHARCUTIERIE

1. SAUSAGE

- a) Introduction to charcutierie
- b) Sausage - Types & Varieties
- c) Casings - Types & Varieties
- d) Fillings - Types & Varieties
- e) Additives & Preservatives

2. FORCEMEATS

- a) Types of forcemeats
- b) Preparation of forcemeats
- c) Uses of forcemeats

3. BRINES, CURES & MARINADE

- a) Types of Brines
- b) Preparation of Brines
- c) Methods of Curing
- d) Types of Marinades
- e) Uses of Marinades
- f) Difference between Brines, Cures & Marinades

4. HAM, BACON & GAMMON

- a) Cuts of Ham, Bacon & Gammon.
- b) Differences between Ham, Bacon & Gammon
- c) Processing of Ham & Bacon
- d) Green Bacon
- e) Uses of different cuts

5. GALANTINES

- a) Making of galantines
- b) Types of Galantine
- c) Ballotines

6. PATES

- a) Types of Pate
- b) Pate de foie gras
- c) Making of Pate
- d) Commercial pate and Pate Maison
- e) Truffle - sources, Cultivation and uses and Types of truffle

7. MOUSE & MOUSSELINE

- a) Types of mousse
- b) Preparation of mousse
- c) Preparation of mousseline
- d) Difference between mousse and mousseline

8. CHAUD FROID

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- a) Meaning of Chaud froid
- b) Making of chaud froid & Precautions
- c) Types of chaud froid
- d) Uses of chaud froid

9. ASPIC & GELEE

- a) Definition of Aspic and Gelee
- b) Difference between the two
- c) Making of Aspic and Gelee
- d) Uses of Aspic and Gelee

10. QUENELLES, PARFAITS, ROULADES

- a) Preparation of Quenelles, Parfaits and Roulades

11. NON EDIBLE DISPLAYS

- a) Ice carvings
- b) Tallow sculpture
- c) Fruit & vegetable Displays
- d) Salt dough
- e) Pastillage
- f) Jelly Logo
- g) Thermanol work

UNIT-III

APPETIZERS & GARNISHES

- a) Classification of Appetizers B. Examples of Appetizers
- b) Historic importance of culinary Garnishes D. Explanation of different Garnishes

UNIT-IV

SANDWICHES

- a) Parts of Sandwiches B. Types of Bread
- b) Types of filling - classification D. Spreads and Garnishes
- c) Types of Sandwiches
- d) Making of Sandwiches
- e) Storing of Sandwiches

Recommended Books

1. Quantity Food Production
2. Taste of India
3. Flavours of India
4. Heritage of India
5. Prashad
6. Cooking Delights of the Maharajas
7. Parvinder Bali, 'Food Production Operation'.

FOOD & BEVERAGE SERVICE-IV

Subject Code: BHOM3-437

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

Duration: 37 Hrs.

UNIT-I

SPIRITS

- a) Introduction & definition

- b) Production of spirit
- c) Pot still method
- d) Patent still method
- e) Types and production of spirits
 - i) Whiskey
 - ii) Rum
 - iii) Gin
 - iv) Brandy
 - v) Vodka
 - vi) Tequila
- (f) Different proof spirits
 - i) Proof scales
 - ii) American proof
 - iii) Gay-Lussac
- (g) Service of spirits

UNIT-II

Aperitifs

- a) Introduction and definition Different types of aperitifs.

Liqueurs

- a) Definition, classification & History
- b) Production of Liqueurs.
- c) Name of Liqueurs and country of origin & predominant flavour
- d) Service of liqueurs.

Cocktails

- a) Definition & Classification
- b) Cocktail bar equipment
- c) Preparation & service of cocktails/mock tails

Service of Special Coffee

UNIT-III

GUERIDON SERVICE

- a) History of gueridon
- b) Definition
- c) General consideration of operations
- d) Advantages, Disadvantages
- e) Types of trolleys
- f) Factor to create impulse, Buying - Trolley, open kitchen
- g) Gueridon equipment
- h) Gueridon ingredients

UNIT-IV

BAR OPERATIONS

- a) Types of Bar, Cocktail, Dispense B. Area of Bar
- b) Front Bar D. Back Bar
- c) E. Under Bar (Speed Rack, Garnish Container, Ice well etc.)
- d) F. Bar Stock G. Bar Control
- e) H. Bar Staffing I. Opening and closing duties

Recommended Books

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

1. Denis Lillicrap, 'Food & Beverage Service'.
2. Vijay Dhawan, 'Food & Beverage Service'.
3. Rao J. Suhas, 'Food & Beverage Service'.

FRONT OFFICE-IV

Subject Code: BHOM3-438

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

Duration: 37 Hrs.

PLANNING & EVALUATING FRONT OFFICE OPERATIONS

- a) Forecasting techniques
- b) Forecasting Room availability
- c) Useful forecasting data
 - i) % of walking
 - ii) % of overstaying
 - iii) % of under stay
- d) Forecast formula
- e) Sample forecast forms

BUDGETING

- a) Making of front office budget B. Factors affecting budget planning
- b) Capital operation budget for front office D. Refining budgets
- c) E. Forecasting room revenue Customer Relationship

FRENCH

Conversation with guests, providing information to guest about the hotel, city, sight-seeing, car rentals, historical places, banks, airlines, travel agents, shopping centers and worship places etc. Departure (Cashier, Bills Section and Bell Desk)

Recommended Books

1. Sudhir Andrews, 'Front Office Training Manual'.
2. Kasavana & Brooks, 'Managing Front Office Operations'.
3. Ahmed Ismail, 'Front Office – Operations and Management', Thomson Delmar.
4. Michael Kasavana & Cahell, 'Managing Computers in Hospitality Industry'.
5. Colin Dix & Chris Baird, 'Front Office Operations'.
6. Jatashankar R. Tewari, 'Hotel Front Office Operation and Management'.

ACCOMMODATION OPERATION-II

Subject Code: BHOM3-439

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

Duration: 37 Hrs.

PLANNING AND ORGANISING THE HOUSE KEEPING DEPARTMENT

- a) Area inventory list
- b) Frequency schedules
- c) Performance and Productivity standards
- d) Time and Motion study in House Keeping operations
- e) Standard Operating manuals - Job procedures
- f) Job allocation and work schedules
- g) Calculating staff strengths & Planning duty rosters, teamwork and leadership in House Keeping

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- h) Training in HKD, devising training programmes for HK staff
- i) Inventory level for non recycled items
- j) Budget and budgetary controls
- k) The budget process
- l) Planning capital budget
- m) Planning operation budget
- n) Operating budget - controlling expenses - income statement
- o) Purchasing systems - methods of buying
- p) Stock records - issuing and control

**HOUSEKEEPING IN INSTITUTIONS & FACILITIES OTHER THAN HOTELS
CONTRACT SERVICES**

- a) Types of contract services
- b) Guidelines for hiring contract services
- c) Advantages & disadvantages of contract services
- d) Safety awareness and accident prevention
- e) Fire safety and fire fighting
- f) Crime prevention and dealing with emergency situation

**ENERGY AND WATER CONSERVATION IN HOUSEKEEPING OPERATIONS
RECOMMENDED BOOKS**

1. Sudhir Andrews, 'Hotel Housekeeping Training Manual'.
2. Grace Brigham, 'Housekeeping for Hotels, Hostels and Hospitals'.
3. Joan C Branson & Margaret Lennox, 'Hotel Hostel and Hospital Housekeeping', ELST.
4. Margaret Kappa & Aleta Nitschke, 'Managing Housekeeping Operations'.
5. Sudhir Andrews, 'Hotel House Keeping', Tata McGraw Hill.
6. Tucker Schneider, 'The Professional Housekeeper', VNR.
7. G. Raghubalan, 'Hotel House Keeping Operation & Management'.

FACILITY PLANNING

Subject Code: BHOM3-440

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

Duration: 26 Hrs.

UNIT-I

HOTEL DESIGN

- a) Design Consideration
- b) Attractive Appearance
- c) Efficient Plan
- d) Good location
- e) Suitable material
- f) Good workmanship
- g) Sound financing
- h) Competent Management

UNIT-II

FACILITIES PLANNING

The systematic layout planning pattern (SLP)

Planning Consideration

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- a) Flow process & Flow diagram
- b) Procedure for determining space considering the guiding factors for guest room/ public facilities, support facilities & services, hotel administration, internal roads/budget hotel/5 star hotel.

Architectural Consideration

- a) Difference between carpet area plinth area and super built area, their relationships, reading of blue print (plumbing, electrical, AC, ventilation, FSI, FAR, public Areas)
- b) Approximate cost of construction estimation
- c) Approximate operating areas in budget type/5-star type hotel approximate other operating areas per guest room
- d) Approximate requirement and Estimation of water/electrical load gas, ventilation.

UNIT-III

STAR CLASSIFICATION OF HOTEL

Criteria for star classification of hotel (Five, four, three, two, one & heritage)

KITCHEN

- a) Equipment requirement for commercial kitchen Heating - gas/electrical Cooling (for various catering establishment)
- b) Developing Specification for various Kitchen equipment
- c) Planning of various support services (pot wash, wet grinding, chef room, larder, store & other staff facilities)

UNIT-IV

KITCHEN LAY OUT & DESIGN

Principles of kitchen layout and design

- a) Areas of the various kitchens with recommended dimension
- b) Factors that affect kitchen design
- c) Placement of equipment
- d) Flow of work
- e) Space allocation
- f) Kitchen equipment, manufacturers and selection
- g) Layout of commercial kitchen (types, drawing a layout of Commercial kitchen)
- h) Budgeting for kitchen equipment

PRINCIPLES OF MANAGEMENT-I

Subject Code: BHOM3-441

L T P C

Duration: 37 Hrs.

3 0 0 3

UNIT-I

INTRODUCTION TO MANAGEMENT

- a) Meaning, definition and concept
- b) Characteristics of Management
- c) Importance of Management

UNIT-II

MANAGEMENT-A SCIENCE OR AN ART

- a) Management as profession
- b) Management Styles

MANAGEMENT PROCESSES AND SKILLS

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- a) Managerial Roles
- b) Managerial skills
- c) Functions of Management
- d) Levels of Management

UNIT-III

EVOLUTION OF MANAGEMENT

Management Theories: Scientific Management, Administrative Management
Human Relations Movement

- a) Behavioral Approach
- b) Quantitative Approach
- c) Systems Approach
- d) Contingency Approach

UNIT-IV

PLANNING

- a) Nature and Purpose
- b) Planning premises
- c) Types of Plans

DECISION MAKING

- a) Meaning and definition
- b) Types of decisions
- c) Decision making process

MRSPTU

FOOD PRODUCTION-IV LAB.

Subject Code: BHOM3-442

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

Three course menus to be formulated featuring International Cuisines

1. FRENCH

2. ORIENTAL

- a) Chinese
- b) Thai

SUGGESTED MENUS FRENCH

MENU 01

Consommé Carmen Poulet Sauté Chasseur Pommes Loretta Haricots Verts
Salade de Betterave Brioche
Baba au Rhum

MENU 02

Bisque D'écresse Escalope De Veau viennoise Pommes Batailles
Course Provencale Epinards au Gratin

MENU 03

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

Crème Du Barry
Darne De Saumon Grille Sauce paloise
Pommes Fondant
Petits Pois A La Flamande French Bread
Tarte Tartin

MENU 04

Veloute Dame Blanche
Cote De Porc Charcuterie Pommes De Terre A La Crème Carottes Glace Au Gingembre Salade Verte
Harlequin Bread Chocolate Cream Puffs

MENU 05

Cabbage Chowder Poulet A La Rex Pommes Marguises Ratatouille
Salade De Carottées Et Céleris Clover Leaf Bread
Savarin Des Fruits

MENU 06

Barquettes Assortis Stroganoff De Boeuf Pommes Persilles Salade De Chou-Cru Garlic Rolls
Crêpe Suzette

MENU 07

Duchesse Nantua Poulet Maryland Croquette Potatoes Salade Niçoise Brown Bread
Pâte Des Pommes

MENU 08

Kromeski
Filet De Sols Walweska Pommes Lyonnaise Funghi Marirati
Bread Sticks Souffle Milanaise

MENU 09

Vol-Au-Vent De Volaille Et Jambon Homard Thermidor
Salade Waldorf Vienna Rolls Mousse Au Chocolat

MENU 10

Crabe En Coquille Quiche Lorraine Salade de Viande Pommes Parisienne Foccacia
Crème Brûlée

SUGGESTED MENUS CHINESE

MENU 01

Prawn Ball Soup Fried Wantons Sweet & Sour Pork Hakka Noodles

MENU 02

Hot & Sour soup Beans Sichwan
Stir Fried Chicken & Peppers Chinese Fried Rice

MENU 03

Sweet Corn Soup Shao Mai
Tung-Po Mutton Yangchow Fried Rice

MENU 04

Wonton Soup Spring Rolls
Stir Fried Beef & Celery Chow Mein

MENU 05

Prawns in Garlic Sauce Fish Szechwan
Hot & Sour Cabbage Steamed Noodles

FOOD & BEVERAGE SERVICE-IV LAB.

Subject Code: BHOM3-443

L T P C

0 0 2 1

SERVICE OF SPIRITS

- a) WHISKY
- b) BRANDY
- c) GIN
- d) VODKA
- e) TEQUILA
- f) RUM

SERVICE OF

- a) APERTIFS
- b) LIQUEURS

MAKING & SERVICE OF COMMON COCKTAILS PREPARING ITEMS ON GUERIDON TROLLEY

Crêpe Suzette Banana au Rhum Peach Flambé Rum Omlette Steak Diane Pepper Steak

FRONT OFFICE-IV LAB.

Subject Code: BHOM3-444

L T P C

0 0 2 1

Hands on practice of computer application (Hotel Management System) related to front office procedures such as (night audit, income audit,

SUGGESTIVE LIST OF TASKS FOR FRONT OFFICE OPERATION SYSTEM

S.N. Topic

1. HMS Training - Hot Function keys
2. How to put message
3. How to put a locator?
4. How to check in a first time guest
5. How to check in an existing reservation
6. How to check in a day use
7. How to issue a new key?
8. How to verify key?
9. How to cancel a key?
10. How to issue a duplicate key?
11. How to extend a key?
12. How to print and prepare registration cards for arrivals
13. How to programme keys continuously
14. How to programme one key for two rooms
15. How to re-programme a key
16. How to make a reservation?
17. How to create and update guest profiles

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

18. How to update guest folio?
19. How to print guest folio?
20. How to make sharer reservation?
21. How to feed remarks in guest history?
22. How to add a sharer?
23. How to make add on reservation
24. How to amend a reservation?
25. How to cancel a reservation?
26. How to make group reservation?
27. How to make a room change on the system?

ACCOMMODATION OPERATION-2 LAB.

Subject Code: BHOM3-445

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

- a) First Aid
 - i) First aid kit
 - ii) Dealing with emergency situation 02 Special Decorations
- b) Layout of a guest room 04 Team cleaning
- c) Devising training modules/standard operating procedures/inspection check lists

MRSPTU

COMPUTER & MIS LAB.

Subject Code: BHOM3-446

**L T P C
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Fox Pro 2.6

Introduction, working with data: creating modifying and deleting Sorting, Indexing and Expressions,

Rushmore technology Working with multiple database file, Using the view Window, Generating reports and labels Relational Query by examples.

MS OFFICE 2007/MS-POWER POINT

- a) Making a simple presentation
- b) Using Auto Content Wizards and Templates
- c) Power Points five views
- d) Slides
 - i) Creating Slides, re-arranging, modifying
 - ii) Inserting pictures, objects
 - iii) Setting up a Slide Show
- e) E Creating an Organizational Chart

FOOD PRODUCTION-V

Subject Code: BHOM3-547

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

Duration: 37 Hrs.

UNIT-I

INTERNATIONAL CUISINE

- a) Geographic location B. Historical background
- b) Staple food with regional Influences
- c) Specialties
- d) Recipes
- e) Equipment in relation to: Great Britain, France, Italy, Spain & Portugal, Scandinavia, Germany, Middle East, Oriental, Mexican, Arabic.

UNIT-II

CHINESE

- a) Introduction to Chinese foods
- b) Historical background
- c) Regional cooking styles
- d) Methods of cooking
- e) Equipment & utensils

UNIT-III

BAKERY & CONFECTIONERY

I. ICINGS & TOPPINGS

- a) Varieties of icings
- b) Using of Icings
- c) Difference between icings & Toppings
- d) Recipes

II. FROZEN DESSERTS

- a) Types and classification of frozen desserts
- b) Ice-creams - Definitions
- c) Methods of preparation
- d) Additives and preservatives used in Ice-cream manufacture

III. MERINGUES

- a) Making of Meringues
- b) Factors affecting the stability
- c) Cooking Meringues
- d) Types of Meringues
- e) Uses of Meringues

IV. BREAD MAKING

- a) Role of ingredients in bread Making
- b) Bread Faults
- c) Bread Improvers

V. CHOCOLATE

- a) History
- b) Sources
- c) Manufacture & Processing of Chocolate

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- d) Types of chocolate
- e) Tempering of chocolate
- f) Cocoa butter, white chocolate and its applications

UNIT-IV

PRODUCTION MANAGEMENT

- a) Kitchen Organization
- b) Allocation of Work-Job Description, Duty Rosters
- c) Production Planning
- d) Production Scheduling
- e) Production Quality & Quantity Control
- f) Forecasting Budgeting
- g) Yield Management

PRODUCT & RESEARCH DEVELOPMENT

- a) Testing new equipment,
- b) Developing new recipes
- c) Food Trails
- d) Organoleptic & Sensory Evaluation

FRENCH

- a) Culinary French
- b) Classical recipes (recettes classique)
- c) Historical Background of Classical Garnishes
- d) Offals/Game
- e) Larder terminology and vocabulary

Note: Should be taught along with the relevant topics

MRSPTU

FOOD & BEVERAGE SERVICE-V

Subject Code: BHOM3-548

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

Duration: 37 Hrs.

PLANNING & OPERATING VARIOUS F&B OUTLET

- a) Physical layout of functional and ancillary areas
- b) Objective of a good layout
- c) Steps in planning
- d) Factors to be considered while planning
- e) Calculating space requirement
- f) Various set ups for seating
- g) Planning staff requirement
- h) Menu planning
- i) Constraints of menu planning
- j) Selecting and planning of heavy duty and light equipment
- k) Requirement of quantities of equipment required like crockery, Glassware, steel or silver etc.
- l) Suppliers & manufacturers
- m) Approximate cost

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

n) Planning Décor, furnishing fixture etc.

F & B STAFF ORGANISATION

- a) Categories of staff
- b) Hierarchy
- c) Job description and specification
- d) Duty roaster

MANAGING F&B OUTLET

- a) Supervisory skills
- b) Developing efficiency
- c) Standard Operating Procedure

FUNCTION CATERING

1. BANQUETS

- a) History
- b) Types
- c) Organization of Banquet Department
- d) Duties & responsibilities
- e) Sales
- f) Booking procedure
- g) Banquet menus

2. BANQUET PROTOCOL

- a) Space Area Requirement
- b) Table plans/arrangement
- c) Misc-en-place
- d) Service
- e) Toasting

3. INFORMAL BANQUET

- a) Reception
- b) Cocktail parties
- c) Convention
- d) Seminar
- e) Exhibition
- f) Fashion shows
- g) Trade Fair
- h) Wedding
- i) Outdoor catering

FUNCTION CATERING BUFFETS

- a) Introduction
- b) Factors to plan buffets
- c) Area requirement
- d) Planning and organization
- e) Sequence of food
- f) Menu planning
- g) Types of Buffet
- h) Display
- i) Sit down
- j) Fork, Finger, Cold Buffet

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- k) Breakfast Buffets
- l) Equipment
- m) Supplies
- n) Check list

FRONT OFFICE-V

Subject Code: BHOM3-549

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

Duration: 37 Hrs.

YIELD MANAGEMENT

- a) Concept and importance
- b) Applicability to rooms division
- c) Capacity management
- d) Discount allocation
- e) Duration control
- f) Measurement yield
- g) Potential high and low demand tactics
- h) Yield management software
- i) Yield management team

ACCOMODATION OPERATION-III

Subject Code: BHOM3-550

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

Duration: 37 Hrs.

INTERIOR DECORATION

- a) Elements of design
- b) Colour and its role in décor -types of colour schemes
- c) Windows and window treatment
- d) Lighting and lighting fixtures
- e) Floor finishes
- f) Carpets
- g) Furniture and fittings
- h) Accessories

LAYOUT OF GUEST ROOMS

- a) Sizes of rooms, sizes of furniture, furniture arrangement
- b) Principles of design
- c) Refurbishing and redecoration

NEW PROPERTY COUNTDOWN

HUMAN RESORCE MANAGEMENT

Subject Code: BHOM3-551

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

Duration: 26 Hrs.

UNIT-I

Introduction to Human Resource Management-

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

Definitions, Functions of Personnel Management, Objectives of Personnel Management, Qualities of a Good Personnel Manager

Human Resource/Man Power Planning

Definitions, Need of Manpower Planning, Objectives of Hr Planning, Advantages Disadvantages of Manpower Planning, Process/Steps.

UNIT-II

Recruitment

Definition, Sources of Recruitment, Internal Sources of Recruitment & (Advantages, Disadvantages), External Sources (Advantages, Disadvantages)

Selection

Definition, Steps in Selection Process (Application Blank, Initial Interview of the Candidates, Employment Tests, Interviews, Checking Reference, Physical or Medical Examination, Final Interview & Induction)

UNIT-III

Training and Development

Training Definition, Importance of Training, The Training Process, Training Methods (On The Job- Job Instruction Training, Job Rotation, Special Assignments)

Off The Job (Vestibule Training, Lecture Method, Conference Method, Seminar or Team Discussion, Case Study Method)

Development-Definition, Need, Methods

-On The Job

-Off The Job

Performance Appraisal

Definition, Objectives, Process, Methods-

-Past Oriented

-Future Oriented

UNIT-IV

Job Evaluation-

Definition, Objectives, Principles, Methods-Non Analytical, Analytical

Employee Remuneration-

Definition, Components, Factors Influencing Employee Remuneration, Concept of Wages

PRINCIPLES OF MANAGEMENT-II

Subject Code: BHOM3-552

L T P C

Duration: 26 Hrs.

2 0 0 2

UNIT-I

FUNDAMENTAL OF ORGANISING

- a) Concept of organization and organizing
- b) Concept of organization structure
- c) Forms of organization structure

DEPARTMENTATION

- a) Bases of departmentation
- b) choice of bases of departmentation

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

UNIT-II

**SPAN OF MANAGEMENT
DELEGATION OF AUTHORITY**

Blocks to effective delegation
Measures for effective delegation
Centralization and Decentralization

UNIT-III

COMMUNICATION

- a) Communication concept
- b) communication symbols
- c) oral, written and non-verbal
- d) communication network
- e) formal, informal, rumour and computer based communication
- f) Barriers to communication
- g) Communication process
- h) How to make communication effective?

STAFFING

- a) Concept of staffing
- b) Factors affecting staffing
- c) Manpower Planning
- d) Manpower Planning process

UNIT-IV

COORDINATION

- a) Co-ordination: Meaning, definition
- b) Types of coordination
- c) Techniques of effective co-ordination

CONTROL

- a) Control: Definition
- b) Steps in controlling
- c) Types of control
- d) Control Areas
- e) Control techniques

HOTEL ACCOUNTANCY

Subject Code: BHOM3-553

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

Duration: 26 Hrs.

UNIT-I

TRIAL BALANCE

- a) Meaning
- b) Methods
- c) Advantages
- d) Limitations
- e) Practicals

FINAL ACCOUNTS

- a) Meaning

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- b) Procedure for preparation of Final Accounts
- c) Difference between Trading Accounts, Profit & Loss Accounts and
- d) Balance Sheet
- e) Adjustments (Only four)
- f) Closing Stock
- g) Pre-paid Expenses
- h) Outstanding Expenses
- i) Depreciation

UNIT-II

UNIFORM SYSTEM OF ACCOUNTS FOR HOTELS

- a) Introduction to Uniform system of accounts
- b) Contents of the Income Statement C:\WINDOWS\hinhem.scr
- c) Practical Problems
- d) Contents of the Balance Sheet (under uniform system)
- e) Practical problems
- f) Departmental Income Statements and Expense statements (Schedules 1to 16)
- g) Practical problems

UNIT-III

INTERNAL CONTROL

- a) Definition and objectives of Internal Control
- b) Characteristics of Internal Control
- c) Implementation and Review of Internal Control

INTERNAL AUDIT AND STATUTORY AUDIT

- a) An introduction to Internal and Statutory Audit
- b) Distinction between Internal Audit and Statutory Audit
- c) Implementation and Review of internal audit

UNIT-IV

DEPARTMENTAL ACCOUNTING

- a) An introduction to departmental accounting
- b) Allocation and apportionment of expenses
- c) Advantages of allocation
- d) Draw-backs of allocation
- e) Basis of allocation
- f) Practical problems

F&B MANAGEMENT

Subject Code: BHOM3-554

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

Duration: 26 Hrs.

UNIT-I

COST DYNAMICS

- a) Elements of Cost
- b) Classification of Cost

SALES CONCEPTS

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- a) Various Sales Concept
- b) Uses of Sales Concept

INVENTORY CONTROL

- a) Importance
- b) Objective
- c) Method
- d) Levels and Technique
- e) Perpetual Inventory
- f) Monthly Inventory
- g) Pricing of Commodities
- h) Comparison of Physical and Perpetual Inventory

UNIT-II

BEVERAGE CONTROL

- a) Purchasing
- b) Receiving
- c) Storing
- d) Issuing
- e) Production Control
- f) Standard Recipe
- g) Standard Portion Size
- h) Bar Frauds
- i) Books maintained
- j) Beverage Control

SALES CONTROL

- a) Procedure of Cash Control
- b) Machine System
- c) ECR
- d) NCR
- e) Preset Machines
- f) POS
- g) Reports
- h) Thefts
- i) Cash Handling

UNIT-III

BUDGETARY CONTROL

- a) Define Budget
- b) Define Budgetary Control
- c) Objectives
- d) Frame Work
- e) Key Factors
- f) Types of Budget
- g) Budgetary Control

VARIANCE ANALYSIS

- a) Standard Cost
- b) Standard Costing
- c) Cost Variances

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

- d) Material Variances
- e) Labor Variances
- f) Overhead Variance
- g) Fixed Overhead Variance
- h) Sales Variance
- i) Profit Variance

BREAKEVEN ANALYSIS

- a) Breakeven Chart
- b) P V Ratio
- c) Contribution
- d) Marginal Cost
- e) Graphs

UNIT-IV

MENU MERCHANDISING

- a) Menu Control
- b) Menu Structure
- c) Planning
- d) Pricing of Menus
- e) Types of Menus
- f) Menu as Marketing Tool
- g) Layout
- h) Constraints of Menu Planning

MENU ENGINEERING

- a) Definition and Objectives
- b) Methods
- c) Advantages

MIS

- a) Reports
- b) Calculation of actual cost
- c) Daily Food Cost
- d) Monthly Food Cost
- e) Statistical Revenue Reports
- f) Cumulative and non-cumulative

FOOD PRODUCTION-V LAB.

Subject Code: BHOM3-555

L T P C

0 0 2 1

Three course menus to be formulated featuring International Cuisines

INTERNATIONAL

a) SPAIN

- i) Gazpacho
- ii) Pollo En Pepitoria
- iii) Paella
- iv) Fritata De Patata
- v) Pastel De Mazaana

MRSPTU BACHELOR OF MANAGEMENT STUDIES (HOTEL MANAGEMENT & CATERING TECHNOLOGY) (3 YEARS) SYLLABUS (SEMS. 1-6) 2016 BATCH

b) ITALY

- i) Minestrone
- ii) Ravioli Arabeata
- iii) Fettocine Carbonara
- iv) Pollo Alla Cacciatore
- v) Medanzane Parmigiane
- vi) Grissini
- vii) Tiramisu

c) GERMANY

- i) Linsensuppe
- ii) Sauerbaaten
- iii) Spatzale
- iv) German Potato Salad
- v) Pumpernickl
- vi) Apfel Strudel

d) U.K.

- i) Scotch Broth
- ii) Roast Beef
- iii) Yorkshire Pudding
- iv) Glazed Carrots & Turnips
- v) Roast Potato
- vi) Yorkshire Curd Tart
- vii) Crusty Bread

e) GREECE

- i) Soupe Avogolemeno
- ii) Moussaka A La Greque
- iii) Dolmas
- iv) Tzaziki
- v) Baklava
- vi) Harlequin Bread

BAKERY-III LAB.

Subject Code: BHOM3-556

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

DEMONSTRATION OF

- a) Charcuterie
- b) Galantines
- c) Pate
- d) Terrines
- e) Mousselines
- f) Decorated Cakes
- g) Gateaux
- h) International Breads
- i) Sorbets, Parfaits
- j) Hot/Cold Desserts

FOOD & BEVERAGE SERVICE-V LAB.

Subject Code: BHOM3-557

L T P C

0 0 2 1

- a) Making of Duty Roster and writing job description & specification
- b) Supervising F&B outlets
- c) Calculation of Space for Banquets, Banquet Menu & Service.

ACCOMODATION OPERATION-III LAB.

Subject Code: BHOM3-558

L T P C

0 0 2 1

- a) Team cleaning
- b) Devising training modules/standard operating procedures/inspection check lists

MRSPTU

**MRSPTU B.Sc. (HONS. SCHOOL) IN MATHS SYLLABUS 2018 BATCH ONWARDS
UPDATED ON 2.11.2018**

1 st Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BMAT1-101	Calculus-I	4	1	0	40	60	100	5
BMAT1-102	Algebra-I	4	1	0	40	60	100	5
BMAT1-103	Analysis-I	4	1	0	40	60	100	5
BHUM1-101	English	4	0	0	40	60	100	4
BCAP1-101	Fortran Programming	4	0	0	40	60	100	4
BCAP1-102	Fortran Programming Lab.	0	0	2	60	40	100	1
Total		20	3	2	260	340	600	24

2 nd Semester		Contact Hrs.			Marks			Credits
Subject	Subject Name	L	T	P	Int.	Ext.	Total	
BMAT1-204	Calculus-II	4	1	0	40	60	100	5
BMAT1-205	Algebra-II	4	1	0	40	60	100	5
BMAT1-206	Analysis-II	4	1	0	40	60	100	5
BHUM1-202	Environmental Science	4	0	0	40	60	100	4
BCAP1-203	Fundamentals of Computers and C+ Programming	4	0	0	40	60	100	4
BCAP1-204	C+ Programming Lab.	0	0	2	60	40	100	1
Total		20	3	2	260	340	600	24

3 rd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BMAT1-307	Differential Equations-I	4	1	0	40	60	100	5
BMAT1-308	Mathematical Statistics	4	1	0	40	60	100	5
BMAT1-309	Geometry	4	1	0	40	60	100	5
BMAT1-310	Number Theory	4	1	0	40	60	100	5
BCAP1-305	Object Oriented Programming	3	0	0	40	60	100	3
BCAP1-306	Object Oriented Programming Lab.	0	0	2	60	40	100	1
Total		19	4	2	260	340	600	24

4 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BMAT1-410	Differential Equations-II	4	1	0	40	60	100	5
BMAT1-411	Linear Algebra	4	1	0	40	60	100	5
BMAT1-412	Mechanics-I	4	1	0	40	60	100	5
BMAT1-413	Numerical Methods	4	1	0	40	60	100	5
BCAP1-407	Latex and R	3	0	0	40	60	100	3
BCAP1-408	Latex and R Lab.	0	0	2	60	40	100	1
Total		19	4	2	260	340	600	24

**MRSPTU B.Sc. (HONS. SCHOOL) IN MATHS SYLLABUS 2018 BATCH ONWARDS
UPDATED ON 2.11.2018**

5 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BMAT1-514	Mechanics-II	4	1	0	40	60	100	5
BMAT1-515	Mathematical Methods	4	1	0	40	60	100	5
BMAT1-516	Differential Geometry	4	1	0	40	60	100	5
BMAT1-517	Finite Element Methods	4	1	0	40	60	100	5
BCAP1-509	MATLAB	3	0	2	40	60	100	3
BCAP1-510	MATLAB Lab.	0	0	2	60	40	100	1
Total		19	4	2	260	340	600	24

6 th Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BMAT1-618	LPP	4	1	0	40	60	100	5
BMAT1-619	Ring Theory	4	1	0	40	60	100	5
BMAT1-620	Mathematical Modelling	4	1	0	40	60	100	5
BMAT1-621	Discrete Mathematics	4	1	0	40	60	100	5
BMAT1-622	Financial Mathematics	4	1	0	40	60	100	5
Total		20	5	0	200	300	500	25

Overall

Semester	Marks	Credits
1 st	600	24
2 nd	600	24
3 rd	600	24
4 th	600	24
5 th	600	24
6 th	500	25
Total	3500	145

CALCULUS-II

Subject Code: BMAT1-204

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

Duration: 55 Hrs.

UNIT-I (11 Hrs.)

Arc formula for the Cartesian equation $y=f(x)$, 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, Area of the surface of the Frustum of a cone, Area of the surface obtained by Revolving the curve about axes.

UNIT-II (11 Hrs.)

Integration by Partial fractions, integration of rational and irrational functions, Properties of definite integral, Reduction formulae for integrals of rational, trigonometric, exponential and logarithmic function and of their combinations.

UNIT-III (12 Hrs.)

Definite integrals and their properties, Reduction formulae for integral of the form $\int_0^{\frac{\pi}{2}} \sin^n \theta d\theta$, $\int_0^{\frac{\pi}{2}} \cos^n \theta d\theta$, $\int_0^{\frac{\pi}{2}} \sin^m \theta \cos^n \theta d\theta$, Improper Integral and special function- Beta and Gamma functions and their properties.

UNIT-IV (12 Hrs.)

Double integrals (Cartesian), Change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Centre of mass and Gravity, Triple integrals (Cartesian), Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes.

Recommended Textbooks/References:

1. G.B. Thomas and R.L. Finney, 'Calculus and Analytic Geometry', 9th Edn., Pearson, Reprint, 2002.
2. T. Veerarajan, 'Engineering Mathematics for First Year', Tata McGraw Hill, New Delhi, 2008.
3. B.V. Ramana, 'Higher Engineering Mathematics', 11th Reprint, Tata McGraw Hill, New Delhi, 2010.
4. B.S. Grewal, 'Higher Engineering Mathematics', 35th Edn., Khanna Publishers, 2000.
5. Erwin Kreyszig, 'Advanced Engineering Mathematics', 9th Edn., John Wiley & Sons, 2006.

ALGEBRA-II

Subject Code: BMAT1-205

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

Duration: 55 Hrs.

UNIT-I (12 Hrs.)

Definition of a group, with examples and simple properties, Abelian Group, Groups of transformations. Subgroups, Generation of groups and cyclic groups, Order of Group, Coset decomposition, Lagrange's theorem and its consequences, Fermat's and Euler's theorems.

UNIT-II (12 Hrs.)

Normal Subgroup, Quotient Groups, Homomorphism, Isomorphism, Automorphism, Permutation of Group, Even and Odd Permutation, Cayley Theorem, Sylow's Theorem

UNIT-III (12 Hrs.)

Definition and examples of a ring and its properties, Subrings, Integral domains, Characteristics of ring, Division rings and Fields, Ring homomorphism and isomorphism, Ideals and Quotient rings.

UNIT-IV (12 Hrs.)

Inner product, length, orthogonality, orthogonal projections, Cauchy-Schwartz inequality, Gram-Schmidt orthogonalisation process, inner product spaces.

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 Edn., Vikas Publishing House, New Delhi, **1993**.
3. I.N. Herstein, 'Topics in Algebra', 2nd Edn., Vikas Publishing House, **1976**.
4. John B. Fraleigh, 'A First Course in Abstract Algebra', 7th Edn., Pearson, **2002**.
5. M. Artin, 'Abstract Algebra', 2nd Edn., Pearson, **2011**.
6. Joseph A. Gallian, 'Contemporary Abstract Algebra', 4th Edn., Narosa, **1999**.
7. George E. Andrews, 'Number Theory', Hindustan Publishing Corporation, **1984**.

ANALYSIS-II

Subject Code: BMAT1-206

L T P C
4 1 0 5

Duration: 55 Hrs.

UNIT-I (12 Hrs.)

Riemann Integral:

Definition, Examples and Properties of Riemann Integral, Bounded Theorem, Riemann Integrable Functions, Cauchy Criterion, The Squeeze Theorem, Classes of Riemann Integrable Functions, Additivity Theorem, Fundamental theorem- First and Second Form, Substitution Theorem, Lebesgue integrability Criterion, Composition theorem, Product Theorem, Taylor's Theorem with Remainder, Approximate integration, The Trapezoidal Rule, The Mid Point Rule, Simpson's Rule.

UNIT-II (10 Hrs.)

Sequences of Functions:

Pointwise and Uniform Convergence, Interchange of Limit and Continuity, Interchange of Limit and Derivatives, Interchange of Limit and Integral, Bounded Convergence Theorem, Dini's Theorem. The exponential Functions Logarithmic Functions, The Trigonometric Functions.

UNIT-III (10 Hrs.)

Series of Functions:

Absolutely and uniformly convergent series of functions defined on a domain, Interchange of Integral and Summation, Tests for Uniform Convergence—Cauchy Criterion, Weierstrass M- Test, Power Series, Radius of Convergence, Cauchy Hadamard Theorem, Term by Term differentiation, Taylor's Series.

UNIT-IV (12 Hrs.)

Metric Spaces:

Metric spaces, Examples of Metric Spaces, Neighborhood of a point, Limit point and isolated points of a set, Closed Set, Interior Point of a Set, Open Set, Perfect Set, Bounded Set, Dense Set, Union and Intersection of Open Sets, Closure of a Set, Subspaces of a Metric Space, Compact Sets, k-Cells, Compactness of a k-Cells, Weierstrass Theorem, Perfect Sets in \mathbb{R}^k , Connected Sets in \mathbb{R} , Images of Compact and Connected Sets under Continuous Functions, Compactness and Uniform Continuity of Functions.

Recommended Books:

1. Robert G. Bartle and Donald R. Sherbert, 'Introduction to Real Analysis', 3rd Edn., John Wiley & Sons, Inc. **2000**.
2. Walter Rudin, 'Principles of Mathematical Analysis', 3rd Edn., McGraw Hill, **1976**.
3. S.C. Malik and Savita Arora, 'Mathematical Analysis', New Age International Publisher, Reprint **2008**.
4. S. Shirali & H.L. Vasudeva, 'Metric Spaces', Springer, **2006**.
5. T.M. Apostol, 'Mathematical Analysis', 2nd Edn., Narosa Publishing House, Reprint **2002**.

ENVIRONMENTAL SCIENCES

Subject Code: BHUM1-202

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I (12 Hrs.)

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.

UNIT-II (11 Hrs.)

Ecosystems: (a) Concept of an ecosystem. (b) Structure and function of an ecosystem. (c) Producers, consumers and decomposers. (d) Energy flow in the ecosystem. (e) Ecological succession. (f) Food chains, food webs and ecological pyramids.

Biodiversity and its Conservation: (a) Introduction – Definition: genetic, species and ecosystem diversity. (b) Biogeographically classification of India. (c) Value of biodiversity: consumptive use, productive use, social, ethical aesthetic.

UNIT-III (12 Hrs.)

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.

UNIT-IV (12 Hrs.)

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.

Recommended Books:

1. J.G. Henry and G.W. Heinke, 'Environmental Sc. & Engineering', Pearson Education, 2004.
2. G.B. Masters, 'Introduction to Environmental Engg. & Science', Pearson Education, 2004.
3. ErachBharucha, 'Textbook for Environmental Studies', UGC, New Delhi.

FUNDAMENTALS OF COMPUTER AND C+ PROGRAMMING

Subject Code: BCAP1-203

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I (10 Hrs.)

Computer Fundamentals: Block diagram of a computer, Characteristics of computers, Hardware-input devices, Output devices, Memories, Software, System software, Application software, Compiler, Interpreter, utility program, Introduction to operating Systems-Windows based/MACOS/LINUX, Significance and advantages of operating systems.

UNIT-II (12 Hrs.)

C+ Programming: Introduction to C language, Evolution and characteristics of C language, Character set, Keywords, Identifiers, Data types, Variables, Constants, Operators, Expressions, Type conversion and type casting, Overview of pre-processors, Structure of a C program, Input and output statements. Control Statements: Basic programming constructs, 'if', 'if-else', 'nested-if' statements, Conditional operator, 'for', 'while', 'do - while', Switch, Break, Continue.

UNIT-III (11 Hrs.)

Arrays and strings Need for an array, Declaration and initialization, Basic operation on arrays, Multidimensional array, Structures, Union, Introduction to strings, String handling. Pointers

Introduction, Declaration and initialization, Pointers and arrays: Similarities and advantages/disadvantages of using pointers.

UNIT-IV (12 Hrs.)

Functions and Storage Classes Need for functions, Prototype, Function definition, Function call, return type and return statement, Passing arguments, Functions and arrays, Functions and pointers, Recursive functions, Difference between recursion and iteration storage classes. Files Introduction, File Operations, Character I/O, String I/O, Numeric I/O, Formatted I/O, Block I/O.

Recommended Books:

1. Shubhnandan Jamwal, 'Programming in C', 3rd Edn., Pearson.
2. E. Balagurusamy, 'Programming in ANSI C', 3rd Edn., Tata McGraw Hill.
3. V. Rajaraman, 'Fundamentals of Computers', 3rd Edn., PHI.
4. P.K. Sinha, 'Computer Fundamentals', 5th Edn., BPB Publication.
5. Brian Kernighan and Dennis Ritchie, 'C Programming Language', 2nd Edn., PHI.
6. Byron Gottfried, 'Programming with C', 2nd Edn., Tata McGraw Hill.
7. Yashvant P. Kanetkar, 'Let us C', 4th Edn., BPB Publications, New Delhi.
8. R.S. Salaria, 'Application Programming in C', 2nd Edn., Khanna Book Publishing.

C+ PROGRAMMING LAB.

Subject Code: BCAP1-204

L T P C

0 0 2 1

List of following programs are as follows:

1. **Operators:** Arithmetic, Logical, Conditional, Assignment, Increment/Decrement operators
2. **Decision Making:** switch, if-else, nested if, else-if ladder, break, continue, go to
3. **Loops:** while, do-while, for
4. **Functions:** Definition, Declaration, call by value, Call by reference, Recursive Function
5. **Arrays:** Arrays declarations, Single and multi-dimensional, Strings and string functions
6. **Pointers:** Pointer declarations, Pointer to function, Pointer to array.

Recommended Books:

1. Shubhnandan Jamwal, 'Programming in C', 3rd Edn., Pearson.
2. E. Balagurusamy, 'Programming in ANSI C', 3rd Edn., Tata McGraw Hill.
3. V. Rajaraman, 'Fundamentals of Computers', 3rd Edn., PHI.
4. P.K. Sinha, 'Computer Fundamentals', 5th Edn., BPB Publication.
5. Brian Kernighan and Dennis Ritchie, 'C Programming Language', 2nd Edn., PHI.
6. Byron Gottfried, 'Programming with C', 2nd Edn., Tata McGraw Hill.
7. Yashvant P. Kanetkar, 'Let us C', 4th Edn., BPB Publications, New Delhi.
8. R.S. Salaria, 'Application Programming in C', 2nd Edn., Khanna Book Publishing.

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Semester 1 st		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BAEE3-101	Aerodynamics	3	1	0	40	60	100	4
BAEE3-102	Aerodynamics Lab.	0	0	4	60	40	100	2
BAEE3-103	Human Factors	5	1	0	40	60	100	6
BAEE3-104	English Communication	3	1	0	40	60	100	4
BAEE3-105	Mathematics	5	1	0	40	60	100	6
BAEE3-106	Corrosion and NDI Techniques	3	1	0	40	60	100	4
BAEE3-107	Corrosion and NDI Techniques Lab.	0	0	4	60	40	100	2
Total		19	5	8	320	380	700	28

Semester 2 nd		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BAEE3-208	Electrical Fundamentals-I	3	1	0	40	60	100	4
BAEE3-209	Electrical Fundamentals-I Lab.	0	0	4	60	40	100	2
BAEE3-210	Aviation Legislation	5	1	0	40	60	100	6
BAEE3-211	Environmental Science	3	1	0	40	60	100	4
BAEE3-212	Physics	3	1	0	40	60	100	4
BAEE3-213	Physics Lab.	0	0	4	60	40	100	2
BAEE3-214	Quality Management System	5	1	0	40	60	100	6
Total		19	5	8	320	380	700	28

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Semester 3 rd		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BAEE3-315	Aircraft Structure And Associated Systems	3	1	0	40	60	100	4
BAEE3-316	Aircraft Structure And Associated Systems Lab.	0	0	4	60	40	100	2
BAEE3-317	Electrical Fundamentals-II	3	1	0	40	60	100	4
BAEE3-318	Electrical Fundamentals-II Lab.	0	0	4	60	40	100	2
BAEE3-319	Gas Turbine Engine	3	1	0	40	60	100	4
BAEE3-320	Gas Turbine Engine Lab.	0	0	4	60	40	100	2
BAEE3-321	Aircraft Systems-1	3	1	0	40	60	100	4
BAEE3-322	Aircraft Systems-1 Lab.	0	0	4	60	40	100	2
Total		12	4	16	400	400	800	24

Semester 4 th		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BAEE3-423	Electronic Fundamentals and Digital Techniques-I	3	1	0	40	60	100	4
BAEE3-424	Electronic Fundamentals and Digital Techniques-I Lab.	0	0	4	60	40	100	2
BAEE3-425	Aircraft Materials and Hardware	3	1	0	40	60	100	4
BAEE3-426	Aircraft Materials and Hardware Lab.	0	0	4	60	40	100	2
BAEE3-427	Aircraft Maintenance Practices	3	1	0	40	60	100	4
BAEE3-428	Aircraft Maintenance Practices Lab.	0	0	4	60	40	100	2
BAEE3-429	Avionics	3	1	0	40	60	100	4
BAEE3-430	Avionics Lab.	0	0	4	60	40	100	2
Total		12	4	16	400	400	800	24

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Semester 5 th		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BAEE3-531	Electronic Fundamentals and Digital Techniques-II	3	1	0	40	60	100	4
BAEE3-532	Electronic Fundamentals and Digital Techniques-II Lab.	0	0	4	60	40	100	2
BAEE3-533	Workshop Practices	3	1	0	40	60	100	4
BAEE3-534	Workshop Practices Lab.	0	0	4	60	40	100	2
BAEE3-535	Aircraft Systems-II	3	1	0	40	60	100	4
BAEE3-536	Aircraft Systems-II Lab.	0	0	4	60	40	100	2
BAEE3-537	Piston Engines and Propellers	3	1	0	40	60	100	4
BAEE3-538	Piston Engines and Propellers Lab.	0	0	4	60	40	100	2
Total		12	4	16	400	400	800	24

Semester 6 th		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BAEE3-639	Ground Handling, Safety And Support System	3	1	0	40	60	100	4
BAEE3-640	Ground Handling, Safety And Support System LAB	0	0	4	60	40	100	2
BAEE3-641	Approval of Maintenance Organization	3	1	0	40	60	100	4
BAEE3-642	Approval of Maintenance Organization LAB	0	0	4	60	40	100	2
BAEE3-643	Typical Aircraft Maintenance - Fixed Wing Heavy / Complex Aircraft	3	1	0	40	60	100	4
BAEE3-644	Typical Aircraft Maintenance - Fixed Wing Heavy / Complex Aircraft LAB	0	0	4	60	40	100	2
BAEE3-645	Typical Aircraft Maintenance - Fixed Wing Light / Composite Aircraft	3	1	0	40	60	100	4
BAEE3-646	Typical Aircraft Maintenance - Fixed Wing Light / Composite Aircraft LAB	0	0	4	60	40	100	2
Total		12	4	16	400	400	800	24

Total Credits: 28 + 28 + 24 + 24 + 24 + 24 = 152

AERODYNAMICS

Subject Code: BAEE3-101

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

Duration: 60 Hrs.

Rationale:

As the AME students will involve in supervising the Maintenance, Repair and Overhauling of aircraft, they must possess adequate knowledge on atmosphere, fundamental principles of aerodynamics, instrument system and theory of flight.

Learning Outcomes:

After undergoing the subject, the students will be able to:

1. Understand the different layers of atmosphere
2. Basic principles of aerodynamics
3. Aircraft controls and stability
4. Functions of control surfaces and tabs
5. Lift, drag, thrust and weight
6. Aircraft instrument system
7. High speed theory
8. Principles of rotary wing aircraft
9. Basic terms and terminology of aerodynamics

Contents	Hrs.
Physics of the Atmosphere International Standard Atmosphere (ISA), application to aerodynamics	2
Aerodynamics <ul style="list-style-type: none"> ➤ Airflow Around a Body: Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, up wash and downwash, vortices, stagnation; ➤ The Terms: camber, chord, mean aerodynamic chord, aerodynamic centre, centre of pressure, stagnation point, profile (parasite) drag, induced drag, angle of attack, wash in and wash out, fineness ratio, wing shape and aspect ratio; Thrust, Weight, Aerodynamic Resultant; ➤ Generation of Lift and Drag: Angle of Attack, Lift coefficient, Drag coefficient, polar curve, stall; Aerofoil contamination including ice, snow, frost. 	12
Theory of Flight <ul style="list-style-type: none"> ➤ Relationship between Lift, Weight, Thrust and Drag; Glide ratio; Steady state flights, performance; Theory of the turn; ➤ Influence of Load Factor: Stall, flight envelope and structural limitations; ➤ Lift augmentation. 	10
Flight Stability and Dynamics <ul style="list-style-type: none"> ➤ Longitudinal stability (active and passive) ➤ Lateral (active and passive) ➤ Directional stability (active and passive). 	3
Theory of Flight <ul style="list-style-type: none"> ➤ Aeroplane Aerodynamics and Flight Controls ➤ Operation and effect of: Roll control--ailerons and spoilers; Pitch control-- elevators, stabilators, variable incidence stabilisers and canards; Yaw control--rudder limiters; ➤ Control using elevons, ruddervators; ➤ High Lift Devices: slots, slats, flaps, flaperons; ➤ Drag Inducing Devices: spoilers, lift dumpers, speed brakes; ➤ Effects of wing fences, saw tooth leading edges; 	16

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<ul style="list-style-type: none"> ➤ Boundary layer control using, vortex generators, stall wedges or leading edge devices; ➤ Operation and effect of trim tabs, balance and anti-balance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels. 	
<p>Basic Instrument Systems</p> <ul style="list-style-type: none"> ➤ Classification; Atmosphere; Terminology; Pressure measuring devices and systems; ➤ Pitot static systems; Altimeters; Vertical speed indicators; Airspeed indicators; ➤ Machmeter; Altitude reporting/alerting systems; Air data computers; rate of climb /vertical speed indicator, cabin pressure indicator, pneumatic systems instruments; ➤ Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; ➤ Compasses: direct reading, remote reading; ➤ Angle of attack indication, stall warning systems; ➤ Glass Cockpit, Other aircraft system indication. 	5
<p>High Speed Flight</p> <ul style="list-style-type: none"> ➤ Speed of sound, subsonic flight, transonic flight, supersonic flight, Mach number, critical Mach number, compressibility effect, buffet, shock wave, aerodynamic heating, area rule; ➤ Factors affecting airflow in engine intakes of high speed aircraft; ➤ Effects of sweepback on critical Mach number. 	8
<p>Rotary Wing Aerodynamics</p> <ul style="list-style-type: none"> ➤ Elementary rotary wing and aerodynamic Terminology; ➤ Basic operation and effect of cyclic, collective and anti-torque controls. 	4

Instructional Strategy:

1. Teachers should lay special emphasis in making the students conversant with the basics principles of aerodynamics and terms and terminologies of theory of flight.
2. Use of audio-visual aids/video films should be made to demonstrate the Bernoulli's principle, four forces, operation of controls, stability and high speed theory.
3. Exposure to control surfaces and cockpit so that students can learn how control surfaces are operated from cockpit.
4. Observing the flying of aircraft: operation of control surfaces and high lift/drag devices during landing and take-off.
5. Demonstration of the functions of aircraft parts and control surfaces
6. Practical demonstration of flying controls through a **drone** would be a greater advantage.

Recommended Books:

1. Clancey, 'Aerodynamics'.
2. A.C. Kermode, 'Mechanics of Flight'.
3. 'Force Measurement on Symmetric Airfoil'.
4. 'Force Measurement on Cambered Airfoil'.
5. E.H.J. Pallett, 'Aircraft Instruments'.
6. C.A. Williams, 'Aircraft Instruments'.

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AERODYNAMICS LAB.

Subject Code: BAEE3-102

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	Flow around various objects in a 'Water Channel' - Square, Cylinder, Aerofoil, Understanding laminar flow, turbulent flow, stagnation point, flow separation, boundary layer	4
02	Fabricate Aerofoil Model - Understanding associated terms	4
03	Water Channel - Effect of vortex generator on boundary layer control	4
04	Effect of angle of attack and airflow velocity on lift and Stalling	4
05	Study of flow over streamlined bodies with different angle of attack by flow visualization technique	4
06	Identification of flight control surfaces and their effect on flight control - Aircraft Model	4
07	Identifying High lift devices and practical understanding of their effect on lift with respect to aircraft speed (Air flow)	4
08	Practical understanding of lift spoiling devices	4
09	Removal / installation of Pitot Static Instruments	4
10	Calibration of a Pitot Static System using a Pitot Static Leak tester	4
11	Fabrication of model - high speed flight	4
12	Practical study of various factors affecting lift and drag on an aerofoil	4
13	Factors affecting flow of fluid over an aerofoil surface and demonstrate the Venturi effect	4
14	Identify various type of flap surfaces and their effect on high lift and high drag characteristic	4
15	Identification of various parts of Rotary wing	4

HUMAN FACTORS

Subject Code: BAEE3-103

**L T P C
5 1 0 6**

Duration: 90 Hrs.

Rationale:

The term “human factors” in the context of aviation maintenance engineering is relatively new. It refers to the study of human capabilities and limitations in the workplace. Human factors researchers study the interaction of maintenance personnel, the equipment they use, the written and verbal procedures and rules they follow, and the environmental conditions of any system. The aim of human factors is to optimise the relationship between maintenance personnel and systems with a view to improving safety, efficiency and well-being”. For this purpose, AME students in this course are required to teach the concepts of human factor to develop knowledge for keeping the person and object safe with maximum output during the maintenance work.

Learning Outcomes:

After undergoing this course, the students will be able to know:

1. Human performance and limitations, social psychology, physical environment and factors affecting performance of a person.
2. Task, communication and human error during the work.
3. Hazards in the workplace, human error in the maintenance environment.
4. Human factors in the aircraft maintenance and inspection.
5. Human errors in the aircraft maintenance and inspection.

6. Error prevention and considerations strategies.

Contents	Hrs.
General ➤ The need to take human factors into account; ➤ Incidents attributable to human factors/ human error; ➤ ‘Murphy’s’ law.	5
Human Performance and Limitations ➤ Vision; ➤ Hearing; ➤ Information processing; ➤ Attention and perception; ➤ Memory; ➤ Claustrophobia and physical access.	5
Social Psychology ➤ Responsibility: individual and group; ➤ Motivation and de-motivation; ➤ Peer pressure; ➤ ‘Culture’ issues; ➤ Team working; ➤ Management, supervision and leadership.	5
Factors Affecting Performance ➤ Fitness/health; ➤ Stress: domestic and work related; ➤ Time pressure and deadlines; ➤ Workload: overload and under-load; ➤ Sleep and fatigue, shift work; ➤ Alcohol, medication, drug abuse.	5
Physical Environment ➤ Noise and fumes; ➤ Illumination; ➤ Climate and temperature; ➤ Motion and vibration; ➤ Working environment.	5
Tasks ➤ Physical work; ➤ Repetitive tasks; ➤ Visual inspection; ➤ Complex systems.	5
Communication ➤ Within and between teams; ➤ Work logging and recording; ➤ Keeping up to date, currency; ➤ Dissemination of information.	5
Human Error ➤ Error models and theories; ➤ Types of error in maintenance tasks; ➤ Implications of errors (i.e. accidents); ➤ Avoiding and managing errors.	5

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Hazards in the Workplace ➤ Recognizing and avoiding hazards; ➤ Dealing with emergencies.	5
Human Factors in Aircraft Maintenance and Inspection ➤ Human Factors — Aircraft Maintenance and Inspection; Contemporary ➤ Maintenance Problems; the SHEL Model; the Reason Model; Human Error.	5
Human Error in Aircraft Maintenance and Inspection ➤ (an organizational perspective)	5
Human Error in the Maintenance Environment ➤ Human Factors Issues Affecting Aircraft Maintenance and Dirty Dozen; ➤ Information Exchange and Communication; ➤ Training; Aircraft Maintenance ➤ Technician Facilities and Work Environment.	5
Teams and Organizational Issues in Aircraft Maintenance ➤ Team Work; ➤ Job Design; ➤ Reward Systems; ➤ Selection and Staffing; ➤ Training.	5
Automation and Advanced Technology System ➤ Automation and Computerization; ➤ Advanced Job Aid Tools.	5
Error Prevention, Considerations and Strategies	5

Instructional Strategy:

While imparting instructions, teacher should give demonstration of various models concerned to human factors to the students. Different transparencies and animated projections should be shown to the students for better understanding of the lesson.

Recommended Books:

1. CAP 715 - An Introduction to Aircraft Maintenance Engineering Human Factors for JAR 66, Civil Aviation Authority, UK.
2. CAP 718 - Human Factors in Aircraft Maintenance and Inspection, Civil Aviation Authority, UK.
3. FAA-H-8083-30 - Aircraft Maintenance Technician Handbook - General, US. Department of Transportation, Federal Aviation Administration
4. ICAO Doc 9806

TUTORIAL	
Contents	Hrs.
➤ Application of Human Factors in development of Aircraft Maintenance Programme and Inspection Schedule.	1
➤ Application of Human Factors in Aircraft Maintenance Planning and Execution.	1
➤ Application of Human Factors in Aircraft Maintenance.	1
➤ Detail study of Murphy's' law.	1
➤ To study Shel Model.	2
➤ Study of Dirty Dozen.	1
➤ Stress Management in Aircraft Maintenance environment.	2
➤ To study human behavior in performing aircraft inspection in adverse weather conditions.	2

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➤ Develop procedure and environment for aircraft inspection for error prevention, considerations and strategies.	2
➤ Study of social impact on aircraft maintenance engineer.	2

ENGLISH COMMUNICATION

Subject Code: BAEE3-104

L T P C

Duration: 60 Hrs.

3 1 0 4

Rationale:

Although the art of communication is natural to all living beings, people with effective communication skills succeed in their professions and business in today's world of complexities. After studying this course, the students are expected to gain the fundamental knowledge of communication and learn the tools and techniques to develop the interpersonal communication skills so that they will become excellent in dyadic and corporate communication.

Learning Outcomes:

After studying this subject, the students will have the adequate knowledge on:

1. The importance of communication
2. The process of communication
3. The keys or characteristics of effective communication
4. The barriers of communication
5. The techniques of breaking the communication barriers

After studying this subject, the students will be able to perform the following activities with the enhanced level of confidence:

1. Writing
2. Listening
3. Reading
4. Speaking
5. Interview
6. Non-verbal communication

Contents	Hrs.
Introduction ➤ Theory of Communication ➤ Types and modes of Communication	5
Language of Communication ➤ Verbal and Non-verbal (Spoken and Written), ➤ Personal, Social and Business Barriers and Strategies, ➤ Intra-personal, Inter personal and Group communication	15
Speaking Skills ➤ Monologue ➤ Dialogue ➤ Group Discussion ➤ Effective Communication/ Miscommunication ➤ Interview ➤ Public Speech	20
Reading and Understanding ➤ Close Reading ➤ Comprehension ➤ Summary	15

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<ul style="list-style-type: none"> ➤ Paraphrasing ➤ Analysis and Interpretation ➤ Translation (from Indian language to English and vice-versa) ➤ Literary/Knowledge Texts 	
<p>Writing Skills</p> <ul style="list-style-type: none"> ➤ Documenting ➤ Report Writing ➤ Making notes ➤ Letter writing 	15

Instructional Strategy:

1. Teachers should lay special emphasis in making the students conversant with concepts, process and practices related to effective communication skills.
2. It is recommended to use audio-visual aids/video films to impart the knowledge on the English language and communication skills.

Recommended Books:

1. 'Fluency in English', Part-II, Oxford University Press, 2006.
2. V.R. Narayanaswami, 'Strengthen Your Writing', 3rd Edn., Orient Longman, 2005.
3. Andrea J. Rutherford, 'Basic Communication Skills for Technology', 1st Edn., Pearson Business English, Pearson, 2008.
4. 'Language, Literature and Creativity', Orient Blackswan, 2013, Education Asia (Singapore) Pvt. Ltd., Bangalore, 2001..
5. 'Language through Literature', (forthcoming Edn.). Gauri Mishra, Ranjana Kaul, Brati Biswas, Nell Ann Pickett, Ann A. Laster, Katherine E. Staples,
6. 'Technical English (Writing, Reading and Speaking)', 8th Edn., Pearson Education, USA, Addison Wesley Longman Inc., 2001.

MATHEMATICS-I

Subject Code: BAEE3-105

**L T P C
5 1 0 6**

Duration: 90 Hrs.

Rationale:

Contents of this course provide fundamental base for understanding engineering problems and their solution algorithms. Contents of this course will enable students to use basic tools like logarithm, binomial theorem, partial fractions, matrices, t-ratios and co-ordinates for solving complex engineering problems with exact solutions in a way which involve less computational task. By understanding the logarithm, they will be able to make long calculations in short time and it is also a pre-requisite for understanding Calculus.

Learning Outcomes:

After undergoing this course, the students will be able to:

1. Apply complex number in engineering problems.
2. Apply permutation and combination to count without actual counting.
3. Apply permutation and combination to understand binomial theorem.
4. Calculate the approximate value of roots of certain expressions in engineering problems by application of binomial theorem.
5. Resolve rational functions to partial fractions for the use in Integral Calculus.
6. Use matrices to provide solution to engineering problems.
7. Solve different problems using trigonometry.
8. Understand the geometric shapes used in engineering problems by Co-ordinate Geometry.
9. Explore the idea of location, graph, and linear relationships between two variables.

Contents	Hrs.
PART-1	10
Linear Algebra Elementary Row Transformation, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination Method, Gauss-Jordan Method, Eigen Values and Eigen Vectors of a Matrix, Caley-Hamilton Theorem, Diagonalization of a Matrix,	
PART-2	5
Trigonometry Functions Elementary trigonometry, sine, cosine and tan functions, reciprocals of trig functions, angle values of trig functions, geometrical problems, trigonometric inverse functions	
PART-3	20
Multivariable Differential Calculus Functions of 2 Variables, Limits and continuity, Partial differentiation, Euler's Theorem, Maxima and Minima of two variables, Method of Lagrange Multipliers, Taylor Series and Maclaurin Series of two variables, Jacobian.	
PART-4	20
Multivariable Integral Calculus Multiple Integrals-Double integrals, Change of order, Applications to areas, volumes, Triple Integral.	
PART-5	20
Vector Calculus Gradient, Divergence, Curl, Evaluation of Line Integral, Green's Theorem in Plane (without proof), Stoke's Theorem (without proof), Gauss Divergence Theorem (without proof).	

Instructional Strategy:

1. Basic elements of algebra, trigonometry and co-ordinate geometry can be taught in the light of their applications in the field of engineering and technology.
2. By laying more emphasis on applied part, teacher can also help in providing a good continuing education base to the students.
3. Students need to be taught the skills needed to use software tools built by experts through multiple problem solving based on the topics related to Algebra, Trigonometry and Coordinate Geometry that the industry requires.
4. Examples to be used should be related to engineering.
5. Students should be able to relate to the actual use of these examples and the way mathematical calculations will help them in doing their job.

Recommended Books:

1. Shanti Narain, 'Differential Calculus'.
2. Shanti Narain, 'Integral Calculus'.
3. 'Linear Algebra', Schaum Outline Series.
4. B.S. Grewal, 'Engineering Mathematics'.

CORROSION AND NDI TECHNIQUES

Subject Code: BAEE3-106

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

Duration: 60 Hrs.

Rationale:

Lot of development has taken place in the field NDT to investigate different types of corrosion. New equipment and technologies are being developed continuously since its inception. AME students in this Course are required to have knowledge of various types NDT equipment and its applications. For this purpose, it is necessary to teach them basics of the NDT and corrosion in aircraft. This subject aims at developing knowledge about the basics of NDT used in the Aircraft industries.

Learning Outcomes:

After undergoing this subject, the students will be able to:

1. Understand principle of different NDT techniques.
2. Classify different types of corrosion.
3. Know effects, properties and identification and removal of corrosion.

Contents	Hrs.
PART-1	6
Type of Corrosion, Corrosion Theory; General Development: Development of Corrosion, Factors influencing corrosion. Forms of Corrosion, Corrosion and Mechanical Factors, Common Corrosive Agents. Metallic Mercury Corrosion on Aluminum Alloys, Micro Organisms.	
PART-2	10
Importance of NDT in quality assurance; Different types of non-destructive techniques to obtain information regarding size, location and orientation of Damage or cracks. Visual inspection techniques coin tapping technique for Composite structures and adhesive bonds. Ultrasonic testing (UT Level 1, 2), Radiography Inspection (RT Level 1, 2), Magnetic particle testing (MT Level 1, 2), Microwave testing, Pulse echo technique, pitch-catch technique, through transmission technique, A-scan, B-Scan, C-scan. Acoustic emission: Sources of acoustic emission in composites, peak amplitude, rise time during events, ring-down counts duration of events. X-ray radiography: Absorption spectra, short wave length, X-ray for detection of voids. Die penetration technique.	
PART-3	10
Liquid/Dye penetrant test (PT level 1, 2), Visual testing (VT-level 1, 2), Eddy current testing (ET level 1, 2), Guided wave testing.	
PART-4	8
TKY joints ultrasonic inspection, Basics of NDT, Metallurgy for non-metallurgists.	
PART-5	6
Effects of Corrosion on Metals, Corrosion Prone Areas and Preventative Maintenance Battery Compartments and battery vent openings, Lavatories, Buffets and Galleys, Bilge Areas, Wheel wells and landing gear, External skin areas, Water entrapment areas, Engine Frontal Areas and cooling air vents, Electronic package compartments.	

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PART-6	8
Factors in corrosion control, preventative maintenance, frequency of inspection, recommended depth of inspection, non-destructive inspection (NDI), Corrosion removal techniques, Standard methods, Preparations for rework, Paint removal, special techniques, fairing or blending reworked areas, chemical testing, chemical spot analysis of magnetic metals, surface treatment testing, chemical spot testing of non-magnetic metals, post identification cleaning and refinishing, mechanical corrosion removal by blasting.	
PART-7	8
Corrosion Damage and Rework Limits on Aluminum and Aluminum Alloys, Treatment, Processing of Aluminum Surfaces, Repair, Corrosion Removal Corrosion damage and rework limits on Magnesium and Alloy treatment, Processing of Aluminum surfaces, repair, corrosion removal. Corrosion damage and rework limits on Ferrous Corrosion Damage and Rework.	
PART-8	4
Limits on Ferrous & Alloy Treatment, Processing of Aluminum Surfaces, Repair, Corrosion Removal; Corrosion damages on composite material Mercury spills/corrosion damage. Corrosion protection for agricultural aircraft.	

Instructional Strategy:

While imparting instructions, teacher should give demonstration of various types NDT equipment to the students. Transparencies and animated videos should be shown to the students for better understanding of the lesson.

Recommended Books:

1. AC-43-4A
2. AC-43-1B
3. Prasad J. and C.G. Krishnadas Nair, 'Non-Destructive Test and Evaluation of Materials'.
4. Non-Destructive Testing Handbook, Vol. - 1. Aerospace NDT – The American Society for Non-destructive Testing.

CORROSION AND NDI TECHNIQUES LAB.

Subject Code: BAEE3-107

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	Identify different types of corrosion, factors contribute to corrosion, areas prone for corrosion, corrosive agents avoidance of corrosion	5
02	Detection of corrosion, defects and recording	8
03	Various Corrosion preventive technique - practice	10
04	Surface cleaning, rework and protection technique of ferrous and non-ferrous (Magnesium and Aluminum alloys) metallic surface	10
05	Accidental spillage of corrosive agents, cleaning and restoration	10
06	Ultrasonic Thickness testing	2
07	Liquid Penetrant testing	2
08	Eddy current	2
09	Magnetic Particle	2
10	Visual Inspection	2
11	Radiography testing	2
12	Guided wave testing	3

ELECTRICAL FUNDAMENTALS-I

Subject Code: BAEE3-208

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

Duration: 60 Hrs.

Rationale:

Electricity & Magnetism is devoted to the utilization of the forces of nature and materials for the benefits of mankind. Harnessing the vast sources of energy and transforming them to the most convenient form (electrical) for the overall benefit of the society for sustenance is prime objective. For this purpose, it is necessary to teach the students basics of electrical science, fundamental laws of electricity and different electrical components. This subjects aims at developing knowledge of electricity and its application used in domestic and aviation industries.

Learning Outcomes:

After undergoing this course, the students will be able to:

1. Understand about fundamentals of electron theory.
2. Distinguish between conductor, semi-conductor & insulator.
3. Characteristics of static electricity & properties of electrostatic charges.
4. Understand about different electrical terminology.
5. Understand various laws of electricity - Coulomb's law; Kirchhoff's law; Ohm's Law.
6. Distinguish between resistor, capacitor and inductor.
7. Distinguish between alternating current and direct current.
8. Characteristics & properties of magnetism and interrelation with electricity.
9. Understand properties & application of Transformers and Filters.

Contents	Hrs.
Electron Theory ➤ Structure and distribution of electrical charges within: atoms, molecules, ions, compounds ➤ Molecular structure of conductors, semiconductors and insulators.	03
Static Electricity and Conduction ➤ Static electricity and distribution of electrostatic charges; Electrostatic laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and a vacuum.	03
Electrical Terminology ➤ The following terms, their units and factors affecting them: potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow.	02
DC Circuits ➤ Ohms Law, Kirchhoff's Voltage and Current Laws; Calculations using the above laws to find resistance, voltage and current; Significance of the internal resistance of a supply.	04
Resistance/Resistor ➤ Resistance and affecting factors; Specific resistance; Resistor colour code, values and tolerances, preferred values, wattage ratings; Resistors in series and parallel; Calculation of total resistance using series, parallel and series parallel combinations; Operation and use of potentiometers and rheostats; Operation of Wheatstone Bridge. ➤ Positive and negative temperature coefficient conductance; Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; Construction of potentiometers and	05

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rheostats; Construction of Wheatstone Bridge.	
Capacitance/Capacitor ➤ Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, construction and function; Capacitor colour coding; ➤ Calculations of capacitance and voltage in series and parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.	04
Magnetism ➤ Theory of magnetism; Properties of a magnet Action of a magnet suspended in the Earth's magnetic field; Magnetization and demagnetization; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor. ➤ Magneto motive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.	05
Inductance/Inductor ➤ Faraday's Law; Action of inducing a voltage in a conductor moving in a magnetic field. ➤ Induction principles; Effects of the following on the magnitude of an induced voltage: magnetic field strength, rate of change of flux, number of conductor turns; Mutual induction; The effect the rate of change of primary current and mutual inductance has on induced voltage; Factors affecting mutual inductance: number of turns in coil, physical size of coil, permeability of coil, position of coils with respect to each other; Lenz's Law and polarity determining rules; Back emf, self-induction; Saturation point; Principle uses of inductors.	06
AC Theory ➤ Sinusoidal waveform: phase, period, frequency, cycle; Instantaneous, average, root mean square, peak, peak to peak current values and calculations of these values- in relation to voltage, current and power Triangular/Square waves; Single/3 phase principles.	08
Resistive (R), Capacitive (C) and Inductive (L) Circuits ➤ Phase relationship of voltage and current in L, C and R circuits, parallel, series and series parallel; Power dissipation in L, C and R circuits; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.	08
Transformers ➤ Transformer construction principles and operation; Transformer losses and methods for overcoming them; Transformer action under load and no-load conditions; ➤ Power transfer, efficiency, polarity markings; Calculation of line and phase voltages and currents; Calculation of power in a three phase system; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.	06
Filters ➤ Operation, application and uses of the following filters: low pass, high pass, band pass, band stop.	06

Instructional Strategy:

While imparting instructions, teacher must show various images or videos related to Topic by using projector. Students should be asked to collect different electrical

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Components available in the market. Visits to industry should be planned to demonstrate Electrical power generation, distribution & utilization in the industry.

Recommended Books:

1. B.L. Theraja, 'Electrical Technology'.
2. E.H.J. Pallett, 'Aircraft Electrical System'.

ELECTRICAL FUNDAMENTALS-I LAB.

Subject Code: BAEE3-209

L T P C

Duration: 60 Hrs.

0 0 4 2

S.N.	Contents	Hrs.
01	Simple experiments with static electricity and the coulomb's law	4
02	Application of Electromotive forces and Potential difference; Ballistic Galvanometer - Measurement of charge & current sensitivity	4
03	Measuring (a) Resistances (b) AC and DC Voltages (c) DC Current & checking electrical fuses and connection	4
04	Use of a range of test meters to measure volts, amps and resistance.	4
05	Resistor colour codes - Calculation of resistance value using colour codes	4
06	Potentiometer, rheostat & wheat stone bridges and determine unknown resistance	4
07	Use a Multimeter for measuring Resistance, checking electrical fuses, identify various types of resistance	4
08	Identify various types of capacitors	4
09	Measurement of magnetic field strength, Magnetic field density & permeability using flux meter.	4
10	Production of electricity by inductance methods	4
11	Single phase and three phase power supply distribution using star and delta connection	4
12	Construct series LCR circuit and determine its (a) Resonant Frequency (b) Quality Factor	4
13	Construct parallel LCR circuit and determine its (a) Anti-resonant frequency (b) Quality factor Q	4
14	Use of transformer in power distribution and measurements.	4
15	Make filters circuit to study function of low pass, high pass, band pass & band stop	4

AVIATION LEGISLATION

Subject Code: BAEE3-210

L T P C

Duration: 90 Hrs.

5 1 0 6

Rationale:

The Civil Aviation Safety Authority is responsible for establishing and administrating the regulatory framework in relation to aircraft safety. This subject will enable the students to learn about civil aviation rules and requirements. A healthy, well-managed Civil Aviation sector, supported by good aviation policy-making and regulation, is vital to the economy of every state. Civil Aviation Authorities (CAAs) are responsible for the oversight and regulation of civil aviation with a focus on aviation safety, security, airspace policy, economic regulation, efficiency, sustainability, consumer protection and respect for the environment.

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Learning Outcomes:

1. To get the knowledge of ICAO, FAR, EASA procedures through CAR
2. Acquire knowledge of documentation and procedures of certificate of airworthiness and registration.
3. Procedures of maintenance programme and inspections.
4. Understanding of the legislation and regulations that must be adhered to when manufacturing and maintaining aircraft.

Contents	Hrs.
<p>Regulatory Framework Role of International Civil Aviation Organization; Introduction to Chicago Convention, 1944; Introduction to ICAO, Convention, Standards and Recommended Practices; The Aircraft Act, 1934; The Aircraft Rules, 1937 - Part I, II, III, IV, VI, VII, IX, XIIA, XIIB, XIIC, XIII, XIV. Role of the DGCA; Relationship between CAR-21, CAR-M, CAR-145, CAR-66, CAR 147; Aeronautical Information Circulars (Applicable to Aircraft Maintenance and Release); CAR - Sections 1 and 2.</p>	6
<p>CAR-M Detail understanding of CAR M provisions related to Continuing Airworthiness; Detailed understanding of CAR-M.</p>	15
<p>CAR-145 — Approved Maintenance Organisations Detailed understanding of CAR-145 and CAR M Subpart F.</p>	15
<p>CAR-66 Certifying Staff – Maintenance Detailed understanding of CAR-66.</p>	5
<p>CAR-147 Approved Maintenance Training Organization Detailed understanding of CAR-147.</p>	5
<p>Aircraft Operations Commercial Air Transport/Commercial Operations; Air Operators Certificates; Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Documents to be carried on board; Aircraft Placarding (Markings);</p>	5
<p>Aircraft Certification a) General: Certification rules: such as FAA & EACS 23/25/27/29; Type Certification Supplemental Type Certification; Type Approval; CAR-21 Sub-Part F, G, H, I, M, P & Q. Aircraft Modifications and repairs approval and certification; permit to fly requirements. b) Documents: Certificate of Airworthiness; Certificate of Registration; Noise Certificate; Weight Schedule; Radio Station License and Approval.</p>	10
<p>Applicable National and International Requirements Introduction to ICAO, FAR, EASA Regulations - Aircraft Maintenance and certification a) Maintenance Programme, Maintenance checks and inspections; Master Minimum Equipment Lists, Minimum Equipment List; Dispatch Deviation Lists; Airworthiness Directives; Service Bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc.;; b) Continuing airworthiness; Test flights; ETOPS /EDTO, maintenance and dispatch requirements; RVSM, maintenance and dispatch requirements; RNP, MNPS Operations All Weather Operations; Category 2/3 operations and minimum equipment,</p>	5

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maintenance, training and certification requirements.	
Safety Management System State Safety Programme; Basic Safety Concepts; Hazards & Safety Risks; SMS Operation; SMS Safety performance; Safety Assurance.	10
Fuel Tank Safety Special Federal Aviation Regulations (SFARs) from 14 CFR SFAR 88 of the FAA and of JAA TGL 47; Concept of CDCCL, Airworthiness Limitations Items (ALI).	4

Instructional Strategy:

While imparting instructions, teacher should show various types of certificates and necessary documentation to the students. Students should be asked to fill all the forms and maintain log books.

Recommended Books:

1. The Aircraft Act, 1934
2. The Aircraft Rules, 1937, VOL 1
3. The Aircraft Rules, 1937, VOL 3
4. Aeronautical Information Circular
5. CAR - Section - 1, 2, & 8 SMS,
6. CAR - 21, M, 145, 66 & 147
7. Special Federal Aviation Regulations (SFARs) - 14 CFR, SFAR 88 & JAA TGL 47 Airworthiness Procedure Manual

ENVIRONMENTAL SCIENCE

Subject Code: BAEE3-211

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

Duration: 60 Hrs.

Rationale:

Environmental science is important to save our world from destruction. Because of man's abusive actions, the environment is not safe anymore. There are more calamities experienced such as flashfloods, hurricanes and draughts and climate change. If we do not study the environment, then there is a great danger that everything that we know as home with all that surround us, will lead to extinction, yes including the extinction of our specie.

We need to study the environment and the sciences applied into it to find solutions to different environmental issues so that children of tomorrow will still enjoy the healthy and productive environment we still have now. If man will only make use of the different discoveries through environmental science, then this world will definitely be a better place to be called home not only for us but for the next generation.

Learning Outcomes:

The Environmental Studies major prepares students for careers as leaders in understanding and addressing complex environmental issues from a problem-oriented, interdisciplinary perspective. Students:

1. Master core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
2. Master core concepts and methods from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
3. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
4. Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.

5. Apply systems concepts and methodologies to analyse and understand interactions between social and environmental processes.
6. Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
7. Demonstrate proficiency in quantitative methods, qualitative analysis, critical thinking, and written and oral communication needed to conduct high-level work as interdisciplinary scholars and/or practitioners.

Contents	Hrs.
PART-1	2
Multidisciplinary nature of environmental studies Scope and importance; Concept of sustainability and sustainable development	
PART-2	6
What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems: ➤ Forest ecosystem ➤ Grassland ecosystem ➤ Desert ecosystem ➤ Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).	
PART-3	8
Natural Resources: Renewable and Non-renewable Resources ➤ Land Resources and Land Use Change: Land degradation, soil erosion and desertification ➤ Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. ➤ Water: Use and over--exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter--state). ➤ Energy Resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.	
PART-4	8
Biodiversity and Conservation ➤ Levels of biological diversity: genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots. ➤ India as a mega-biodiversity nation; Endangered and endemic species of India ➤ Threats to biodiversity: Habitat loss, poaching of wildlife, man--wildlife conflicts, biological invasions; Conservation of biodiversity: In--situ and Ex-situ conservation of biodiversity. ➤ Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.	
PART-5	8
Environmental Pollution ➤ Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution. ➤ Nuclear hazards and human health risks ➤ Solid waste management: Control measures of urban and industrial waste. ➤ Pollution case studies.	

PART-6	7
<p>Environmental Policies & Practices</p> <ul style="list-style-type: none"> ➤ Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture ➤ Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD). ➤ Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context 	
PART-7	6
<p>Human Communities and the Environment</p> <ul style="list-style-type: none"> ➤ Human population growth: Impacts on environment, human health and welfare. ➤ Resettlement and rehabilitation of project affected persons; case studies. ➤ Disaster management: floods, earthquake, cyclones and landslides. ➤ Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan. ➤ Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. ➤ Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi). 	
PART-8	15
<p>Field Work</p> <ul style="list-style-type: none"> ➤ Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc. ➤ Visit to a local polluted site--Urban/Rural/Industrial/Agricultural. ➤ Study of common plants, insects, birds and basic principles of identification. ➤ Study of simple ecosystems--pond, river etc. 	

Instructional Strategy:

The learning outcomes provide the planning framework for teachers.

- In their planning, teachers in Lower Primary schools use the learning outcomes from the syllabuses, and the elaborations in this Teacher Guide, to identify specific knowledge, skills and attitudes that can be developed at each grade.
- Continuous assessment of student learning against the outcomes will ensure a supportive classroom environment that will meet the students' individual learning needs.
- Here is a discovery-learning motto to keep in mind when planning activities for students who are learning in two languages.

Recommended Books:

1. M. Gadgil & R. Guha, 'This Fissured Land: An Ecological History of India', Univ. of California Press, 1993.
2. Gilbert M. Masters, 'Introduction to Environmental Engineering and Science', 2nd Edn., Pearson Education Pvt., Ltd., ISBN 81-297-0277-0, 2004.
3. T.G. Miller JR., 'Environmental Science', Wadsworth Publishing Co.
4. E.P. Odum, H.T. Odum & J. Andrews, 'Fundamentals of Ecology', Philadelphia: Saunders, Andrews, 1991.
5. R. Sengupta, 'Ecology and Economics: An Approach to Sustainable Development', OUP, **2003.**
6. J.S. Singh, S.P. Singh and S.R. Gupta, 'Ecology, Environmental Science and Conservation', S. Chand Publishing, New Delhi, 2014.
7. N.S. Sodhi, L. Gibson & P.H. Raven (eds), 'Conservation Biology: Voices from the Tropics', John Wiley & Sons, 2013.

8. V. Thapar, 'Land of the Tiger: A Natural History of the Indian Subcontinent', **1998**.
9. M.N. Rao & A.K. Datta. 'Waste Water Treatment', Oxford and IBH Publishing Co. Pvt. Ltd., **1987**.

PHYSICS

Subject Code: BAEE3-212

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

Duration: 60 Hrs.

Rationale:

Applied physics includes the study of a large number of diverse topics all related to things that go on in the world around us. It aims to give an understanding of this world both by observation and by prediction of the way in which objects will behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content.

Note: Teachers should give examples of engineering/technology applications of various concepts and principles in each topic so that students are able to appreciate learning of these concepts and principles. In all contents, SI units should be followed. Working in different sets of units can be taught through relevant software.

Learning Outcomes:

After undergoing this subject, the students will be able to:

1. Identify physical quantities, parameters and select their units for use in engineering solutions.
2. Compute units and dimensions of different physical quantities.
3. Represent physical quantities as scalar and vectors. Solve difficult problems (walking of man, motion of lawn roller.)
4. Analyze and design banking of roads and apply conservation of momentum principle to explain recoil of gun etc.
5. Define work, energy and power and their units. Derive work, power and energy relationship and solve problems about work and power State the principle of conservation of energy.
6. Identify forms of energy, conversion from one form to another. Compare and contrast the physical properties associated with linear motion and rotational motion and give examples of conservation of angular momentum.
7. Describe the surface tension phenomenon and its units, cause of surface tension and effects of temperature on surface tension.
8. Describe the viscosity of liquids. Define stress and strain. State Hooke's law and conditions under which it is valid.
9. Measure temperature in various processes on different scales (Celsius, Kelvin Fahrenheit etc.)
10. Distinguish between conduction, convection and radiation.
11. Use equipment like Vernier caliper, screw gauge, spherometer.

Contents	Hrs.
PART-1	4
Vector algebra. Scalar and vector products. Derivatives of a vector with respect to a parameter.	
PART-2	14
Elasticity: Hooke's law - Stress-strain diagram - Elastic Moduli-Relation between elastic constants - Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants - Work done in stretching and work done in twisting a wire - Twisting couple on a cylinder	

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- Determination of Rigidity modulus by static torsion - Torsional pendulum- Determination of Rigidity modulus and moment of inertia - q , η and s by Searle's method.	
PART-3 Momentum and Energy: Conservation of momentum. Work and energy. Conservation of Energy: Motion of rockets. Rotational Motion: Angular velocity and angular momentum. Torque. Conservation of angular momentum. Laws of Motion: Frames of reference. Newton's Laws of motion. Dynamics of a System of particles. Centre of Mass.	12
PART-4 Gravitation: Newton's Law of Gravitation. Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant). Kepler's Laws (statement only). Satellite in circular orbit and applications. Geosynchronous orbits. Weightlessness. Basic idea of global positioning system (GPS).	10
PART-5 Oscillations: Simple harmonic motion. Differential equation of SHM and its solutions. Kinetic and Potential Energy, Total Energy and their time averages. Damped Oscillations.	10
PART-6 Special Theory of Relativity: Constancy of speed of light. Postulates of Special Theory of Relativity. Length contraction. Time dilation. Relativistic addition of Velocities.	10

Instructional Strategy:

1. Teacher may use various teaching aids like models, charts, graphs and experimental kits etc. for imparting effective instructions in the subject.
2. Students need to be exposed to use of different sets of units and conversion from one unit type to another. Software may be used to solve problems involving conversion of units.
3. The teacher should explain about field applications before teaching the basics of mechanics, work, power and energy, rotational motion, properties of matter etc. to develop proper understanding of the physical phenomenon.
4. Use of demonstration can make the subject interesting and develop scientific temper in the students.

Recommended Books:

1. F.W. Sears, M.W. Zemansky and H.D. Young, 'University Physics', 13th Edn., Addison Wesley, 1986.
2. Charles Kittel, et. Al., 'Mechanics Berkeley Physics Course', Vol.-1, Tata McGraw Hill, 2007.

PHYSICS LAB.

Subject Code: BAEE3-213

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	Measurements of length (or diameter) using Vernier caliper, screw gauge and	6
02	Travelling microscope.	6
03	To determine the Height of a Building using a Sextant.	6
04	To determine the Moment of Inertia of a Flywheel.	6
05	To determine the Young's Modulus of a Wire by Optical Lever Method.	6

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06	To determine the Modulus of Rigidity of a Wire by Maxwell's needle.	6
07	To determine the Elastic Constants of a Wire by Searle's method.	6
08	To determine g by Bar Pendulum.	6
09	To determine g by Kater's Pendulum.	6
10	To determine g and velocity for a freely falling body using Digital Timing technique	6

QUALITY MANAGEMENT SYSTEM

Subject Code: BAEE3-214

**L T P C
5 1 0 6**

Duration: 90 Hrs.

Rationale:

A quality management system (QMS) is a formalized system that documents processes, procedures, and responsibilities for achieving quality policies and objectives. A QMS helps coordinate and direct an organization's activities to meet customer and regulatory requirements and improve its effectiveness and efficiency on a continuous basis. Quality management systems serve many purposes, including:

1. Improving processes
2. Reducing waste
3. Lowering costs
4. Facilitating and identifying training opportunities
5. Engaging staff
6. Setting organization-wide direction

The aim of quality management system is to improve understanding of what customers really want in the way of services the organisation produces and to ensure that it consistently delivers exactly what is expected. For this purpose, AME students in this course are required to teach the quality management system to develop knowledge to maintain consistently the standard of maintenance work carried out with economy.

Learning Outcomes:

After undergoing this course, the students will be able to:

1. Meaning of Quality and quality improvement.
2. Need of quality control in aviation industry.
3. Quality audit, Total quality management, Concept of Zero defect.
4. ISO-9001 quality systems, IAQG, AS-9100 Aerospace standards.
5. DGCA, FAA, EASA and IATA Requirements and Standards Aerospace Quality manuals, aircraft airworthiness, documentation, Safety practices & standards. Quality policy.
6. Auditing techniques, recording findings, communication, assessing compliance action and monitoring compliance.

Contents	Hrs.
Module-I	16
Introduction Descriptors/Topics Meaning of Quality and quality improvement, need of automobile & Aviation Quality, Introduction to Statistical methods for quality control, Process Capability for aerospace applications.	

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Module-II	14
Quality Control Statistical Quality Control, Ishikawa diagram, control charts, Control charts for attributes & variables, Moving average chart for aviation Quality systems.	
Module-III	12
Production Control Acceptance Sampling, OC curve, Sampling Plan, Producer's risk, Consumer's risk, Average Quality Level, AOQL, Design of Single & double sampling plan.	
Module-IV	12
Quality Assurance Need of Aerospace Quality Assurance, Quality Audit, total quality management, Concept of Zero defects, ISO-9001 quality systems, IAQG, AS-9100 Aerospace Standards.	
Module-V	7
Aerospace Certification DGCA, FAA, EASA and IATA Requirements and Standards Aerospace Quality manuals, aircraft airworthiness, documentation, Safety practices & standards. Quality Policy, Objective, Quality Requirements, Quality procedures and evidence retention.	
Module-VI	2
Regulatory Compliance Quality Standards / Regulatory Compliance – Compliance Records.	
Module-VII	12
Audit and Surveillance Auditing techniques, recording findings, communication, assessing compliance action and monitoring compliance. Statistical analysis and risk assessment. Risk based surveillance.	

Instructional Strategy:

While imparting instructions, teacher should give demonstration of various figures and diagrams concerned to quality management system to the students. Different transparencies and animated projections should be shown to the students for better understanding of the lesson.

Recommended Books:

1. E.L. Grant & R.S. Leavenworth, 'Statistical Quality Control', McGraw Hill Co.
2. M. Mahajan, 'Statistical Quality Control', Dhanpat Rai & Co.
3. Kanishka Bedi, 'Quality Management', Oxford University Press.
4. ISO 9001
5. AS 9100
6. DGCA – Civil Aviation Requirements
7. IATA – IOSA Standards Manual

TUTORIAL	
Contents	Hrs.
Develop Typical Quality System for five specific activities of aircraft maintenance industry.	5
Carryout audit of five specific activities of aircraft maintenance industry establish regulatory compliance and record recommendation.	5

Carryout audit of five specific activities of aircraft maintenance industry record findings, document evidence, communicate findings, verify action taken and root cause assessment and carryout risk assessment.	5
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AIRCRAFT STRUCTURE AND ASSOCIATED SYSTEMS

Subject Code: BAEE3-315

L T P C

Duration: 60 Hrs.

3 1 0 4

Rationale:

As the AME students will involve in maintenance, repair and overhauling of aircraft in future, they must be well versed in identifying the parts of aircraft and understanding their functions. Hence, learning the basic term of aviation, the concepts of aircraft structure and control surfaces are mandatory.

Learning Outcomes:

After undergoing the subject, students will be able to have the adequate knowledge on the following:

1. General terms and terminologies of aviation
2. Major and minor parts of aircraft and their functioning
3. Types of aircraft structure
4. Classification of aircraft structure
5. Fasteners and rivets being used in aircraft
6. Loads acting on aircraft during flight
7. Rigging and symmetry checks
8. Mass balancing and aerodynamic balancing
9. Attachment of wings
10. Aircraft surface protection

Contents	Hrs.
Introduction to General term and vocabulary used in Aeronautical Science ➤ Introduction to aircraft technical literature. ➤ Introduction to ATA system	4
Introduction to aircraft, major aircraft components, aircraft systems and their functions, reference lines, station and zone identification systems	4
Airframe Structures — General Concepts ➤ Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage, tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Lightning strike protection provision. Drains and ventilation provisions, System installation provisions Aircraft bonding and continuity. ➤ Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments; ➤ Describe current practice in aircraft design related to load transfer, load path continuity and reduction of stress raisers in pressurized fuselages.	20
Fasteners used on Aircraft ➤ Fasteners, Screw threads: Screw nomenclature; thread forms, dimensions and tolerances for standard threads used in aircraft; measuring screw threads; ➤ Bolts, studs and screws	4

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<ul style="list-style-type: none"> ➤ Bolt types: specification, identification and marking of aircraft bolts, international standards; ➤ Nuts: self-locking, anchor, standard types; Machine screws: aircraft specifications; ➤ Studs: types and uses, insertion and removal; Self tapping screws, dowels. ➤ Aircraft rivets: Types of solid and blind rivets: specifications and identification, heat treatment. ➤ Riveting: Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints. 	4
<p>Structural Assembly</p> <ul style="list-style-type: none"> ➤ Structural assembly techniques: riveting, bolting, bonding. ➤ Methods of surface protection, such as chromating, anodising, painting, Surface cleaning. ➤ Airframe symmetry: Methods of alignment and symmetry checks. ➤ Complete airframe for symmetry fuselage for twist and bending, vertical stabiliser for alignment wings and horizontal stabilisers for dihedral and incidence. 	4
<p>Airframe Structures — Aeroplane</p> <ul style="list-style-type: none"> ➤ Fuselage (ATA 52/53/56): Construction and pressurisation sealing ➤ Wing, stabiliser, pylon and undercarriage attachments ➤ Seat installation and cargo loading system ➤ Doors and emergency exits: construction, mechanisms, operation and safety devices ➤ Windows and windscreen construction and mechanisms 	10
<p>Wings (ATA 57)</p> <ul style="list-style-type: none"> ➤ Anhedral, dihedral and incidence angle ➤ Inter-plane struts ➤ Longitudinal dihedral ➤ Rigging position ➤ Stagger ➤ Wash in and Washout ➤ Construction ➤ Fuel storage ➤ Landing gear ➤ Pylon ➤ Control surface ➤ High lift/drag attachments. 	4
<p>Stabilizers</p> <ul style="list-style-type: none"> ➤ Construction ➤ Control surface attachment. 	4
<p>Flight Control Surfaces (ATA 55/57)</p> <ul style="list-style-type: none"> ➤ Construction and attachment ➤ Balancing -- mass and aerodynamic. 	4
<p>Nacelles/Pylons (ATA 54)</p> <ul style="list-style-type: none"> ➤ Construction ➤ Firewalls ➤ Engine mounts 	2

Instructional Strategy:

1. Teachers should lay special emphasis in making the students conversant with the parts of aircraft and their functions, aviation terms and terminologies, types of aircraft constructions and materials used.
2. Use of audio-visual aids/video films should be made to show specialized operations.

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3. Exposure to aircrafts parts
4. Observing the flying of aircraft: operation of control surfaces and high lift/drag devices during landing and take off
5. Demonstration of the functions of aircraft parts and control surfaces.

Reference Books:

1. Aircraft handbook FAA (AC 65-15 A)
2. Aircraft structure Ch. 01 (FAA)
3. Aircraft Construction Repair and Inspection-By Joe Christy
4. Aviation Maintenance Technician Hand book by FAA
5. Aircraft Maintenance and Repair- Delp /Bent/McKinley,
6. AC 43.1B

AIRCRAFT STRUCTURE AND ASSOCIATED SYSTEMS LAB.

Subject Code: BAEE3-316

L T P C

Duration: 60 Hrs.

0 0 4 2

S.N.	Contents	Hrs.
01	Identifying aircraft reference lines, station and zone numbers	4
02	Identification of major structural members of fixed wing aircraft. Loads on major structural members.	4
03	Identification of detail structural members of aircraft and loads acting on these structural members.	4
04	Aircraft structure construction	4
05	Aircraft structural assembly, joints and lightning protection	4
06	Identification of components of flight control surfaces and methods of mass balancing	4
07	Control surface, landing gear and engine attachment	4
08	Identification of type of Fuselage and method of pressure sealing Identification of Pressure bulkheads and unpressurised bulkheads	4
09	Common structural defects, simple inspection technique and recording	8
10	Types of rivets, defects, inspection of riveted joints and structure	8
11	Construction (Modelling) of various types structural joints	8
12	Check aircraft symmetry	4

ELECTRICAL FUNDAMENTALS-II

Subject Code: BAEE3-317

L T P C

Duration: 60 Hrs.

3 1 0 4

Rationale:

Electricity & Magnetism is devoted to the utilization of the forces of nature and materials for the benefits of mankind. Harnessing the vast sources of energy and transforming them to the most convenient form (electrical) for the overall benefit of the society for sustenance is prime objective. For this purpose, it is necessary to teach the students basics of electrical science, fundamental laws of electricity and different electrical components. This subjects aims at developing knowledge of electricity and its application used in domestic and aviation Industries.

Learning Outcomes:

After undergoing this course, the students will be able to:

1. Understand about sources of electrical energy.
2. Understand about construction and working of battery.

**MRSPTU B.Sc. (HONS.) AIRCRAFT MAINTENANCE ENGINEERING SYLLABUS
2018 BATCH ONWARDS**

3. Understand about construction and working of DC & AC generators.
4. Distinguish between bonding, grounding and shielding.
5. Understand about electrical cable and connectors.
6. Distinguish between wire stripping, crimping & splicing.
7. Understand about electromagnetic interference (EMI).
8. Understand about electrostatic sensitive devices.

Contents	Hrs.
<p>Generation of Electricity Elementary knowledge on generation of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.</p>	04
<p>DC Sources of Electricity Construction and basic chemical action of: - primary cells & secondary cells, lead acid cells, nickel cadmium cells & other alkaline cells; Cells connected in series and parallel; internal resistance and its effect on a battery; construction, materials and operation of thermocouples; operation of photo-cells.</p>	04
<p>DC Motor/Generator Theory Basic motor and generator theory; Construction and purpose of components in DC generator; Operation of DC generator, factors affecting output & direction of current flow in DC generators; Operation of DC motor and factors affecting output power, torque, speed and direction of rotation of DC motors; series wound, shunt wound and compound motors; Starter Generator construction.</p>	09
<p>AC Generators Rotation of loop in a magnetic field and waveform produced; operation and construction of revolving armature and revolving field type AC generators; single phase, two phase and three phase alternators; Three phase star and delta connections, advantages & uses; Permanent Magnet Generators.</p>	09
<p>AC Motors Construction, principles of operation and characteristics of: - AC synchronous and induction motors (both single and polyphase); Methods of speed control and direction of rotation; Methods of producing a rotating field: - capacitor, inductor, shaded or split pole.</p>	08
<p>Power Power, work and energy (kinetic and potential); Dissipation of power by a resistor; power formula; Calculations involving power, work and energy</p>	08
<p>Aircraft Electrical Cables and Connectors a) Cable types, construction and characteristics; High tension and co-axial cables; Crimping; Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes. b) Electrical Wiring Interconnection System (EWIS) Continuity, insulation and bonding techniques and Testing; Use of crimp tools: hand and hydraulic operated; testing of crimp joints; Connector pin removal and insertion; Co-axial cables: testing & installation precautions; Identification of wire types, their inspection criteria and damage tolerance, Wiring protection techniques: Cable looming and loom support, cable clamps, and protective sleeving techniques including heat shrink wrapping, shielding. EWIS installations, inspection, repair, maintenance and cleanliness standards.</p>	08

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Electromagnetic Environment influence of the following phenomena on maintenance practices for electronic system:- Electromagnetic Compatibility EMC; Electromagnetic Interference EMI; High Intensity Radiated Field HIRF; Lightning/lightning protection	06
Electro Sensitive Devices Special handling of components sensitive to electrostatic discharges; awareness of risks and possible damage, component and personnel anti-static protection devices.	04

Instructional Strategy:

While imparting instructions, teacher must show various images or videos related to Topic by using projector. Students should be asked to collect different electrical Components available in the market. Visits to industry should be planned to demonstrate Electrical power generation, distribution & utilization in the industry.

Recommended Books:

1. B.L. Theraja, 'Electrical Technology'.
2. E.H.J. Pallett, 'Aircraft Electrical System'.
3. Thomas K. Eismin, 'Aircraft Electricity and Electronics'.

ELECTRICAL FUNDAMENTALS-II LAB.

Subject Code: BAEE3-318

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	Generation of electricity by light, heat, chemical action, magnetism & motion.	4
02	Construct power sources using primary and secondary cells.	4
03	Construct a model to study usage of thermo-cell and photo-cell.	4
04	Construct a model to generate DC power using different method of coil Arrangements (series and shunt) to understand their Usage.	4
05	Construct a model of DC motor using different method of coil arrangements (series and shunt) to understand their Usage.	4
06	Construct a model to generate single/poly phase AC power to understand their usage.	4
07	Construct a model of AC motor using single/ poly phase arrangements to understand their usage.	4
08	Measure amount of power dissipated by various resistors; calculation of power	4
09	Using at least two crimping systems, select appropriate cable crimping tools and crimp cables to prepare cable ends or plug / socket terminals.	4
10	Check an aircraft electrical circuit for continuity in conjunction with an electrical wiring diagram.	4
11	Identify cables and cables values by reference to the maintenance manuals. Identify a range of electrical component symbols.	4
12	Inspection of electrical cable looms / bundles and cable trunking.	4
13	Select and use appropriate cable stripping tools and solder cables to single and multipin connectors / tag boards.	4
14	Prepare, and install a simple loom, using at least two binding methods.	4
15	Identification of various fasteners and locking devices used in aircraft.	4

GAS TURBINE ENGINE

Subject Code: BAEE3-319

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

Duration: 60 Hrs.

Rationale:

Lot of development has taken place in the field of gas turbine engine. New engine designs and technology are being developed continuously since its inception. AME students in this course are required to have knowledge of various types of turbine engines and its applications. For this purpose, it is necessary to teach them basics of the construction, systems of gas turbine engines fitted in aircraft. This subject aims at developing knowledge about the basic design and functioning of different turbine engine systems used in the Aircraft industries.

Learning Outcomes:

After undergoing this course, the students will be able to:

1. Understand principle of operation, basic design and construction of gas turbine engines.
2. Classify different types of turbine engines.
3. Know characteristics, properties and identification of engines used in aircraft.
4. Understand about fuel, oil and ignition system components of the engine.
5. Know about starting system, power augmentation system, fire protection system of the engine.
6. Gas turbine engine monitoring, ground operation engine preservation and storage techniques.

Contents	Hrs.
Fundamentals Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; The relationship between force, work, power, energy, velocity, acceleration; Constructional arrangement and operation of turbojet, turbofan, turbo shaft, turboprop.	3
Engine Performance Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption; Engine efficiencies; By-pass ratio and engine pressure ratio; Pressure, temperature and velocity of the gas flow; Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations.	3
Inlet Compressor inlet ducts; Effects of various inlet configurations; Ice protection.	2
Compressors Axial and centrifugal types; Constructional features and operating principles and applications; Fan balancing; Operation: Causes and effects of compressor stall and surge; Methods of air flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; Compressor ratio.	4
Combustion Section Constructional features and principles of operation.	2
Turbine Section Operation and characteristics of different turbine blade types; Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep.	3
Exhaust Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction; Thrust reversers.	2
Bearings and Seals Constructional features and principles of operation and handling .	2

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Lubricants and Fuels Properties and specifications; Fuel additives; Safety precautions.	1
Lubrication Systems System operation/lay-out and components.	2
Fuel Systems Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	3
Air Systems Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.	3
Starting and Ignition Systems Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.	3
Engine Indication Systems Exhaust Gas Temperature/ Inter-stage Turbine Temperature; Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems; Oil pressure and temperature; Fuel pressure and flow; Engine speed, Propeller Speed; Vibration measurement and indication; Torque; Power.	4
Power Augmentation Systems Operation and applications; Water injection, water methanol; Afterburner systems.	2
Turbo-prop Engines Gas coupled/free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Over-speed safety devices.	3
Turbo-shaft Engines Arrangements drive systems, reduction gearing, couplings, control systems.	3
Auxiliary Power Units (APUs) Purpose, operation, protective systems.	3
Power Plant Installation Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.	3
Fire Protection Systems Operation of detection and extinguishing systems.	2
Engine Monitoring and Ground Operation Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Trend (including oil analysis, vibration and boroscope) monitoring; Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer; Compressor washing/cleaning; Foreign Object Damage.	4
Engine Storage and Preservation Preservation and de-preservation for the engine and accessories/ systems.	3

Instructional Strategy:

While imparting instructions, teacher should give demonstration of various types of gas turbine engines, its systems and components, to the students. Different mock ups, transparencies and animated videos should be shown to the students for better understanding of the lesson.

Recommended Books:

1. Irwine Treager, 'Aircraft Gas Turbine Technology'.
2. Rolls Royce, 'The Jet Engine'.
3. 'Power Plant Section Text Book', (EA-ITP-P).

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2018 BATCH ONWARDS**

4. Dale Crane, 'Aviation Maintenance Technician Series'.
5. Jack V. Casamassa and Ralph D. Bent, 'Jet Aircraft Power Systems'.
6. Turbomeca, 'Gas Turbine Engines'. Bordes, France.
7. M. Guillon, 'Hydraulic Servo Systems'.
8. John Anderson, 'Introduction to Flight'.
9. 'Civil Aircraft Inspection Procedure (CAP459) Part-II Aircraft'.
10. M.J. Kroes, T.W. Wild, R.D. Bent and J.L. McKinley, 'Aircraft Power Plants'.

GAS TURBINE ENGINE LAB.

Subject Code: BAEE3-320

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	Identify engine types, modules and subassemblies and components of turbine engines .	2
02	Identify various parts of thrust management and bypass system of turbine engine.	2
03	Identification and inspection of compressors stages.	2
04	Engine compressor surge and stall management components and control.	2
05	Identification various components of combustion systems and methods of cooling's.	2
06	Identification of exhaust system and methods of noise reduction.	2
07	Identification and inspection of components of thrust reversal system.	2
08	Identify normal & electronic fuel control, monitoring and indication system.	6
09	Familiarization with methods of engine starting and ignition systems.	4
10	Operation check of Engine indicating systems.	4
11	Familiarization of APU starting and shutdown procedure.	4
12	Familiarization with power plant removal & installation.	8
13	Visual Inspection of engines.	4
14	Typical engine control rigging.	6
15	Familiarization with engines and airframe interface.	4
16	Testing of engine fire monitoring and extinguishing operation.	4
17	Study engine storage and preservation.	2

AIRCRAFT SYSTEMS-I

Subject Code: BAEE3-321

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

Duration: 60 Hrs.

Rationale:

This subject provides the knowledge about handling procedures of aircraft on ground which includes weighing, balancing, taxiing, re-fuelling/defueling procedures and will enable the students to comprehend the theory, concepts and working of pneumatic, Air conditioning and cabin pressurization system. This will help them to troubleshoot the faults in the systems

Learning Outcomes:

Key areas of study include:

1. Aircraft handling and effects of environmental conditions on it and its storage.
2. Emergency equipment requirements, cabin lay-out and cargo handling and retention equipment
3. Airframe systems; including hydraulic, pneumatic, and environmental control systems etc.

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2018 BATCH ONWARDS**

Contents	Hrs.
Aircraft Weight and Balance a) Centre of Gravity/Balance limits calculation: use of relevant documents; b) Preparation of aircraft for weighing; Aircraft weighing.	4
Aircraft Handling and Storage Aircraft taxiing/towing and associated safety precautions; Aircraft jacking, chocking, securing and associated safety precautions; Aircraft storage methods; Refuelling /defueling procedures; De-icing/anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies. Effects of environmental conditions on aircraft handling and operation.	5
Pneumatic/Vacuum (ATA 36) System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	8
Air Conditioning and Cabin Pressurization (ATA 21) Air supply- Sources of air supply including engine bleed, APU and ground cart; Air Conditioning- Air conditioning systems; Air cycle and vapour cycle machines Distribution systems; Flow, temperature and humidity control system. Pressurization - Pressurization systems; Control and indication including control and safety valves; Cabin pressure controllers. Safety and warning devices; Protection and warning devices.	8
Equipment and Furnishings (ATA 25) Emergency equipment requirements; Seats, harnesses and belts, Electronic emergency equipment requirements Cabin lay-out, cargo retention; Equipment lay-out; Cabin Furnishing Installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Air stairs. Lifting system; Emergency flotation systems;	6
Flight Controls (ATA 27) Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control; High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic, pneumatic, electrical, fly-by-wire; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks systems; Balancing and rigging; Stall protection/warning system.	8
Fuel Systems (ATA 28) System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross- feed and transfer; Indications and warnings; Refueling and defueling; Longitudinal balance fuel systems.	8
Hydraulic Power (ATA 29) System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Filters; Pressure Control; Power distribution; Indication and warning systems; Interface with other systems.	5
Ice and Rain Protection (ATA 30) Ice formation, classification and detection; Anti-icing systems: electrical, hot air and chemical; De-icing systems: electrical, hot air, pneumatic and chemical; Rain repellent; Probe and drain heating; Wiper systems.	3
Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and auto-braking; Tyres; Steering; Air-ground sensing; Skids, floats.	3
Abnormal Events (ATA 05) a) Inspections following lightning strikes and HIRF penetration.	2

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2018 BATCH ONWARDS**

b) Inspections following abnormal events such as heavy landings and flight through turbulence.	
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Instructional Strategy:

While imparting instructions, teacher should practically demonstrate the aircraft weighing and various procedures related to aircraft system on aircraft by referring aircraft manual. Students should be asked to maintain their log cards/ books.

Recommended Books:

1. 'Airframe and Power Plant Mechanics (AC 65-15A) -Airframe Hand Book FAA'.
2. 'Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft'.
3. Jeppesen, 'A & P Technician Air Frame Text Book'.
4. Larry Reithmaier, 'Aircraft Repair Manual (FAA-AC-43.13)'.
5. M. Guillon, 'Aviation Maintenance Technician Hand Book', FAA Hydraulic Servo Systems.
6. E.H.J. Pallett, 'Aircraft Instruments'.
7. E.H.J. Pallett, 'Aircraft Electrical System'.

AIRCRAFT SYSTEMS-I LAB.

Subject Code: BAEE3-322

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	Jacking and leveling of an aircraft. Record caution, warnings and procedure	6
02	Locate and inspect Bleed components installed on aircraft and use maintenance manual	4
03	Locate and inspect components of air-conditioning system and indications and use maintenance manual.	4
04	Locate and inspect components of aircraft pressurization system and safety devises and use maintenance manual	4
05	Replace passenger seats and Check seat belts for serviceability.	4
06	Identification and inspection of flight control system	4
07	Rigging and operational check flight control systems	8
08	Identification and inspection of landing gear systems. Wheel and Brake removal / installation.	12
09	Identification and inspection of Fuel system	4
10	Quantity Indicating systems functional testing.	4
11	Inspection of aircraft hydraulic system and servicing	6
12	Inspection for lightning strike protection.	2

ELECTRONIC FUNDAMENTALS AND DIGITAL TECHNIQUES-I

Subject Code: BAEE3-423

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

Duration: 60 Hrs.

Rationale:

This subject comes under the Core Technology group and will enable the students to comprehend the theory, concepts, characteristics and working principles of basic electronic devices and their applications in electronic circuits. The knowledge of various devices acquired by the students will help them to design, test, troubleshoot and repair electronic circuits

Learning Outcomes:

1. After undergoing this course, the students will be able to:
2. Classify various types of Diodes and transistors
3. Characteristics, and properties of Operational Amplifier
4. Acquire knowledge about printed circuit board.
5. Know about principle of operation of resolvers, differential, control and torque.
6. Classification of numbering system
7. To get knowledge about microprocessor

Contents	Hrs.
<p>Semiconductors Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes. Materials, electron configuration, electrical properties; P and N type materials: effects of impurities on conduction, majority and minority characters; PN junction in a semiconductor, development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions; Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers; Detailed operation and characteristics of the following devices: silicon controlled rectifier (thyristor), light emitting diode, Shottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, Zener diode.</p>	8
<p>Transistors Transistor symbols; Component description and orientation; Transistor characteristics and properties. Construction and operation of PNP and NPN transistors; Base, collector and emitter configurations; Testing of transistors. Basic appreciation of other transistor types and their uses. Application of transistors: classes of amplifier (A, B, C); Simple circuits including: bias, decoupling, feedback and stabilization; Multistage circuit principles: cascades, push-pull, oscillators, multi-vibrators, flip- flop circuits.</p>	8
<p>Integrated Circuits Description and operation of logic circuits and linear circuits/operational amplifiers. Description and operation of logic circuits and linear circuits; Introduction to operation and function of an operational amplifier used as: integrator, differentiator, voltage follower, comparator; Operation and amplifier stages connecting methods: resistive capacitive, inductive (transformer), inductive resistive (IR), direct; Advantages and disadvantages of positive and negative feedback Operation and use of encoders and decoders. , functions of encoders type. Uses of medium, large and very large scale integration.</p>	8
<p>Printed Circuit Boards Description and use of printed circuit boards.</p>	4
<p>Servomechanisms Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of the following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters. Understanding of the following terms: Open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, dead band; Construction operation and use of the following synchro system components: resolvers, differential, control and torque, E</p>	10

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2018 BATCH ONWARDS**

and I transformers, inductance transmitters, capacitance transmitters, synchronous transmitters; Servomechanism defects, reversal of synchro leads, hunting.	
Numbering Systems Numbering systems: binary, octal and hexadecimal; Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.	3
Data Conversion Analogue Data, Digital Data; Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.	3
Data Buses Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications.	3
Logic Circuits Identification of common logic gate symbols, tables and equivalent circuits; Applications used for aircraft systems, schematic diagrams. Interpretation of logic diagrams.	3
Microprocessors Functions performed and overall operation of a microprocessor; Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit.	6
Fiber Optics Advantages and disadvantages of fiber optic data transmission over electrical wire propagation; Fibre optic data bus; Fiber optic related terms; Terminations; Couplers, control terminals, remote terminals; Application of fiber optics in aircraft systems	4

Instructional Strategy:

While imparting instructions, teacher should show various types of engineering materials to the students. Students should be asked to collect various electronics components available in the market.

Recommended Books:

1. Bemard Grob, 'Basic Electronics'.
2. Malvino, 'Digital Fundamentals'.
3. V.K. Mehta, 'Leech Principles of Electronics'.

ELECTRONIC FUNDAMENTALS AND DIGITAL TECHNIQUES-I LAB.

Subject Code: BAEE3-424

L T P C

Duration: 60 Hrs.

0 0 4 2

S.N.	Contents	Hrs.
01	Identification of basic electronic components (diodes, transistors), digital Multimeter, Function Generator and Oscilloscope	4
02	Practical on I-V Characteristics of (a) p-n junction Diode, and (b) Zener diode.	4
03	Study of Clipping and Clamping circuits	4
04	Conversion of A C Voltage using (a) Half wave rectifier and (b) Full wave rectifier (FWR).	4
05	Uses of basic electronic components (diodes, transistors),digital Multimeter, Function Generator and Oscilloscope	4
06	Construct a model to study fixed Bias and Voltage divider bias configuration for CE transistor.	4
07	Construct a model to study Single Stage CE amplifier of given gain	4
08	Construct a model to study correlation between different numbering systems	4

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09	Construct a model to study digital to analogue converters	4
10	Construct a model to study typical data buses used in aircraft system.	4
11	Functions performed and overall operation of a microprocessor;	4
12	Demonstrate fiber optic data transmission over electrical wire propagation;	4
13	Construct a Universal Gates and test	4
14	Construct a flip flop circuit using elementary gates	4
15	Construct a seven segment display driver	4

AIRCRAFT MATERIALS AND HARDWARE

Subject Code: BAEE3-425

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

Duration: 60 Hrs.

Rationale :

Lot of development has taken place in the field of materials and hardware. New materials are being developed and it has become possible to change the properties of materials to suit the requirements. AME students in this course are required to make use of different materials hardware for various applications. For this purpose, it is necessary to teach them basics of metal structure, properties, usage various ferrous and non-ferrous, Composite and Non-Metallic materials and various types of Fasteners used in aircraft. This subject aims at developing knowledge about the characteristics and usage of various types of materials aircraft hardware used in the Aircraft industries.

Learning Outcomes:

After undergoing this course, the students will be able to:

1. Distinguish between metals and non-metals and ferrous and non-ferrous materials.
2. Classify various types of metals and non-metals.
3. Characteristics, properties and identification of common alloy steels used in aircraft.
4. Characteristics, properties and identification of common non-ferrous materials used in aircraft;
5. Heat treatment and application of non-ferrous materials;
6. Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft.
7. Characteristics, properties and types of fabrics used in aeroplane; Inspections methods for fabric.
8. Thread forms, dimensions and tolerances for standard threads used in aircraft; measuring screw threads

Contents	Hrs.
Aircraft Materials — Ferrous (a) Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels; (b) Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.	12
Aircraft Material — Non-Ferrous (a) Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials; (b) Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.	12
Aircraft Materials - Composite and Non- Metallic (a) Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.	10

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(b) The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.	
Wooden Structures Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in airplanes; Preservation and maintenance of wooden structure; Types of defects in wood material and wooden structures; The detection of defects in wooden structure; Repair of wooden structure.	8
Fabric covering & Non-Metals Characteristics, properties and types of fabrics used in aeroplane; Inspections methods for fabric; Types of defects in fabric; Repair of fabric covering.	4
Fasteners Screw threads Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; measuring screw threads;	2
Bolts, studs and screws Bolt types: specification, identification and marking of aircraft bolts, international standards; Nuts: self-locking, anchor, standard types; Machine screws: aircraft specifications; Studs: types and uses, insertion and removal; Self tapping screws, dowels.	2
Locking devices Tab and spring washers, locking plates, split pins, palnuts, wire locking, quick release fasteners, keys, circlips, and cotter pins and techniques.	2
Aircraft rivets Types of solid and blind rivets: specifications and identification, heat treatment.	4
Riveting Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	4

Instructional Strategy:

While imparting instructions, teacher should show various types of engineering materials to the students. Students should be asked to collect samples of various materials available in the market. Visits to industry should be planned to demonstrate use of various types of materials or Heat Treatment Processes in the industry.

Means of Assessment:

Assignments and quiz/class tests, mid-term and end-term written tests, model/prototype making

Recommended Books:

1. Aircraft handbook FAA (AC 65-15 A)
2. Civil Aircraft Inspection Procedures (CAIP 459-Part I, Basic)
3. Airframe & Power Plant Mechanics (General Handbook EA-AC 65-9A) FAA
4. Titterton, 'Aircraft Materials & Processes'.
5. A.C. Parkinson, 'Machine Drawing'.
6. Cindy Foreman Electricity, 'Advanced Composites (EA-358)'.
7. CAIP 562

AIRCRAFT MATERIALS AND HARDWARE LAB.

Subject Code: BAEE3-426

L T P C
0 0 4 2

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	Testing of Non -Ferrous materials for hardness, tensile , Fatigue strength	4
02	Testing of ferrous materials for hardness, tensile , Fatigue strength	4
03	Identification of the characteristics and properties of common composite and non-metallic materials other than wood, used in aircraft.	4
04	Detection of defects/deterioration in composite and non-metallic material	4
05	Identification of the characteristics and properties of common types of wood and glue used in aircraft.	4
06	Identification and detection of defects in wood material and wooden structures	4
07	Simple repair of composite and non-metallic materials and structures	4
08	Inspection and Repair of wooden structures.	4
09	Identification of the characteristics and properties of common fabrics and adhesives used in wooden structure aircraft.	4
10	Identification of defects and Repair of fabric covering.	4
11	Use of basic tools and equipment for: cutting, forming and joining commonly used materials.	4
12	Identification of Aircraft metallic materials	4
13	Identification of aircraft non-materials used on aircraft	4
14	Identification of various rivets and use of any one riveting technique	4
15	Identification of various fasteners and locking devices used in aircraft	4

AIRCRAFT MAINTENANCE PRACTICES

Subject Code: BAEE3-427

L T P C
3 1 0 4

Duration: 60 Hrs.

Rationale :

Aircraft Maintenance Engineers are responsible for the maintenance and repair of aircraft for this purpose they must have proper knowledge of aircraft maintenance procedures and tools used for maintenance. Proper handling, care and controls of their personal tools.

Learning Outcomes:

After undergoing this course, the students will be able to:

1. Aspects of safe working practices- Aircraft and workshop.
2. Knowledge on fire and extinguishing agents.
3. Care, control and use common hand tools, Common power tools.
4. Use of precision measuring tools.
5. Lubrication equipment and methods.
6. Engineering Drawings, Diagrams and Standards.
7. Classes of fits
8. Standard methods for checking shafts, bearings and other parts.
9. Causes of corrosion. Types of corrosion and their identification.
10. Welding, Brazing, Soldering and Bonding methods.
11. Disassembly, Inspection, Repair and Assembly Techniques.
12. Maintenance Procedures
13. Power Transmissions
14. Bearings, Control Cables, Pipes and Hoses and springs

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Contents	Hrs.
<p>Safety Precautions-Aircraft and Workshop Aspects of safe working practices including precautions to take when working with electricity, gases especially oxygen, oils and chemicals; Instructions on the remedial action to be taken in the event of a fire or another accident with one or more of these hazards including knowledge on extinguishing agents.</p>	4
<p>Workshop Practices Care of tools, control of tools, use of workshop materials; Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards.</p>	4
<p>Tools Common hand tool types; Common power tool types; Operation and use of precision measuring tools; Lubrication equipment and methods. Operation, function and use of electrical general test equipment;</p>	4
<p>Engineering Drawings, Diagrams and Standards Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerized presentations; Specification 100 of the Air Transport Association (ATA) of America; Aeronautical and other applicable standards including ISO, AN, MS, NAS and MIL; Wiring diagrams and schematic diagrams.</p>	4
<p>Fits and Clearances Drill sizes for bolt holes, classes of fits; Common system of fits and clearances; Schedule of fits and clearances for aircraft and engines; Limits for bow, twist and wear; Standard methods for checking shafts, bearings and other parts.</p>	4
<p>Corrosion a) Chemical fundamentals; Formation by, galvanic action process, microbiological stress; b) Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.</p>	6
<p>Welding, Brazing, Soldering and Bonding a) Soldering methods; inspection of soldered joints. b) Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded joints.</p>	5
<p>Disassembly, Inspection, Repair and Assembly Techniques a) Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection. b) General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programs; c) Non-destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and borescope methods. d) Disassembly and re-assembly techniques. e) Trouble shooting techniques</p>	9
<p>Maintenance Procedures Maintenance planning; Modification procedures; Stores procedures; Certification/release procedures; Interface with aircraft operation; Maintenance Inspection/Quality Control/Quality Assurance; Additional maintenance procedures; Control of life limited components</p>	3

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<p>Bearings Purpose of bearings, loads, material, construction; Types of bearings and their application. Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.</p>	3
<p>Transmissions Gear types and their application; Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns; Belts and pulleys, chains and sprockets. Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.</p>	3
<p>Control Cables Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components; Bowden cables; Aircraft flexible control systems. Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.</p>	3
<p>Pipes and Unions (a) Identification of, and types of rigid and flexible pipes and their connectors used in aircraft; (b) Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.</p>	3
<p>Pipes and Hoses Bending and belling/flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.</p>	3
<p>Springs Types of springs, materials, characteristics and applications. Inspection and testing of springs.</p>	2

Instructional Strategy:

While imparting instructions, teacher should show various types of tools used in Aircraft Maintenance to the students. Visits to Aircraft Maintenance workshop should be planned to demonstrate use of various types of tools.

Recommended Books:

1. Airframe and Power Plant Mechanics (AC 65-15A)-Airframe Hand Book FAA
2. Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft
3. Kroes, Watkin and Delph, 'Aircraft Maintenance and Repair'.
4. Acceptable Methods, Techniques and practices (FAA)-EA-AC 43.13-1 A & 2A.
5. FAA, 'Aviation Maintenance Technician Hand Book'.

AIRCRAFT MAINTENANCE PRACTICES LAB.

Subject Code: BAEE3-428

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	Draw different projections of a given object – Three View Diagram simple object, structural member, and joints	12
02	Fit and remove thread inserts	4

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03	Use of precision measuring instruments, selection, handling of instruments and marking	6
04	Removal and installation of hydraulic system pressurized / unpressurized components – safety, handling precautions, selection of appropriate tools and manuals. Use zonal numbers to record location. Use parts catalogue & component location manual to locate components. Identify pipes and hoses	6
05	Removal and installation of pneumatic system pressurized / unpressurized components – safety, handling precautions, selection of appropriate tools and manuals. Use zonal numbers to record location. Use parts catalogue & component location manual to locate components. Identify pipes and hoses	6
06	Removal and installation of oxygen system components – safety, handling precautions, selection of appropriate tools and manuals. Use zonal numbers to record location. Use parts catalogue & component location manual to locate components. Identify pipes and hoses	4
07	Visual inspection of various types of surface defects of aircraft structure using simple aids like magnifying glass, light and mirror. Use zonal and station numbers to record defect location	8
08	Visual inspection of various types of surface defects of aircraft structure and system components like bearings, gears, chain, pulley, spring and cables using simple aids like magnifying glass, light and mirror and record defects.	8
09	Selection and use of lubrication technique of bearings, flight / engine / propeller controls and undercarriages. Identifying lubricants.	2

AVIONICS

Subject Code: BAEE3-429

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

Duration: 60 Hrs.

Rationale :

Maxwell first suggested the existence of electromagnetic waves in 1864. In 1894, Marconi demonstrated the commercial potential of the phenomenon that Maxwell predicted and Hertz actually used in his apparatus. Marconi's system of wireless telegraphy proved to be invaluable for maritime communications. The use of radio equipment & avionics in general has increased markedly for all types of aircraft during the past century. Today the term avionics, which is a combination of the words aviation electronics, encompasses a variety of electronic system. This subjects aims at developing knowledge of avionics system installed in aircraft can include communications (COMM), navigation (NAV) & autopilot.

Learning Outcomes:

After undergoing this syllabus, the students will be able to:

1. Understand about function of aircraft radio communication system.
2. Understand about function of aircraft radio navigation system.
3. Understand about automatic flight control system.
4. Understand about on board maintenance system.
5. Understand about on board information sharing system.
6. Understand about Avionic General Test Equipment.

Contents	Hrs.
Communication (ATA 23) Fundamentals of radio wave propagation, antennas, transmission lines, communication, receiver and transmitter; Working principles of following systems: Very High Frequency	08

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(VHF) communication; High Frequency (HF) communication; Audio; Emergency Locator Transmitters; Cockpit Voice Recorder; ARINC communication and reporting.	
Navigation (ATA 34) Very High Frequency omnidirectional range (VOR); Automatic Direction Finding (ADF); Instrument Landing System (ILS); Microwave Landing System (MLS); Distance Measuring Equipment (DME); Very Low Frequency and hyperbolic navigation(VLF/Omega); Doppler navigation; Area navigation RNAV systems; Flight Management Systems (FMS); Global Positioning System (GPS), Global Navigation Satellite Systems (GNSS); INS (Inertial Navigation System); Air Traffic Control transponder, secondary surveillance radar; Traffic Alert and Collision Avoidance System(TCAS). Weather Avoidance Radar; Radio altimeter; Inertial reference system (IRS).	18
Auto-flight (ATA 22) Fundamentals of automatic flight control including working principles and current terminology; Flight Director System; Command signal processing; Modes of operation - roll, pitch and yaw channels; Yaw dampers; Auto-throttle systems; Automatic Landing Systems - principles & categories, modes of operation: Approach, glide slope, land, go-around; system monitors and failure conditions. Fly by Wire (FBW).	15
On board Maintenance Systems (ATA 45) Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring). Software management control: Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	05
Information Systems (ATA 46) The units and components which furnish a means of storing, updating and retrieving digital information traditionally provided on paper, microfilm or microfiche - includes units that are dedicated to the information storage and retrieval functions such as the electronic library mass storage and controller & Does not include units or components installed for other uses and shared with other systems such as flight deck printer or general use display; Typical examples include Air Traffic and Information Management Systems and Network Server Systems; Aircraft General Information System; Flight Deck Information System; Maintenance Information System; Passenger Cabin Information System; Miscellaneous Information System.	10
Avionic General Test Equipment Operation, function and use of avionic general test equipment. Cabin System; Information system.	04

Instructional Strategy:

While imparting instructions

1. Instructor must show various images, videos & animation related to the topic with the help of projector (OHP).
2. With the help of Aircraft Flight Simulator demonstrate different aircraft radio system to the students.
3. Arrange visit to different Airline & MROs to demonstrate functioning of different aircraft system and its components installed into actual aircraft engage into operation.

Recommended Books:

1. E.H.J. Pallett, 'Micro Electronics Aircraft System'.
2. James W. Wasson, 'Avionics Systems Operation & Maintenance'.
3. Thomas K. Eismin, 'Aircraft Electricity and Electronics'.

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4. Civil Aircraft Inspection Procedure (CAP 459) – Part-II (Aircraft).
5. Millman and Halkias, ‘Integrated Electronics’.
6. J. Powell, ‘Aircraft Radio System’.
7. George Kennedy, ‘Electronic Communication System’.
8. Kayton & Fried, ‘Avionics Navigation Systems’.
9. Borje Forssell, ‘Radio Navigation System’.

AVIONICS LABS.

Subject Code: BAEE3-430

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	VHF / HF Communications LRU replacement and Communication Check.	4
02	Use of various test equipment for avionics system maintenance.	2
03	VHF Navigation LRU replacement and system tests.	4
04	Inspection and testing of ELT.	2
05	CVR - switching and recording.	2
06	Antenna replacement and system testing.	4
07	Radio Standing Wave ratio Measurement Tests.	4
08	Function Testing of ATC / TCAS system components.	4
09	Operation test of Weather Radar system.	2
10	Intercommunication / Passenger Address Component function testing.	2
11	ILS / VOR Systems function testing using appropriate test equipment e.g. Nav 401/402.	4
12	Radio Altimeter system test utilizing appropriate (555) test set.	4
13	DME / VOR Functional Testing utilizing appropriate test set.	4
14	ADF component functions and tests.	4
15	Functional check of inertial navigation system.	4
16	Operational testing of Flight Director System's and auto pilot system.	4
17	Locate Auto throttle systems components and bite test.	2
18	Perform BITE on Central Maintenance system.	4

ELECTRONIC FUNDAMENTALS AND DIGITAL TECHNIQUES-II

Subject Code: BAEE3-531

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

Duration: 60 Hrs.

Rationale:

This subject comes under the Core Technology group and will enable the students to comprehend the theory, concepts, characteristics and working principles of basic electronic devices and their applications in electronic circuits. The knowledge of various devices acquired by the students will help them to design, test, troubleshoot and repair electronic circuits.

Learning Outcomes:

After undergoing this course, the students will be able to:

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2018 BATCH ONWARDS**

1. Understand Computer related terminology and typical memory devices
2. Acquire knowledge of Operation, application and identification in logic diagrams of multiplexers.
3. Understand Principles of operation of common types of displays Functions that may be typically integrated in the Integrated Modular Avionic (IMA).

Contents	Hrs.
<p>Basic Computer Structure Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems). Computer related terminology; Operation, layout and interface of the major components in a microcomputer including their associated bus systems; Information contained in single and multi-address instruction words; Memory associated terms; Operation of typical memory devices; Operation, advantages and disadvantage of the various data storage systems.</p>	9
<p>Multiplexing Operation, application and identification in logic diagrams of multiplexers and demultiplexers.</p>	3
<p>Electronic Displays and Instrument Systems Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display. Electronic Flight Instrument Systems; Typical systems arrangements and cockpit layout of electronic instrument systems ECAM-Electronic Centralized Aircraft Monitoring; EFIS-Electronic Flight Instrument System; EICAS-Engine Indication and Crew Alerting System Instrument warning systems including master warning systems and centralized warning panels;</p>	18
<p>Typical Electronic/Digital Aircraft Systems General arrangement of typical electronic/digital aircraft systems and associated BITE (Built in Test Equipment) testing such as: ACARS-ARINC Communication and Addressing and Reporting System; Integrated modular Avionics;</p>	10
<p>Integrated Modular Avionics (ATA 42) Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others: Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc.; Core System; Network Components.</p>	12
<p>Cabin Systems (ATA 44) The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System) and between the aircraft cabin and ground stations (Cabin Network Service) - Includes voice, data, music and video transmissions; The Cabin Intercommunication Data System provides an interface between cockpit/ cabin crew and cabin systems. These systems support data exchange of the different related LRU's and they are typically operated via Flight Attendant Panels.</p>	8

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<p>The Cabin Network Service typically consists on a server, typically interfacing with, among others, the following systems: Data/Radio Communication; In-Flight Entertainment System;</p> <p>The Cabin Network Service may host functions such as: Access to pre-departure/departure reports; E-mail/intranet/Internet access; Passenger database; Cabin Core System; In-flight Entertainment System; External Communication System; Cabin Mass Memory System; Cabin Monitoring System; Miscellaneous Cabin System.</p>	
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Instructional Strategy:

While imparting instructions, teacher should show various types of engineering materials to the students. Students should be asked to collect various electronics components available in the market.

Recommended Books:

1. Bemard Grob, 'Basic Electronics'.
2. Malvino and Leech, 'Digital Fundamentals'.
3. V K Mehta, 'Principles of Electronics'.

ELECTRONIC FUNDAMENTALS AND DIGITAL TECHNIQUES-II LAB.		
Subject Code: BAEE3-532	L T P C	Duration: 60 Hrs.
	0 0 4 2	

S.N.	Contents	Hrs.
01	Familiarization with computer architecture and its components	4
02	Identification of components of Display systems	4
03	Operation check of Display system.	4
04	Familiarization with CRT and various components associated with EFIS	4
05	Identification of components in engine display systems	4
06	Bite / self-test of EFIS system.	4
07	BITE on different aircraft systems.	4
08	Familiarization with components of system associated with Integral modular avionics systems such Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication.	4
09	Operation check of ventilation control system.	4
10	Operation check of IFE system.	4
11	Operation check of intercom system.	4
12	Operation check of intercom system.	4
13	Inspection of IFE system, intercom system and other cabin systems.	4
14	Operation of temperature control system	4
15	Identify ECAM system components and carry out test	4

WORKSHOP PRACTICES

Subject Code: BAEE3-533

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

Duration: 60 Hrs.

Rationale:

AME students are responsible for supervising repair and maintenance of the aircraft. For this purpose, knowledge about various workshop machinery operations and processes are required to be imparted.

Learning Outcomes:

1. After undergoing the subject, students will be able to:
2. Safely handling of workshop machineries.
3. Knowledge of sheet working.
4. Knowledge of various Hand tools for working on bench.
5. Fabricate welding joints using gas welding, arc welding,
6. Inspect various welding joints, castings, forgings.
7. Prepare sand moulds manually.
8. Pipe bending and flaring, pipe inspection.
9. Identification, hose end fittings.

Contents	Hrs.
Safety & Precautions to be taken while working in the Machine shop. Various types of aids to be used while working on machines. Basic Machining	4
Material handling - Sheet Metal Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.	6
Various types of gears and usage and inspection Various Hand tools for working on bench	8
Drills and drilling procedures. Simple Turning and Taper turning. Various types of measuring and layout tools	6
Welding Techniques: Preparation of arc welding of butt joints, lap joints and tee joints. Gas welding practice; Metric Measurement	8
Various forms of Surface Finish and Surface measurement, Various forms of Heat Treatment & Testing of Materials, Various forms of Taps & Dies	16
a) Smithy operations, upsetting, swaging, setting down and bending b) Foundry operations like mould preparation for gear and step cone pulley	8
Hoses and Pipes Pneumatic, Hydraulic pipes and end fitting identification, pipe bending and flaring, pipe inspection. Types of hoses, identification, hose end fittings, house routing and inspection.	4

Instructional Strategy:

1. Teachers should lay special emphasis in making the students conversant with concepts, principles, procedures and practices related to various workshop operations and processes.
2. Use of audio-visual aids/video films should be made to show specialized operations.

Recommended Books:

1. K.P. Roy, 'Workshop Technology', A.K. Hajra Chowdhary, 2000.
2. James Anderson, 'Shop Theory'.

WORKSHOP PRACTICES LAB.

Subject Code: BAEE3-534

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	Sheet metal marking, cutting, sheet metal structural defects	4
02	Practice of 1st model. Butt Joint and inspect	4
03	Practice of 2nd model. Lap Joint and inspect	4
04	Practice of 3rd model. V-Joint and inspect	4
05	Practice of 3rd model. T-Joint and inspect	4
06	Demonstration of 1st model - Dovetail 4	4
07	Demonstration of 2nd model- Radius Gauge	4
08	Inspection of various welded samples with / without defects and record observation	4
09	Soldering Exercises, inspection and defects	4
10	Cable splicing and swaging	4
11	Pipe bending and inspection of pipe assembly	4
12	Taps and Dies, thread cutting and inspection	4

AIRCRAFT SYSTEMS-II

Subject Code: BAEE3-535

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

Duration: 60 Hrs.

Rationale:

This subject provides the knowledge about Batteries Installation and Operation of aircraft lights system and will enable the students to comprehend the theory, concepts and working of various instruments and taking readings, system lay-out of oxygen system and Integrated Modular Avionics This will help them to troubleshoot the faults in the systems

Learning Outcomes:

After successful completion of course students should be able to

1. To know about basic principle of flight instruments that how they are useful to pilots for operation of flight.
2. To understand about what types of operating systems are used to conduct successful operation.
3. To understand about how aircrafts are maintained
4. To understand about how controls, operate an aircraft.

Contents	Hrs.
Aircraft Electrical Power System (ATA24) Batteries Installation and Operation; DC power generation; AC power generation; Emergency power generation; Voltage regulation; Power distribution; Inverters, transformers, rectifiers; Circuit protection; External/Ground power;	8
Aircraft Lights System (ATA 33) External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency Lights.	4
Instrument System (ATA34) Direct reading pressure and temperature gauges; Temperature indicating systems; Fuel quantity indicating systems; Gyroscopic principles; Artificial horizons; Attitude director,	15

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direction indicator, horizontal situation indicator, turn and slip indicators, turn coordinator; Directional gyros; Ground Proximity Warning Systems; Compass systems: direct reading, remote reading; Flight Data Recording systems; Stall warning systems and angle of attack indicating systems; Vibration measurement and indication; Glass cockpit.	
Oxygen System(ATA35) System lay-out: cockpit, cabin; Sources, storage, charging and Distribution; Supply regulation; Indications and warnings;	8
Fire Protection (ATA26) a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests. b) Portable fire extinguisher.	6
Water/Waste (ATA38) Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.	4
Integrated Modular Avionics (ATA42) Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others: Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc.; Core System; Network Components.	10
Door and Door Warning Type of Doors. Sensors, Escape Slides, Door warning systems, Inspections techniques.	5

Instructional Strategy:

While imparting instructions, teacher should practically demonstrate the aircraft weighing and various procedures related to aircraft system on aircraft by referring aircraft manual. Students should be asked to maintain their log cards/books.

Recommended Books:

1. Keith W. Bose, 'Aviation Electronics'.
2. E.H.J. Pallett, 'Aircraft Instruments'.
3. C.A. Williams, 'Aircraft Instruments'.
4. James W. Wasson, 'Avionics Systems Operation & Maintenance'.
5. A. Typers & R.B. Miles, 'Principles of Servo Mechanism'.
6. Bent McKinley and also by Eismin/Bent McKinley, 'Aircraft Electricity and Electronics'.
7. Civil Aircraft Inspection Procedure (CAP 459) -Part II Aircraft
8. Winston Merkey John Hovorka, 'The Mechanism of Inertial Position and Heading Indication'.

AIRCRAFT SYSTEMS-II LAB.

Subject Code: BAEE3-536

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	Reading and interpretation of electrical schematic and wiring diagrams and Identification of components of electrical power supply system.	4
02	Replacement of switches and circuit breakers and system check	4

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2018 BATCH ONWARDS**

03	Installation and operation check of Batteries in aircraft	4
04	Generator power check / voltage adjustment.	4
05	Internal lighting, replace bulb and filament.	4
06	Operational check of GPWS	4
07	Operational check-up of stall warning system and angle of attack indicating system	4
08	Operational check of temperature indicating system	4
09	Gyroscopic Instrument component replacements and functional tests.	4
10	Inspection and operation check of fuel quantity indication	4
11	Functional check of RR compass	4
12	Removal and Installation of Crew O2 system component	4
13	Identification of FDR system components	4
14	Check operation of fire / smoke detection and warning system.	4
15	Identification of components of door warning system and its operation check	4

PISTON ENGINES AND PROPELLERS

Subject Code: BAEE3-537

L T P C

Duration: 60 Hrs.

3 1 0 4

Rationale:

Lot of development has taken place in the field of piston engines as well as in propeller used in aircraft. New engine and propeller designs and technology are being developed continuously since its inception. AME students in this course are required to have knowledge of various types of piston engines, propellers and their applications in aircraft. For this purpose, it is necessary to teach them basics of the construction, systems of piston engines and propellers fitted in aircraft. This subject aims at developing knowledge about the basic design and functioning of different piston engines and propellers systems used in the Aircraft industries.

Learning Outcomes:

After undergoing this course, the students will be able to:

1. Understand fundamentals, principle of operation, basic design and construction of piston engines.
2. Classify different types of propellers used on aircraft.
3. Know characteristics, properties and identification of piston engines used in aircraft.
4. Understand about fuel, oil and ignition system components of the engine.
5. Know about starting system, power augmentation system, fire protection system of the engine.
6. Piston engine monitoring, ground operation engine preservation and storage techniques.
7. Propeller pitch control, synchronising, propeller maintenance, preservation of propeller.

Contents	Hrs.
Fundamentals Mechanical, thermal and volumetric efficiencies operating principles — 2 stroke, 4 stroke, Otto and Diesel, Piston displacement and compression ratio; Engine configuration and firing order.	2
Engine Performance Power calculation and measurement; Factors affecting engine power; Mixtures/leaning, pre-ignition.	2
Engine Construction Crank case, crank shaft, cam shafts, sumps; Accessory gearbox; Cylinder and piston assemblies; Connecting rods, inlet and exhaust manifolds; Valve mechanisms;	3

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2018 BATCH ONWARDS**

Propeller reduction gearboxes.	
Engine Fuel Systems Carburettor Types, construction and principles of operation; Icing and heating.	2
Fuel injection systems Types, construction and principles of operation.	2
Electronic engine control Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	4
Starting and Ignition Systems Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems.	3
Induction, Exhaust and Cooling Systems Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.	2
Supercharging/ Turbo charging Principles and purpose of supercharging and its effects on engine parameters. Construction and operation of supercharging/ turbo-charging systems; System terminology; Control systems; System protection.	3
Lubricants and Fuels Properties and specifications; Fuel additives; Safety precautions.	2
Lubrication Systems System operation/lay-out and components.	2
Engine Indication Systems Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.	3
Power Plant Installation Configuration of firewalls, cowlings, acoustic panels, engine mounts, antivibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.	3
Engine Monitoring and Ground Operation Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Inspection of engine and components: criteria, tolerances, and data specified by engine manufacturer.	5
Engine Storage and Preservation Preservation and de-preservation for the engine and accessories/ systems.	2
Aircraft Propeller Fundamentals; Blade element theory; High/low blade angle, reverse angle, angle of attack, rotational speed; Propeller slip; Aerodynamic, centrifugal, and thrust forces; Torque; Relative airflow on blade angle of attack; Vibration and resonance.	4
Propeller Construction Construction methods and materials used in wooden, composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; fixed pitch, controllable pitch, constant speeding propeller; Propeller/spinner installation.	3
Propeller Pitch Control Speed control and pitch change methods, mechanical and electrical/electronic; Feathering and reverse pitch; Over speed protection.	3
Propeller Synchronising Synchronising and synchrophasing equipment.	2

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2018 BATCH ONWARDS**

Propeller Ice Protection Fluid and electrical de-icing equipment.	2
Propeller Maintenance Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.	3
Propeller Storage and Preservation Propeller preservation and de-preservation.	3

Instructional Strategy:

While imparting instructions, teacher should give demonstration of various types of piston engines as well as propellers, its systems and components, to the students. Different mock ups, transparencies and animated videos should be shown to the students for better understanding of the lesson.

Recommended Books:

1. Airframe and Power Plant Mechanics (EA-AC 65- 12A) -Power Plant Hand FAA
2. Bent and McKinley, 'Power Plant'.
3. Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft
4. Frank Delph, 'Aircraft Propeller and Controls'.
5. Power Plant Section Text Book- (EA-ITP-P)
6. Herschel Smith, 'Aircraft Piston Engines'.
7. Dale Crane, 'Aviation Maintenance Technician Series'.

PISTON ENGINES AND PROPELLERS LAB.

Subject Code: BAEE3-538

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	Familiarise with constructions and functions of piston engines.	3
02	Identification and inspection of various subassemblies of piston engines.	3
03	Identification and inspection of cylinder and piston assemblies.	3
04	Inspection of accessory gear box valve mechanism.	3
05	Identification and inspection of various components of piston engines.	3
06	Identification and inspection of engine fuel system and function of carburettor.	3
07	Identification and inspection of engine fuel injection system and electronic fuel control.	3
08	Function check of magneto.	3
09	Various methods of engine starting and ignition systems and Engine indicating systems.	3
10	Identification and inspection of components and function of lubrication system.	3
11	Engine control system and rigging.	4
12	Familiarization with engines and airframe interface.	3
13	Testing of engine fire warning and extinguishing operation.	3
14	Preparation for engine/ propeller storage and preservation.	3
15	Familiarise with propeller construction.	3
16	Methods of propeller pitch control and its effect on engine power. Feathering and reverse pitch control. Propeller synchrophasing system.	4
17	Check Propeller track.	3
18	Engine monitoring and ground operation.	4

19	Spark plug cleaning and testing.	3
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GROUND HANDLING, SAFETY AND SUPPORT SYSTEM

Subject Code: BAEE3-639

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

Duration: 60 Hrs.

Rationale:

A successful Safety Management System (SMS) reduces the rate and cost of accidents and incidents, improves communication and productivity, and helps your airport meet its legal responsibility to manage safety. This subject enables the students to learn how to implement an efficient SMS at your organization and promote a safety culture within your organization. Understand the relevance of risk management in relation to SMS and learn how to evaluate, prioritize and mitigate risk. Analyze the impact human factors have on safety and develop your skills in detecting, controlling and preventing errors in an airport environment.

Learning Outcomes:

On completion of this course students will be able to:

1. Implement a safety culture throughout their organization
2. Apply the risk management cycle to their organization
3. Integrate safety into aerodrome operations by applying management controls to safety-critical processes
4. Understand how regulatory requirements, State concerns and State Safety Program (SSP) apply to SMS.

Contents	Hrs.
Part-I General knowledge of ground handling of Aircraft, Aircraft Safety; Mooring, Jacking, Leveling, hoisting of aircraft, Towing, Mooring of an a/c during adverse conditions. Aircraft cleaning and maintaining. Ground signaling/marshalling of aircraft in day & night time.	5
Part-II Brief knowledge of airport and its procedures. Control tower, Dispersal areas, Aprons, Tarmac, Taxi track, Runway and its ends. Approach and clear zone layout. Brief knowledge of the signals given by the control tower. Knowledge of Airfield lighting system, Aircraft Rescue & Fire Fighting.	10
Part-III Maintenance and handling of ground equipment's used in maintenance of aircraft. Compressors, Portable hydraulic test stands, Electrical power supply equipment, charging trolley. Air-conditioning and Heating unit, ground support air start unit. Pressure oil unit, Fire extinguishers, jacks, Hoisting cranes/gantry, Ladders, Platforms, Trestles, and Chocks.	15
Part-IV Knowledge of safety and fire precautions to be observed during maintenance including re-fueling, defueling & engine start. Maintenance of hydraulic accumulators, reservoirs and filters:	10

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2018 BATCH ONWARDS**

Part-V	10
Rigging of flight control surfaces and duplicate inspection; Rigging checks-Angular alignment checks and symmetry checks, Knowledge and use of Tensiometers, Protractors etc.	
Part-VI	10
Maintenance of landing gear (L/G), Shock strut charging and bleeding, Maintenance of L/G brakes i.e., Dragging, Grabbing, Fading, Brakes and excessive brake pedal travel. Maintenance on wheels, tires and tubes i.e., dismantling, inspection, assembling, inflating, inspection and installation Storage of Rotables.	

Instructional Strategy:

Learn how to plan, organize, create and deliver performance-based safety training that truly engages students and improves organization's safety practices.

Recommended Books:

1. General handbook AC65-9A
2. Airframe Handbook AC 65-15A

GROUND HANDLING, SAFETY AND SUPPORT SYSTEM LAB.

Subject Code: BAEE3-640

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	Hydraulic system bleeding, replenish fluid reservoir and handling precautions	6
02	Hydraulic accumulator charging	6
03	Use of ground power unit and checks	4
04	4 Identification and control of various types of fires, practicing fire extinguishing.	
05	Practical on headset communication during arrival and departure of aircraft & Identification of aircraft hazard zones	4
06	Fuel sample check and refuelling	6
07	Flight control system lubrication	6
08	Landing gear system lubrication	6
09	Landing gear oleo charging	6
10	Tyre pressure check	4
11	Aircraft parking and mooring	8

APPROVAL OF MAINTENANCE ORGANIZATION

Subject Code: BAEE3-641

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

Duration: 60 Hrs.

Rationale:

This Subject establishes the requirements to be met by an organization to qualify for the issue or continuation of an approval for the maintenance of aircraft and components to be installed therein used by air operators and other civil aircrafts registered or operated in India.

Learning Outcomes:

1. After undergoing this subject, the students will be able to:
2. Understand DGCA rules to be followed by Maintenance Organizations.
3. Know procedure to be followed for Approval of Maintenance Organization.
4. Create maintenance work orders, Aircraft Certificate of Release to Service, Component Certificate of Release to Service.

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Contents	Hrs.
Scope, Application, Extent Of Approval, Maintenance Organization Manual	5
Maintenance Organization Manual, Personnel Requirements,	5
Certifying staff and airworthiness review staff, Components, Equipment and Tools	7
Maintenance Data, Maintenance Work Orders, Maintenance Standards, Aircraft Certificate of Release to Service, Component Certificate of Release to Service.	7
Maintenance Records and airworthiness review record, Privileges of the Organization.	6
Organizational Review, Changes to the Approved Maintenance Organization, Continued Validity of Approval, Findings.	5
CAR-145 SECTION A TECHNICAL REQUIREMENTS: ACCEPTABLE MEANS OF COMPLIANCE GUIDANCE MATERIAL	25

Instructional Strategy

While teaching this subject teacher need to refer latest revision of CAR-M and CAR-145 available on DGCA website www.dgca.nic.in.

Recommended Books:

1. CAR-M available on DGCA website www.dgca.nic.in.
2. CAR-145 available on DGCA website www.dgca.nic.in.

APPROVAL OF MAINTENANCE ORGANIZATION LAB.

Subject Code: BAEE3-642

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	Scope, Application, Extent Of Approval, Maintenance Organization Manual	
02	Maintenance Organization Manual, Personnel Requirements,	
03	Certifying staff and airworthiness review staff, Components, Equipment and Tools	
04	Maintenance Data, Maintenance Work Orders, Maintenance Standards, Aircraft Certificate of Release to Service, Component Certificate of Release to Service.	
05	Maintenance Records and airworthiness review record, Privileges of the Organization.	
06	Organizational Review, Changes to the Approved Maintenance Organization, Continued Validity of Approval, Findings.	
07	CAR-145 SECTION A TECHNICAL REQUIREMENTS: ACCEPTABLE MEANS OF COMPLIANCE GUIDANCE MATERIAL	

**TYPICAL AIRCRAFT MAINTENANCE - FIXED WING HEAVY/COMPLEX
AIRCRAFT**

Subject Code: BAEE3-643

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

Duration: 60 Hrs.

Rationale:

This Subject has been prepared for a specific fixed wing Heavy/Complex Aircrafts. It contains information necessary to enable the students to service, troubleshoot, functionally test, and repair systems and equipment in the particular aircraft. It also includes information

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2018 BATCH ONWARDS**

necessary for the students to perform maintenance or make minor repair to units in the aircraft normally requiring such action on the flight line or in the maintenance hangar. It covers the aircraft configuration as described in the AMM.

Learning Outcomes:

After undergoing this subject, the students will be able to:

1. Read the Maintenance Manual, Illustrated Parts Catalogue, Wiring Diagrams and other literature available with the aircraft.
2. Understand the various systems fitted to the specific aircraft.
3. Troubleshoot the Landing Gear system.
4. Carryout towing, Leveling, Weighing and Pre-flight operations.

Contents	Hrs.
Dimensions and Areas, Lifting and Shoring, Levelling and Weighing.	
Towing and Taxiing, Placards and Markings, Servicing.	
Air Conditioning, Auto flight.	
Electrical Power, Equipment and Furnishings.	
Fire Protection, Flight Controls.	
Fuel, Hydraulic Power, Ice and Rain Protection.	
Landing Gear, Lights, Oxygen system, Pneumatic system, Vacuum system, Instruments and Panels, Lights.	
Doors, Fuselage, Stabilizer, Windows, Wings,	
Power Plant, Engine Fuel and Control, Ignition, Engine Controls, Engine Indicating, Oil, Starting	

Instructional Strategy:

While teaching this subject teacher need to refer the Aircraft Maintenance Manual and other publications of the fixed wing Heavy/Complex aircraft available with the Institute. To make the subject more interesting artificial snags can be developed in aircraft systems and troubleshooting procedures should be followed for rectification as per the Maintenance Manual.

Recommended Books:

1. Specific "Aircraft Maintenance Manual" for heavy/complex aircraft available with the Institute.
2. Specific "Aircraft Flight Manual" for heavy/complex aircraft available with the Institute.

**TYPICAL AIRCRAFT MAINTENANCE - FIXED WING HEAVY/COMPLEX
AIRCRAFT LAB.**

Subject Code: BAEE3-644

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	GENERAL VISUAL INSPECTION.	
02	PHASE A1 300 HOUR INSPECTION/CHECKS	
03	PHASE A2 300 HOUR INSPECTIONICHECKS	
04	PHASE A3 300 HOUR INSPECTIONICHECKS	
05	PHASE A4 300 HOUR INSPECTIONICHECKS	
06	PHASE A5 300 HOUR INSPECTIONICHECKS	
07	PHASE A6 300 HOUR INSPECTIONICHECKS	

**TYPICAL AIRCRAFT MAINTENANCE - FIXED WING LIGHT/COMPOSITE
AIRCRAFT**

Subject Code: BAEE3-645

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

Duration: 60 Hrs.

Rationale:

This Subject has been prepared for specific Fixed Wing Light / Composite Aircrafts. It contains information necessary to enable the students to service, troubleshoot, functionally test, and repair systems and equipment in the particular aircraft. It also includes information necessary for the students to perform maintenance or make minor repair to units in the aircraft normally requiring such action on the flight line or in the maintenance hangar. It covers the aircraft configuration as delivered to the customer.

Learning Outcomes:

After undergoing this subject, the students will be able to:

1. Read the Maintenance Manual, Illustrated Parts Catalogue, Wiring Diagrams and other literature available with the aircraft.
2. Understand the various systems fitted to the specific aircraft.
3. Troubleshoot the Landing Gear system.
4. Carryout towing, Levelling, Weighing and Pre-flight operations.

S.N.	Contents	Hrs.
01	General Description of Light Aircraft as per AMM	
02	Ground Handling, Servicing, Cleaning, Lubrication and Inspection.	
03	Fuselage, Wing And Empennage, Aileron Control System, Wing Flap Control System, Elevator Control System, Elevator Trim Tab Control System, Rudder Control System, Landing Gear And Brakes.	
04	Engine, Propeller, Fuel System.	
05	Instruments & Instrument Systems.	
06	Electrical System, Lighting And Lightning Protection	
07	Wiring Diagrams.	
08	Avionics.	
09	Inspection Following an Incident, List Of Fuels, Oils, Lubricants, Greases And Their Periodicity Of Usage.	

Instructional Strategy:

While teaching this subject teacher need to refer the Aircraft Maintenance Manual and other publications of the fixed wing Light/Composite aircraft available with the Institute. To make the subject more interesting artificial snags can be developed in systems and troubleshooting procedures should be followed for rectification as per Aircraft Maintenance Manual.

Recommended Books:

1. Specific "Aircraft Maintenance Manual" for Light/composite aircraft available with the Institute.
2. Specific "Aircraft Flight Manual" for Light/composite aircraft available with the Institute.

**TYPICAL AIRCRAFT MAINTENANCE - FIXED WING LIGHT/COMPOSITE
AIRCRAFT LAB.**

Subject Code: BAEE3-646

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

Duration: 60 Hrs.

S.N.	Contents	Hrs.
01	General Description of Light Aircraft as per AMM	
02	Ground Handling, Servicing, Cleaning, Lubrication and Inspection.	
03	Fuselage, Wing And Empennage, Aileron Control System, Wing Flap Control System, Elevator Control System, Elevator Trim Tab Control System, Rudder Control System, Landing Gear And Brakes.	
04	Engine, Propeller, Fuel System.	
05	Instruments & Instrument Systems.	
06	Electrical System, Lighting And Lightning Protection	
07	Wiring Diagrams.	
08	Avionics.	
09	Inspection Following an Incident, List Of Fuels, Oils, Lubricants, Greases and their Periodicity of Usage.	

MRSPTU

**MRSPTU B.TECH. AGRICULTURE ENGG. SYLLABUS 2016 BATCH ONWARDS
UPDATED ON 13.11.2018**

SEMESTER 7 TH		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BAGE2-732	Ground Water, Well & Pumps	3	1	0	40	60	100	4
BAGE2-733	Micro Irrigation Systems & Design	2	1	0	40	60	100	3
BAGE2-734	Food Processing Plant Design & Layout	3	1	0	40	60	100	4
Open Elective-III		3	0	0	40	60	100	3
BAGE2-735	Ground Water, Well & Pumps Lab.	0	0	2	60	40	100	1
BAGE2-736	Micro Irrigation Systems & Design Lab.	0	0	2	60	40	100	1
BAGE2-737	B. Tech. Project-I	0	0	4	60	40	100	2
BAGE2-738	Training-III #	0	0	8	60	40	100	4
Total		11	3	16	400	400	800	22

SEMESTER 8 TH		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BAGE2-839	Crop Process Engineering	3	1	0	40	60	100	4
BAGE2-840	Watershed Planning and Management	3	1	0	40	60	100	4
BAGE2-841	Crop Process Engineering Lab.	0	0	2	60	40	100	1
BAGE2-842	Watershed Planning and Management Lab.	0	0	2	60	40	100	1
BAGE2-843	B. Tech. Project-II	0	0	10	60	40	100	5
BAGE2-844	Seminar	0	0	2	100	0	100	1
Total		6	2	16	360	240	600	16

AGRICULTURE FOR ENGINEERS

Subject Code: BAGE2-301

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

Duration: 48 Hrs.

Course Objectives:

This course includes with a fairly good concept of the fundamentals of different topics related to Agriculture field like Soil Science, organic matter availability in soil, agronomy, horticulture and layout etc.

Course Outcomes:

The Students will understand the different types of soils, rocks, characteristics and Identifications.

1. The Students will understand the layout and planting methods of horticultural crops.
2. Identify the different types of soil and organic matters.
3. Identify the different types of equipment for tillage operations.
4. The students will able to understand about the essential plants nutrients.

Unit - I (12 Hrs.)

Soil Characteristics: Nature and origin of soil, Soil forming rocks and minerals, their classification and composition, Soil forming processes, Classification of soils, Soil taxonomy orders, Important soil physical properties and their importance, Soil particle distribution, Soil inorganic colloids – their composition, Ion exchange in soil and nutrient availability.

Unit – II (12 Hrs.)

Soil Organic Matter: Its composition and decomposition, effect on soil fertility, saline and sodic soils Quality or irrigation water, Essential plants nutrients, Functions and deficiency symptoms in plants, Important inorganic fertilizers and their reactions in soils. Soil water plant relationship, Crop rotation, cropping systems, Mixed cropping, Relay cropping

Unit - III (10 Hrs.)

Agronomy: Definition and scope of agronomy, Classification of crops, Effect of different weather parameters on crop growth and development, Principles of tillage, Tilt and its characteristics,

Horticulture: Scope of horticultural and vegetable crops, Soil and climatic requirements for fruits Soil and climatic requirements for Vegetables, improved varieties of horticulture crops High-tech horticulture- Poly-houses for flowers and vegetables.

Unit –IV (14 Hrs.)

Criteria for Site Selection of Horticulture Crops: Layout and planting methods, Nursery raising, Macro and micro propagation methods, Pant growing structures, Pruning & training, Fertilizer application process, Fertigation, Harvesting, Grading and packaging, Post-harvest practices, Garden tools, management of orchard, Extraction and storage of vegetables seeds.

Recommended Books:

1. T.D. Biswas and S.K. Mukherjee, 'Soil Science', TMH Publication.
2. T. Yellamanda and G.H. Sankara Reddy, 'Principle of Agronomy', Kalyani Publication.
3. Jitendra Singh, 'Basic Horticulture', Kalyani Publisher.
4. K.K. Mehta, 'Reclamation of Alkali Soil in India', Oxford & IBH.
5. Maharaj Singh, 'Education for Sustainable Agriculture', Indian J. Agronomy.

FARM MACHINERY

Subject Code: BAGE2-302

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

Duration: 48 Hrs.

Course Objectives:

Farm machinery is utilizing different sources of power and mechanization achieved through the design, development, testing and adaptation of farm implements and. Today farm labour is

becoming scarce and expensive day by day. It is also necessary to reduce the cost of cultivation of Different crops.

Course Outcomes:

1. To identify the need of farm mechanization in India and evaluation of tillage, sowing in farming.
2. To abreast the students with mathematical, experimental and computational skills for solving
3. different field problems.
4. To develop skills in the students required to develop and modification of farm machineries.
5. To identify the need of earth moving equipment and their importance in farming.

Unit – I (12 Hrs.)

Tillage: primary and secondary tillage equipment, Zero and conservation tillage equipment Forces acting on tillage tools, Hitching systems and controls, Measurement of forces of tillage tools, Draft measurement of tillage equipment, Types of dynamometer; spring type, Hydraulic type and strain gauge types.

Unit – II (10 Hrs.)

Objectives of Farm Mechanization: Classification of farm machines, Materials of construction and heat treatment, Principles of operation and selection of machines used for production of crops, field capacities and economics.

Unit – III (12 Hrs.)

Earth Moving Equipment: Their construction & working principles, Bulldozer, Elevators, Scraper and Digger, Sowing, planting & transplanting equipment, various type Zero till ferti-drill Seed and planting metering devices, their calibration and adjustments. Furrow openers and covering devices, Fertilizer application equipment and their metering devices.

Unit – IV (14 Hrs.)

Weed control and Plant protection equipment- sprayers and dusters, their calibration selection, constructional features of different components, harvesting machinery- mowers, windrowers, reapers, reaper binders and forage harvesters, forage chopping & handling equipment, Description working principle of threshing machineries, grain and straw combine.

Recommended Books:

1. R.A. Kepner, Roy Bainer, 'Principles of Farm Machinery,' CBS Publication.
2. Radhey Lal, 'Agricultural Engineering', Saroj Publication.
3. Jagdishwar Sahay, 'Elements of Agricultural Engineering', Standard Publishers Distributors.
4. R. Suresh, 'Farm Power and Machinery Engineering', Standard Publishers Distributors.
5. Triveni Singh Prasad, 'Farm Machinery,' PHI, 2016.

THERMODYNAMICS AND HEAT ENGINE

Subject Code: BAGE2-303

L T P C

Duration: 46 Hrs.

3 1 0 4

Course Objectives:

This course is designed for comprehensive study of combustion and thermal aspects in internal combustion engines, steam power plants and its allied components. This will enable the students to understand combustion phenomenon and thermal analysis of steam power plant components.

Course Outcomes:

The students will be able to-

1. Understand the Basic principles of thermodynamics like conservation of mass, conservation of energy and the second law of thermodynamics.
2. Analyse the performance of various power cycles and to identify methods for improving thermodynamics performance.
3. Analyse the working, efficiency, process of Otto, diesel and dual cycle.
4. Carry out simple analysis on internal combustion engines.

Unit – I (10 Hrs.)

Thermodynamics Properties: Closed and open system Flow and non-flow processes Gas laws of thermodynamics Internal Energy Application of first law in heating and expansion of gases in non-flow processes First law applied to steady flow processes.

Unit – II (10 Hrs.)

Second Law of Thermodynamics: Kelvin-Planck statement, Clausius Statement, Reversible processes, Carnot cycle, Carnot theorem, Steam Generator- Classification of steam boilers, Lancashire boiler, Locomotive boiler, Boiler mountings, Boiler accessories, Desirable properties of working fluid used for power plants, Rankine cycle

Unit – III (12 Hrs.)

Entropy: Physical concept of entropy, Change of entropy of gases at constant volume, Change of entropy of gases at constant Pressure, Change of entropy of gases at constant Temperature, Change of entropy of gases at reversible adiabatic process Change of entropy of gases at poly tropic process.

Unit – IV (14 Hrs.)

Thermodynamic Air Cycle: Air Standard efficiency, Engine efficiencies and terms, Otto cycle, Diesel cycle, Dual cycle, mean effective pressure, Measurement of IP and BP, HBC.

Recommended Books

1. D.S. Kumar, 'Thermodynamics', Katson Publication 1st Edition, **2009**.
2. D.K. Jha, 'A Text Book of Thermodynamics', Discovery Publishing House.
3. R.S. Khurmi & J.K. Gupta, 'A Text Book of Thermal Engineering,' S. Chand & Company Limited, reprint **2002**.
4. P.K. Nag, 'Engineering Thermodynamics', TMH Publication.
5. R. Yadav, 'Thermodynamics and Heat Engines', Central Publishing House, **2002**.

WASTELAND DEVELOPMENT

Subject Code: BAGE2-304

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

Duration: 46 Hrs.

Course Objectives:

To improve resources conservation (soil and water) and land use and maximizing productivity per unit area, per unit time and per unit of water. This course includes the study of how to wasteland land Reclamation by the different ways like Afforestation, reforestation, topographic condition of soil, conservative structures etc.

Course Outcomes:

The students will able to-

1. Theoretical knowledge of identifying the arid, semi-arid, humid and sub humid regions.
2. The students will able to conserving the land against its degradation.
3. The students will able to know about uses of structures in conservation of land.
4. The students will able to know about the wasteland treatment under micro irrigation.

Unit – I (10 Hrs.)

Land Degradation: Concept, classification - arid, semiarid, humid and sub-humid regions, denuded range land and marginal land, Wastelands - factors causing, classification and mapping of wastelands, planning of wastelands development - constraints, agro-climatic conditions, development options, contingency plans.

Unit – II (12 Hrs.)

Conservation Structures: Gully stabilization, ravine rehabilitation, sand dune stabilization, water harvesting and recycling methods (In brief). **Afforestation**-Agro-horti-forestry Silvopasture methods forage and fuel crops– socioeconomic constraints, Shifting cultivation, optimal land use options.

Unit – III (12 Hrs.)

Wasteland Development: Hills, semi-arid, coastal areas, water scarce areas, reclamation of waterlogged and salt-affected lands. Mine spoils- impact, land degradation and reclamation and rehabilitation, slope stabilization and mine environment management.

Unit-IV (12 Hrs.)

Micro-irrigation- Use in wastelands development, Sustainable wasteland development- drought situations, socio-economic perspectives. Government policies, Participatory approach. Preparation of proposal for wasteland development and benefit-cost analysis.

Recommended Books

1. I.P. Abrol and V.V. Dhruva Narayana, 'Technologies for Wasteland Development,' ICAR, New Delhi, 1998.
2. S.K. Ambast, S.K. Gupta and Gurbachan Singh, 'Agricultural Land Drainage – Reclamation of Waterlogged Saline Lands'.
3. H.R. Yadav, 'Management of Wastelands', Concept Publishing Company, New Delhi.
4. S.C. Kalwar, 'Wastelands and Planning for Development', Concept Publishing Company 2008.
5. C. Karthikeyan, K. Thangaraja, C. Cinthia Fernandez and K. Chandrakandon, 'Dryland Agriculture and Wasteland Management', Atlantic Publishers, New Delhi, 2009.

IRRIGATION ENGINEERING

Subject Code: BAGE2-305

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

Duration: 46 Hrs.

Course Objectives:

To study the techniques of irrigation methods and understand the various technologies of irrigation. This course learns about the acquire knowledge of irrigation water, use of irrigation water in field, understand different irrigation methods and effective usage of water resources.

Course Outcomes:

1. To provide a sound theoretical knowledge applied to water resources and agricultural engineering.
2. The students will able to understand the requirements of crop water.
3. The Students will understand the importance of water quality for beneficial uses, especially irrigation and its management.
4. To develop innovative capacity of students for increasing agricultural production with scarce water resources available.

Unit- I (10 Hrs.)

Source of irrigation water, measurement of irrigation water, infiltration, application of soil plant atmospheric continuum and principles of fluid mechanics to design of irrigation system, water balance equation and evaluation of different components; measurement of evaporation and evapo-transpiration.

Unit- II (12 Hrs.)

Water resource development and utilization in India, Surface water resources ground water resources, India's water budget, utilization of water resources, factors a fleeting water utilization, major river basins of India

Unit- III (10 Hrs.)

History and development of Irrigation in India, Classification of irrigation projects, canal network, water distribution pattern, system of levying irrigation charges.

Unit- IV (14 Hrs.)

Estimation of irrigation water requirement and irrigation scheduling: efficiencies of irrigation systems, Hydraulics, Design and evaluation of surface, sub-surface, overhead and drip irrigation

systems; design of water conveyance systems including control structures, design principles, Selection of pumps and prime movers.

Recommended Books:

1. A.M. Michael, 'Irrigation Theory and Practice', Vikas Publications, New Delhi.
2. S.K. Majumdar, 'Irrigation Engineering', Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1983.
3. Om Prakash, 'Irrigation and Water Management', Rama Publishing House, Meerut.
4. K.K. Schwab, 'Soil and Water Conservation Engg.' John Wiley and Sons Inc. New York.
5. R. Lal 'Irrigation Hydraulics', Saroj Prakashan, Allahabad, 1978.
6. N.N. Basak, 'Irrigation Engineering', McGraw Hill Education, 1999.

AGRICULTURE FOR ENGINEERS LAB.

Subject Code: BAGE2-306

L T P C

0 0 2 1

EXPERIMENTS

1. Study of Garden tools, implements and plant protection equipment.
2. Identification of rocks and minerals.
3. Study of manures and fertilizers.
4. Study of layout in different irrigation systems.
5. To study of Pruning and training of orchard trees.
6. Examination of soil profile in the field.
7. Determination of bulk density.
8. Identification of weeds.
9. Determination particle density and porosity of soil.
10. Study of different Cultivator.
11. Study of different weed control methods.
12. Determination of organic carbon of soil.
13. Fertilizer application methods.
14. Study of different orchard layout methods.
15. Identification of crops and their varieties seeds.

FARM MACHINERY LAB.

Subject Code: BAGE2-307

L T P C

0 0 2 1

EXPERIMENTS

1. To study animal drawn and tractor drawn mould Board ploughs.
2. Introduction to various farm machineries.
3. To study Indigenous or country plough.
4. To study the starting and stopping of Diesel Engine.
5. Introduction, construction and working of earth moving equipment.
6. To study four stroke cycle engine.
7. Construction and working of rotavator and other rotary tillers.
8. To study cultivators and its important functions.
9. Weeding equipment- their use and adjustment
10. Field operation of showing and planting equipment and their adjustments.
11. Field capacity and field efficiency measurement for at least two machines/implements.
12. Working of Paddy Transplanter and their calibration.
13. To Study the field capacity of sprayer and duster.
14. To study Air cooling system and its advantages.

15. Study on methods of repair, maintenance and off season storage of farm equipment.
16. Working of seed-cum-fertilizer drills and their calibration.

SOFT SKILLS-I

Subject Code: BHUM0-F91

L T P C
0 0 2 1

Course Objectives:

The course aims to cause a basic awareness about the significance of soft skills in professional and interpersonal communications and facilitate an all-round development of personality.

Course Outcomes:

At the end of the course, the student will be able to develop his/her personal traits and expose their personality effectively.

UNIT-1

Soft Skill: 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.

UNIT-2

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-3

Art of Listening: Proxemics, Haptics: The Language of Touch, Meta Communication, Listening Skills, Types of Listening, Listening tips.

UNIT-4

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.

Recommended Books:

1. K. Alex, S. Chand Publishers.
2. Butterfield, Jeff, 'Soft Skills for Everyone', Cengage Learning, New Delhi, 2010.
3. G.S. Chauhan and Sangeeta Sharma, 'Soft Skills', Wiley, New Delhi, 2016.
4. Klaus, Peggy, Jane Rohman & Molly Hamaker, 'The Hard Truth About Soft Skills', Harper Collins E-books, London, 2007.
5. S.J. Petes, Francis, 'Soft Skills and Professional Communication', Tata McGraw Hill Education, New Delhi, 2011.

SURVEYING AND LEVELLING

Subject Code: BAGE2-409

L T P C
3 1 0 4

Duration: 48 Hrs.

Course Objectives:

This course introduces to students the theory and application of surveying and to make well understands the fundamentals of surveying knowledge and being familiar with various aspects of surveying practice. It has ability to apply the knowledge of mathematics science and engineering to understand the measurement technique and equipment used in land surveying.

Course Outcomes:

The students should be able to-

1. Demonstrate knowledge of various surveying methods.
2. Conduct a chain survey and compass survey.
3. Conduct levelling survey and be able to do RL calculations.
4. Demonstrate knowledge of properties of various building materials.

Unit – I (12 Hrs.)

Surveying: Principle and basic concepts of surveying, Plans and maps, Classification of surveying, basic measurements, Units of measurement, Types of Scales, Recording the measurement, Principal of chain surveying, Types of Chains, Types of Ranging Chaining Chain and tape errors and corrections, Selection of survey station and lines, offset measurement, Obstacles in chaining and ranging.

Unit – II (12 Hrs.)

Traversing: Methods of traversing, Prismatic compass, Surveyors compass Angle and bearing, quadrantal system, Local attraction, Dip of angle, magnetic declination, Plotting a traverse survey, Errors in compass survey, Bow ditch's rule, Transit rule.

Unit – III (10 Hrs.)

Plane Tabling: Plane tabling instruments and accessories, Methods and principal, two points problem, three points problem, Errors in plane tabling.

Theodolite: Theodolite traversing, Theodolite Surveying, Ranging by theodolite, Temporary and Permanent adjustment of theodolite.

Unit – IV (14 Hrs.)

Levelling: Definition, Basic principal of levelling, Benchmark, Types of levels optical, Principal causes telescopes sensitivity of bubble tubes, levelling staff, Temporary adjustment,

Permanent adjustment of levels, Field book entries, types of levelling, Simple and differential levelling, Check levelling & reciprocal levelling, Precise levelling, profile levelling

Recommended Books:

1. B.C. Punamia, 'Surveying and Levelling', Vol-I & Vol-II, Laxmi Publications, 2005.
2. Kanetkar & Kulkarni, 'Surveying and Levelling Part-1', Vidarthi Griha Prakashan, Pune.
3. S.K. Duggal, 'Surveying', Vol I & II, Tata McGraw Hill, 2006.
4. R. Agor, 'Surveying', Khanna Publishers.
5. S.S. Bhavikatti, 'Surveying & Levelling', Vol. I & II, **2009.**

THEORY OF MACHINES

Subject Code: BAGE2-410

L T P C
3 1 0 4

Duration: 46 Hrs.

Course Objectives:

This course has been designed to cover the basic concepts of kinematic aspects of mechanical machines and major parts used in running of the machines. The students will understand the basic concepts of machines and able to understand constructional and working features of important machine elements.

Course Outcomes:

The students should be able to-

1. Draw inversions and determine velocity and acceleration of different mechanisms.
2. Understand various parts involved in kinematics of machines.
3. Construct different types of cam profile for a given data.
4. Know about clutch, belt, gear system, governor system.

Unit – I (12 Hrs.)

Elements, links, pairs, kinematics chain, and mechanisms, classification of pairs and mechanisms, Lower and higher pairs, four bar chain, slider crank chain and their inversions, Degree of freedom, Determination of velocity and acceleration using graphical (relative velocity and acceleration) method. Instantaneous centres.

Unit – II (12 Hrs.)

Cam, Types of cam, Terminology used in cam-follower system, Cam profile, Gear train, Simple, compound, reverted, and epicyclic gear trains, Determination of velocity ratio and train value by tabular method.

Unit – III (10 Hrs.)

Introduction to Belt drives, types of drives, belt materials, Length of belt, power transmitted, velocity ratio, belt size for flat and V belts. Effect of centrifugal tension, Creep and Slip on power transmission, Chain drives.

Unit – IV (12 Hrs.)

Introduction to Clutches, Types of clutches (Single disc, multiple disc, and cone clutches). Balancing of rotating masses in one and different planes,

Governor: Introduction, Types, Constructional details and Analysis of Watt, Porter, Proell governor, Sensitiveness, stability, hunting, isochronisms, power and effort of a governor, flywheel.

Recommended Books:

1. R.S. Khurmi, 'Theory of Machines', S. Chand Publication.
2. S.S. Rattan, 'Theory of Machines', 4th Edn., McGraw Hill Education Publication.
3. Jagdish Lal, 'Theory of Mechanisms & Machines', Metropolitan Book Co.
4. V.P. Singh, 'Theory of Machines', Dhanpat Rai Pub.
5. Thomas Beven, 'Theory of Machines', Longman's Green & Co., London.

ENGINEERING ECONOMICS

Subject Code: BAGE2-411

L T P C
4 0 0 4

Duration: 46 Hrs.

Course Objectives:

This includes the study of trading, growth, money, income, depression, prices, and monopoly. Economics is important in the world because it can answer questions such as what causes of Inflation and why are people unemployed? Economics includes the study of labour, land, and investments, of money, income, and production etc.

Course Outcomes:

The Students should be able-

1. Understand the concept of macroeconomic equilibrium and implications for the management of the business cycle.
2. Understand the costs of production and profit-maximization.
3. Understand and apply supply and demand analysis to relevant economic issues.
4. Distinguish between perfect competition and imperfect competition and be able to explain the welfare loss in non-competitive markets.

Unit – I (12 Hrs.)

Economics: Definitions, Nature, Scope, Difference between Microeconomics and Macroeconomics, theory of demand & supply; meaning, determinants, law of demand, law of supply Equilibrium between demand and supply elasticity, price elasticity, income elasticity, cross elasticity.

Unit – II (10 Hrs.)

Theory of Production: Production function, meaning, factors of production (meaning & characteristics of Land, Labour, capital & entrepreneur), Law of variable proportions & law of returns to scale Cost; meaning, short run & long run cost, fixed cost, variable cost, total cost, average cost, marginal cost, opportunity cost. Break even analysis; meaning, explanation, numerical.

Unit – III (14 Hrs.)

Markets: Meaning, types of markets & their characteristics (Perfect Competition, Monopoly, Monopolistic Completion, Oligopoly). **National Income-** meaning, stock and flow concept, NI at current price, NI at constant price, GNP, GDP, NNP, NDP, Personal income, disposal income.

Unit –IV (10 Hrs.)

Unemployment: Meaning, types, causes, remedies, Inflation- meaning, types, causes, measures to control, Money- meaning, functions, types, Monetary policy and Fiscal policy - meaning, objectives and tools. Human Resource Management- Definitions, objectives of manpower planning, process, sources of recruitment, process of selection.

Recommended Books:

1. R. Paneerselvam, 'Engineering Economics', PHI.
2. N. Gregory Mankiw, 'Principles of Economics', Cengage Learning.
3. L.M. Prasad, 'Principles and Practices of Management'.
4. Subba Reddy, 'Agricultural Economics', Oxford, 2008.
5. Tripathy and Redd, 'Principles of Management'.
6. K.K. Dewett & M.H. Navalur, 'Modern Economic Theory', S. Chand Publications.

SOIL AND WATER CONSERVATION ENGINEERING

Subject Code: BAGE2-412

L T P C

Duration: 44 Hrs.

3 0 0 3

Course Objectives:

Designing soil conservation works, repairing sites of degradation, controlling water retention, water logging and soil salinity and providing advice on water quality and pollution issues. Carrying out environmental impact studies and monitoring construction sites for environmental problems and assessing of irrigation and drainage requirements of soils.

Course Outcomes:

The student will be able to

1. Know about the causes about water scarcity and their solution to fight against the damage effects through soil and water conservation technologies.
2. Recognize different types of erosion, rainfall and runoff.
3. Design and construct a simple earth dam and ponds for farm use,
4. Understand the concept of Universal Soil Loss Equation (USLE) with respect to soil loss.

Unit – I (10 Hrs.)

Introduction: Soil erosion - causes, types and agents of soil erosion; water erosion – forms of water erosion, mechanics of erosion; gullies and their classification, stages of gully development; characteristics of contours and preparation of contour maps.

Unit – II (12 Hrs.)

Erosion Control Measures: Agronomical measures - contour cropping, strip cropping, mulching; mechanical measures - terraces – level and graded broad base terraces and their design, bench terraces & their design, layout procedure, terrace planning, bunds - contour bunds, graded bunds and their design; gully and ravine reclamation.

Unit – III (10 Hrs.)

Wind Erosion: Factors affecting wind erosion, mechanics of wind erosion, soil loss estimation, wind erosion control measures - vegetative, mechanical measures, wind breaks and shelter belts, sand dunes stabilization.

Unit – IV (12 Hrs.)

Soil Loss Estimation: Universal soil loss equation and modified soil loss equation, determination of their various parameters, Sedimentation - sedimentation in reservoirs and streams, estimation and measurement, sediment delivery ratio, trap efficiency.

Design Principle of Channel: Most Economical trapezoidal, introduction to water harvesting techniques; introduction to stream water quality and pollution.

Recommended Books:

1. Michael, 'Principles of Agricultural Engineering', Vol.-2, Jain Brothers, 2013.
2. R. Suresh, 'Soil & Water Conservation Engineering', Standard Publishers Distributors.
3. Ghanshyam Das, 'Hydrology and Soil Conservation Engineering: Including Watershed Management', 2nd Edn., PHI Publication, 2009.
4. V.V.N. Murthy, 'Land and Water Management Engineering', Kalyani Publishers, 2013.
5. R.P. Tripathi and H.P. Singh, 'Soil Erosion and Conservation', 1st Edn., New Age Publishers, 1993.
6. Bimal Chandra Mal, 'Introduction to Soil and Water Conservation Engineering', Kalyani Publishers, 2011.

FARM POWER

Subject Code: BAGE2-413

L T P C
3 1 0 4

Duration: 46 Hrs.

Course Objectives:

This course involves the use, maintenance, adjustment, calibration, and repair of the machines. The selection and operation of machines will be practiced. Safety will be stressed throughout and also Know the different power sources on a farm. In this subject learn the principles of operation of farm equipment.

Course Outcomes:

1. The students will be able to learn about different sources of farm power, construction and ii) functioning of CI and SI engines.
2. Identify all the power sources for farm operations.
3. Introduce students to the available power sources for farm operations.
4. Introduce students to selection and management of farm tractors and implements.

Unit – I (10 Hrs.)

Sources of farm power - conventional & non-conventional energy sources and their utilization, classification of tractors and IC engines, Review of thermodynamic principles of IC (CI &SI) engine and deviation from ideal cycle.

Unit – II (12 Hrs.)

Engine & their components, their construction, operating principles and functions, valves and valve mechanism, Firing order and diagram, criteria for selection. Study of constructional details, adjustments and operating principles of fuel and air supply, cooling, lubricating, ignition, governing and electrical systems.

Unit – III (12 Hrs.)

IC engine fuels - their properties & combustion of fuels, gasoline tests and their significance, diesel fuel tests and their significance, detonation and knocking in IC engines, Properties of coolants, anti-freeze and anti-corrosion materials, lubricant types & study of their properties.

Unit – IV (12 Hrs.)

Transmission systems of wheel and track type tractors: clutch, gear box, differential and final Drive mechanism PTO system, type, standardization, belt and pulley on tractor and their standardization. Preventive maintenance of various systems.

Recommended Books:

1. Jagdishwar Sahay, 'Elements of Agricultural Engineering', St. Publishers Distributors.
2. John B. Lijjedahal, Paul K. Turnquist, 'Tractors and their Power Units', CBS Publication.
3. S.C. Jain, 'Farm Tractor maintenance and repair,' Standard Publishers Distributors.
4. Donnell Hunt, 'Farm Power and Machinery Management', Medtech, 10th Edn., 2013.
5. Suresh, 'Farm Power and Machinery Engineering', Standard Publishers Distributors.

SURVEYING & LEVELLING LAB.

Subject Code: BAGE2-414

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

EXPERIMENTS

1. Chain survey of an area and preparation of map
2. Measurement of distance, ranging a line.
3. Compass survey of an area and plotting of compass survey.
4. Contour survey of an area and preparation of contour map.
5. Introduction of software in drawing contour.
6. Plane table survey, different methods of plotting, two point & three-point problem.
7. Measurement of bearing and angles with compass, adjustment of traverse by graphical method.
8. To study of different methods of levelling, height of instrument, rise & fall methods.
9. Advancement of Total stations.
10. Measurement of horizontal and vertical angle by theodolite.
11. Determination of height of an inaccessible object.
12. Determination of area of irregular figure by using planimeter.
13. Height of object by using theodolite.
14. Setting out of circular curves in the field using different methods.
15. Determination of tachometric constants and determination of reduced levels by tachometric observations.

THEORY OF MACHINE LAB.

Subject Code: BAGE2-415

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

EXPERIMENTS

1. To study the various inversions of kinematic chains.
2. Conduct experiments on various types of governors.
3. Demonstration of static and dynamic balancing in the laboratory.
4. Determination of gyroscopic couple (graphical method).
5. Balancing of rotating masses (graphical method).
6. Cam profile analysis (graphical method)
7. Motion analysis of Epicyclic gear trains using tabular and formula methods.
8. Analysis of 4-bar mechanism slides crank mechanism and their inversions.
9. Draw graphs between height and equilibrium speed of a governor.
10. To draw circumferential and axial pressure profile in a full journal bearing.
11. To determine coefficient of friction for a belt-pulley material combination.
12. Determination of moment of inertia of flywheel.
13. To study the flywheel and governor action in laboratory.
14. To study the static and dynamic balancing using rigid blocks
15. To draw displacement, velocity & acceleration diagram of four bar mechanism.

SOIL AND WATER CONSERVATION ENGINEERING LAB.

Subject Code: BAGE2-416

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

EXPERIMENTS

1. Study of different types of conservation measures.
2. Design of drop spillway.

3. Design of drop inlet spillway.
4. Design of farm pond.
5. Demonstration of Bench Terrace in the farming.
6. Study of USLE/MUSLE parameter.
7. Study about the Contour farming.
8. Determination from nutrient availability in soil.
9. To demonstrate the conservation of tillage.
10. Study of erosion checked by row cropping pattern.
11. Study of contour cropping effect on soil erosion.
12. Study of bund /graded/contour bund.
13. Design of grassed water ways.
14. Computation of soil erosion by USLE/MUSLE.
15. Design of Trapezoidal water ways.

SOFT SKILLS-II

Subject Code: BHUM0-F92

L T P C
0 0 2 1

Course Objectives:

The course aims to address various challenges of communication as well as behavioural skills faced by individual at work place and organisations. Also, it aims to enhance the employability of the students.

Course Outcomes:

At the end of the course the student will be able to understand the importance of goal setting. They will also be able to handle stress in their lives and future in a better way.

UNIT-1

Developing Positive Attitude: Introduction. Formation of attitude. Attitude in workplace. Power of positive attitude. Examples of positive attitudes. Negative attitudes. Examples of negative attitude. overcoming negative attitude and its consequences.

Improving Perception: Introduction. Understanding perception. perception and its application in organizations.

UNIT-2

Career Planning: Introduction. Tips for successful career planning. Goal setting-immediate, short term and long term. Strategies to achieve goals. Myths about choosing career.

UNIT-3

Art of Reading: 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-4

Stress Management: Introduction. meaning. positive and negative stress. Sources of stress. Case studies. signs of stress. Stress management tips. Teenage stress.

Recommended Books:

1. K. Alex, S. Chand Publishers.
2. Rizvi, M. Ashraf, 'Effective Technical Communication', McGraw Hill.
3. Mohan Krishna & Meera Banerji, 'Developing Communication Skills', Macmillan.
4. Kamin, Maxine, 'Soft Skills Revolution: A Guide for Connecting with Compassion for Trainers, Teams & Leaders', Pfeiffer & Amp; Company, Washington, DC, 2013.

AGRICULTURAL STRUCTURE AND ENVIRONMENTAL CONTROL

Subject Code: BAGE2-517

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

Duration: 44 Hrs.

Course Objectives:

To provide the technical knowledge of structures on the farm and to expose the basic concepts of design.

Course Outcomes:

1. At the end of the course, students will be able to:
2. Study planning and layout of farmstead.
3. Construct and estimate the cost of farm structures.
4. Select the sites and orientation of sanitation buildings.
5. Use of renewable energy sources and environmental control.

Unit - I (10 Hrs.)

Planning and layout of farmstead, Physiological reactions of livestock to solar radiation and other environmental factors, Livestock production facilities, BIS, Standards for dairy, piggery, poultry and other farm structures.

Unit - II (12 Hrs.)

Design, construction and cost estimation of farm structures; animal shelters, compost pit, fodder silo, fencing and implement sheds, barn for cows, buffalo, poultry, etc.:: Design and construction of rural grain storage system, Engineering for rural living and development, rural roads, their construction cost and repair and maintenance.

Unit - III (12 Hrs.)

Sources of water supply, Norms of water supply for human being and animals, drinking water standards and water treatment suitable to rural community, Site and orientation of building in regard to sanitation, community sanitation system; sewage system its design, cost and maintenance, design of septic tank for small family.

Unit - IV (10 Hrs.)

Estimation of power requirement for domestic and irrigation, source of power supply, use of alternate source of energy, electrification of rural Housing, Scope, importance and need for environmental control, Renewable and non-renewable resources and their equitable use, concept of eco system, biodiversity of its conservation, environmental pollution and their control, solid waste management system, BOD and COD of food plant waste, primary and secondary treatment of food plant waste.

Recommended Books:

1. M.L. Hellickson and J.N. Walker, 'Ventilation of Agricultural Structures'.
2. L.P. Bengtsson, 'Farm Structures in Tropical Climates'.
3. J.H. Whitaker, 'Agricultural Buildings and Structures. National Food & Energy'.
4. R.E. Phillips, 'Farm Buildings: From Planning to Completion'.
5. ASAE, 'Environmental Control for Animals and Plants Textbooks'.
6. J.S. Boyd, 'Practical Farm Buildings', A Textbook & Handbook.

SOIL AND WATER CONSERVATION STRUCTURES

Subject Code: BAGE2-518

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

Duration: 44 Hrs.

Course Objectives:

This course includes functional requirement and design of soil conservation structures to check soil erosion due to excessive runoff. Site selection and design of farm ponds and cost estimation of these structures.

Course Outcomes:

1. The Students will know about the different types of soil conservation structures.
2. The students will be able to understand the design principle of these structures.
3. Site selection criteria will be useful for application of knowledge in the field problems.

Unit – I (12 Hrs.)

Introduction and classification of structures, Functional requirements of soil erosion control structures. Flow in open channels, types of flow, state and regimes of flow. Concept of Specific energy and specific force. Runoff measuring structures-H flume and Parshall flume.

Unit – II (12 Hrs.)

Hydraulic jump and its application, Energy dissipation due to jump, jump efficiency and relative loss of energy, Runoff measuring structures; General description of straight drop spillway, structural parts and functions, advantages and disadvantages of spillway. Hydrologic and hydraulic design.

Unit - III (10 Hrs.)

Structural design of a drop spillway, Safety against sliding, overturning, crushing and tension, Chute spillway, general description and its components; Hydraulic design, energy dissipaters and design criteria of a SAF stilling basin and its limitations.

Unit –IV (10 Hrs.)

Drop inlet spillway, general description, functional use and design criteria. Design of diversions. Small earth embankments, types and design principles. Maintenance of earthen dams. Farm ponds, site selection and their design and construction. Cost estimation of structures.

Recommended Books:

1. V.V.N. Murty, 'Land and Water Management Engineering', Kalyani Publication.
2. R. Suresh, 'Soil and Water Conservation Engineering', Standard Publishers, Distributors.
3. Ghanshyam Das, 'Hydrology and Soil Conservation Engineering', PHI Learning Private Ltd.

DAIRY AND FOOD ENGINEERING

Subject Code: BAGE2-519

L T P C
2 1 0 3

Duration: 40 Hrs.

Course Objectives:

This course helps the students to gain a good knowledge on the various processes and equipment used in the processing of milk and milk products. To introduce the students to dairy industry, properties and processing of milk, manufacture of dairy products, sanitation and effluent treatment in dairy industry.

Course Outcomes:

1. The students will gain knowledge about Dairy and Food process engineering
2. Students will understand the importance of quality control and food preservation and packaging.
3. To expose the students to the fundamental knowledge of food, its properties and different methods of food processing.

Unit - I (10 Hrs.)

Dairy development in India. Engineering, chemical and thermal properties of milk and milk products (In brief), Composition and proximate analysis of food products.

Unit - II (10 Hrs.)

Unit operation of various dairy and food processing systems, process flow charts for product manufacture, Deterioration in products and their controls.

Unit - III (10 Hrs.)

Working principles of equipment for receiving, pasteurization, sterilization, homogenization, filling & packaging (Production of butter, Panner & Cheese) dairy plant design and layout,

composition and proximate analysis of food products. Determination in products and their controls.

Unit - IV (10 Hrs.)

Physical, chemical and biological methods of food preservation, changes during processing, evaporation, drying, freezing juice extraction, filtration, membrane separation, thermal processing, plant utilities requirement.

Recommended Books:

1. Sharma, 'Dairy Science and Technology and Food and Dairy Engineering', 1st Edn., CBS, 2009.
2. J.G. Brennan, Butters, Jr. N.D. Cowell and A.E.V. Lilly, 'Food Engineering Operations', Applied Science Publishers, 1976.
3. A.W. Farrall, 'Engineering for Dairy and Food Products', Wiley Eastern Pvt. Ltd., New Delhi, 1967.
4. H.G. Kessler, 'Food Engineering and Dairy Technology', V.A. Kessler, Freising, Germany, 1981.
5. Tufail Ahmad, 'Dairy Plant Engineering and Management', Kitab Mahal, 2003.

TRACTOR SYSTEMS, CONTROL & OPERATION

Subject Code: BAGE2-520

L T P C

Duration: 44 Hrs.

3 1 0 4

Course Objectives:

To provide the technical knowledge of various tractor systems and their Control and operations of farm machinery.

Course Outcomes:

1. At the end of the course, students will be able to know about various tractor systems
2. Students will understand the control and operation of different mechanisms used in tractor and farm implements to perform different tasks.
3. To expose the students to the fundamental knowledge of different components of tractor and implements

Unit- I (10 Hrs.)

Study of transmission systems, clutch, gear box, differential and final drive mechanism. Familiarization of brake mechanism. Ackerman and hydraulic steering and hydraulic systems.

Unit-II (8 Hrs.)

Tractor power outlets: P.T.O., belt pulley, drawbar, etc. Tractor chassis mechanics and design for tractor stability.

Unit-III (10 Hrs.)

Ergonomic considerations and operational safety, Introduction to tractor maintenance procedure and trouble shooting. Scheduled maintenance after 10, 50, 100, 250, 500 and 1000 Hrs. of operation. Safety hints.

Unit-IV (12 Hrs.)

Top end overhauling. Fuel saving tips. Preparing the tractor for storage. Care and maintenance procedure of agricultural machinery during operation and off-season. Repair and maintenance and workshop requirements.

Recommended Books:

1. F.R. Jones, 'Farm Gas Engines and Tractors'.
2. E.L. Barger, Lijedehl, W.B. Carleton and E.G. Mc Kibben, 'Tractors and their Power Units'.
3. Radhey Lal and Dutta, 'Agricultural Engineering through solved examples'.
4. Irving Frazee and V.E. Philip, 'Tractors and Crawlers'.

SOIL AND WATER CONSERVATION STRUCTURES LAB.

Subject Code: BAGE2-521

L T P C

0 0 2 1

EXPERIMENTS

1. Study of different parts of H-flume and Parshall flume.
2. Construction of specific energy and specific force diagram.
3. Measurement of hydraulic jump parameters and amount of energy dissipation.
4. Design of drop spillway.
5. Stability analysis of drop spillway
6. Design of Chute spillway.
7. Design of drop inlet spillway.
8. Design of small earthen embankments.
9. Design of a SAF energy dissipater.
10. Design of water harvesting structures.
11. Cost estimation of structures.
12. Visit to a watershed to understand the runoff pattern.

TRACTOR SYSTEMS, CONTROL & OPERATION LAB.

Subject Code: BAGE2-522

L T P C

0 0 2 1

EXPERIMENTS

1. Introduction to transmission systems and components.
2. Study of clutch functioning, parts and design problem on clutch system.
3. Study of different types of gear box, calculation of speed ratios, design problems on gear box.
4. Study on differential and final drive and planetary gears.
5. Study of brake systems and some design problems; Steering geometry and adjustments.
6. Study of hydraulic systems in a tractor, hydraulic trailer and some design problems.
7. Traction performance of a tractor wheel.
8. Finding C.G. of a tractor by weighing technique.
9. Finding CG of a tractor using suspension/balancing techniques; Finding moment of Inertia of a tractor.
10. Appraisal of various controls in different makes tractors in relation to anthropometric measurements.

DAIRY AND FOOD ENGINEERING LAB.

Subject Code: BAGE2-523

L T P C

0 0 2 1

EXPERIMENTS

1. Study of a composite pilot milk processing plant & equipment
2. Study of pasteurisers
3. Study of sterilizers
4. Study of homogenisers
5. Study of separators
6. Study of butter churners
7. Study of evaporators
8. Study of milk dryers
9. Study of freezers

10. Design of food processing plants & preparation of layout
11. Visit to multiproduct dairy product
12. Determination of physical properties of food products
13. Estimation of steam requirements
14. Estimation of refrigeration requirements in dairy & food plant
15. Visit to Food industry

ENGINEERING HYDROLOGY

Subject Code: BAGE2-625

L T P C
2 1 0 3

Duration: 40 Hrs.

Course objectives:

The knowledge of hydrology is prerequisite for the irrigation engineering and also for design of hydraulic structure. So one of the objective of this course is to impart the knowledge of hydrology that deals with the occurrence, distribution, movement and properties of water on the earth.

Course Outcomes:

1. Students shall learn various components of hydrologic cycle that affect the movement of water in the earth.
2. Students can compute hydrologic mass balance in a closed basin.
3. Students can develop unit hydrographs based on stream flow data, and conduct basic unit hydrograph analysis.
4. Students understand basic concepts of hydrologic simulation modelling.

Unit – I (10 Hrs.)

Introduction: Hydrologic cycle; precipitation - forms, rainfall measurement, mass curve, hydrograph, mean rainfall depth, plotting position, estimation of missing data, test for consistency of rainfall records; interception infiltration; evaporation; evapo-transpiration estimation and measurement.

Unit – II (10 Hrs.)

Runoff: Factors affecting, measurement; stage and velocity, rating curve, extension of rating curve; estimation of peak runoff rate and volume; rational method, Cook's method, SCS method, Curve number method. Geomorphology of watersheds – stream number, stream length, stream area, stream slope.

Unit – III (8 Hrs.)

Hydrograph: Components, base flow separation, unit hydrograph theory, Unit hydrograph of different durations, dimensionless unit hydrograph, distribution hydrograph, synthetic unit hydrograph, uses and limitations of unit hydrograph.

Unit – IV (12 Hrs.)

Head Water Flood Control: Methods, retards and their location; flood routing – graphical methods of reservoir flood routing, Muskingum method of flood routing; hydrology of dry land areas - drought and its classification; Introduction to watershed management and planning, Horton's laws.

Recommended Books & References:

1. Rajesh Srivastava, Ashu Jain, 'Engineering Hydrology', 1st Edn., McGraw Higher Ed., 2017.
2. V.V.N. Murty, 'Land and Water Management Engineering', Kalyani Publication.
3. K. Subramanya, 'Engineering Hydrology', McGraw Higher Ed. Publication, 2013.
4. S.K. Garg, 'Water Resource Engineering and Hydrology', 1st Edn., K.H. Publications, 2010.
5. Engineers Zone Publications, 'Hydrology & Irrigation Engineering, 1st Edn., Engineers Zone Publications, 2016.

ENGINEERING PROPERTIES OF BIOLOGICAL MATERIAL & FOOD QUALITY

Subject Code: BAGE2-626

L T P C
3 1 0 4

Duration: 47 Hrs.

Course Objectives:

This course gives an insight into the properties of different food materials and their quality standards. The objective of this course is to make the students understand the basic properties of food materials and enable them to process, preserve and use them for various applications.

Course Outcomes:

At the end of the course, students will be able to:

1. Describe the importance of engineering properties of biological materials.
2. Explain different physical and thermal characteristics of important biological materials.
3. Discuss the concept, need and objectives of quality control.
4. Apply different types of quality control processes.

Unit – I (8 Hrs.)

Importance of engineering properties of biological materials, Physical properties like shape, size, volume, density, roundness, sphericity, surface area.

Unit – II (10 Hrs.)

Thermal properties like thermal conductivity, specific heat & thermal diffusivity measurement of colour, flavour, consistency, viscosity, texture and their relationship with food quality and composition.

Unit – III (12 Hrs.)

Rheological characteristics like stress, strain time effects, rheological models and their equations, Aerodynamic characteristics and fractional properties of biological materials, Application of engineering properties in handling processing machines and storage structure.

Unit – IV (10 Hrs.)

Objectives and need of food quality; Measurement of colour, flavour, consistency, viscosity, texture and their relationship with food quality and composition; Sampling; purpose, sampling techniques, sampling procedures for liquid, powdered and granular materials.

Recommended Books & References:

1. O.P. Singhal and D.V.K. Samuel, 'Engineering Properties of Biological Materials', Saroj Prakashan, Allahabad, 2003.
2. N.N. Mohenensin, 'Physical Properties of Plant and Animal Materials', Routledge Publication.
3. M.A. Rao and S.S.H. Rizvi, 'Engineering Properties of Foods', 4th Edn., CRC Press, 2014.
4. B. Hallstrom, H.F. Meffert, Th., W.E.L. Speiss, 'Physical Properties of Food'.
5. S. Sahin, & S.G. Summu, 'Physical Properties of Foods', New York: Springer, 2006.

DRAINAGE ENGINEERING

Subject Code: BAGE2-627

L T P C
3 1 0 4

Duration: 47 Hrs.

Course Objectives:

The understanding of various drainage techniques is useful for reclamation for water logged area for crop production.

Course Outcomes:

At the end of the course, students will be able to:

1. To understand the different types of drainage systems.
2. To apply suitable engineering techniques for reclamation of the agricultural lands suffering from water logging.

3. To understand conjunctive use of water resources for solutions to drainage problem on agricultural soils.

Unit – I (8 Hrs.)

Drainage, objectives of drainage, familiarization with the drainage problems of the state, Surface drainage, drainage coefficient, types of surface drainage.

Unit – II (10 Hrs.)

Subsurface drainage purpose and benefits, investigations of design parameters, hydraulic conductivity, drainable porosity, water table, drainage criteria, types and use of subsurface drainage system.

Unit – III (12 Hrs.)

Design of surface drains, interceptor and relief drains, Derivation of ellipse (Hooghoudt's) and Ernst's drain spacing equations. Steady and unsteady state groundwater condition, dynamic equilibrium concept, Design of subsurface drainage system. Drainage materials, drainage pipes, drain envelope, Layout construction and installation of drains.

Unit – IV (10 Hrs.)

Drainage Structures: Vertical drainage. Bio-drainage, Tile Drains; Drainage of irrigated and humid areas; Salt balance, reclamation of saline and alkaline soils; Leaching requirements, Conjunctive use of fresh and saline waters; Economic aspects of drainage.

Recommended Books & References:

1. J.N. Luthin, 'Drainage Engineering', Wiley Eastern Pvt. Ltd. New Delhi.
2. R.T. Thokal, Sunil Gorantiwar, A.G, Powar, 'Agricultural Drainage: Principles & Practices', 1st Edn., Westville Publishing House, New Delhi.
3. A.M. Michael and T.P. Ojha, 'Principles of Agricultural Engineering', Vol.-II, 5th Edn., Jain Brothers, 2018.

HANDS ON TRAINING IN CAD/CAM

Subject Code: BAGE2-628

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

Duration: 40 Hrs.

Course Objectives:

Learn how to integrate Design and Manufacturing Systems through incorporation of computers.

Course Outcomes:

Upon completion of the course, students shall be able to:

1. Understand use of computers in design and manufacturing systems.
2. Know about computerized manufacturing methods.
3. Select suitable manufacturing method for complex components.
4. Acquire the Knowledge of data bases, software s and hardware's for computer design in organization.

Unit - I (8 Hrs.)

First and third angle methods of projection, Preparation of working drawings from models and isometric views Drawing of missing views and different methods of dimensioning Concept of sections, revolved and oblique sections Sectional drawing of simple machine parts.

Unit - II (10 Hrs.)

Types of rivet heads and riveted joints, process of producing leak proof joints Threads nomenclature, profiles, mull start, left and right hand and conventional representation of threads Nuts and bolts- square headed, hexagonal, types of lock nuts, studs, machine screws, cap screw and wood screw, foundation bolts.

Unit - III (12 Hrs.)

Application of computers for design CAD, define, benefits, system components and computer hardware for CAD, display, input and output devices Graphic primitives, display file, frame buffer, display control, display processors, line generation, graphics software; Points and lines,

polygons, filing of polygons, text primitive, windowing and clipping, view port Homogeneous coordinates, transformations, planners and space curves design.

Unit - IV (10 Hrs.)

Introduction to solid modelling, introduction to numeric control, basic components of NC system, NC coordinate and motion control system Computer numerical control, direct numerical control, combined CNC /DNC NC machine tools and control units, tooling for NC machines, part programming, punched tape coding and format, Manual and computer assisted programming.

Recommended Books & References:

1. M. Groover, E. Zimmers, 'CAD/CAM: Computer-Aided Design and Manufacturing', 1st Edn., Pearson Publisher, 2013.
2. P. N. Rao CAD/CAM, 'Principles and Applications', 3rd Edn. 'McGraw Higher Publication, 2010.
3. Hearn, 'Computer Graphics, C Version', 2nd Edn., Pearson Education India, 2002.
4. Alison Beazley, 'Computer-Aided Pattern Design and Product Development', Wiley India Pvt. Ltd., 2011.

ENGINEERING HYDROLOGY LAB.

Subject Code: BTAG-629

L T P C

0 0 2 1

EXPERIMENTS

1. Study and use of anemometer.
2. Study and use of evaporimeters.
3. Study and use of hygrometer.
4. Study and use of sunshine recorder.
5. Study and use of solar radiation instruments.
6. Measurement of precipitation by rain gauges.
7. Analysis of rainfall data.
8. Study of stream gauging instruments and measurement.
9. Development of hydrograph.
10. Run-off- computations.
11. Graphical analysis of flood routing.
12. Study of stage recorders and current meters.
13. Exercises on flood routing problems.

ENGINEERING PROPERTIES OF BIOLOGICAL MATERIAL & FOOD QUALITY LAB.

Subject Code: BTAG-630

L T P C

0 0 2 1

EXPERIMENTS

1. Determination of shape & size of agricultural Products.
2. Determination of volume and density.
3. Measurement of roundness.
4. Measurement of sphericity.
5. Determination of surface area of leaf.
6. Determination of thermal conductivity & thermal diffusivity.
7. Measurement of internal friction of product.
8. Measurement of viscosity of jam and jelly.
9. Measurement of texture of biscuits & confectionary.

10. Estimation of sulphur dioxide in foods.
11. Measurement of angle of repose and internal friction.
12. Determination of protein and carbohydrates in a given food sample.
13. Estimation of vitamin C in any food sample.

DRAINAGE ENGINEERING LAB.

Subject Code: BAGE2-631

L T P C

0 0 2 1

EXPERIMENTS

1. Determination of drainage coefficients.
2. In-situ measurement of hydraulic conductivity by inverse auger hole method.
3. In-situ measurement of hydraulic conductivity by single auger hole method.
4. Installation of piezometer and observation well.
5. Preparation of iso- bath and isobar maps.
6. Determination of drainable porosity.
7. Fabrication and testing of drainage tiles.
8. Design of surface drainage systems.
9. Design of subsurface drainage systems.
10. Determination of chemical properties of soil and water (EC, pH, ESP or SAR).
11. Cost analysis of surface and sub-surface drainage system.
12. Visit to subsurface drainage project and drainage material manufacturing industry.

SOFT SKILLS-IV

Subject Code: BHUM0-F94

L T P C

0 0 2 1

Duration: 25 Hrs.

UNIT-1

Art of Speaking: Introduction. Communication process. Importance of communication, channels of communication. Formal and informal communication. Barriers to communication. Tips for effective communication. tips for conversation. Presentation skills. Effective multi-media presentation skills. Speeches and debates. Combating nervousness. Patterns and methods of presentation. Oral presentation, planning and preparation.

UNIT-2

Group Discussion: Introduction. Importance of GD. Characters tested in a GD. Tips on GD. Essential elements of GD. Traits tested in a GD .GD etiquette. Initiating a GD. Nonverbal communication in GD. Movement and gestures to be avoided in a GD. Some topics for GD.

UNIT-3

Preparing Cv/Resume: Introduction – meaning – difference among bio-data, CV and resume. CV writing tips. Do's and don'ts of resume preparation. Vocabulary for resume, common resume mistakes, cover letters, tips for writing cover letters.

UNIT-4

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. Lucas, Stephen E., 'The Art of Public Speaking', 11th Edn., International Edn., McGraw Hill Book Co., 2014.
3. Goleman, Daniel, 'Working with Emotional Intelligence', Banton Books, London, 1998.

4. Thrope, Edgar and Showick Trope, 'Winning at Interviews', Pearson Education, **2004**.
5. Turk, Christopher, 'Effective Speaking', South Asia Division: Taylor & Francis, **1985**.

GROUNDWATER, WELLS & PUMPS

Subject Code: BAGE2-732

L T P C
3 1 0 4

Duration: 40 Hrs.

Course Objectives:

1. To acquaint and equip the students with the occurrence, development and hydraulics of ground water flow.
2. To understand the theories and application of wells and pumps.
3. To impart knowledge in areas of water supply and groundwater development.

Course Outcomes:

1. Students know the technical aspects of groundwater, its availability, assessment and utilization
2. Familiarized with the theory behind well design, construction and management of wells.
3. To enable the students to know about the ground water potential, its dynamic behaviour and exploration manual and mechanically.

UNIT- I (10 Hrs.)

Occurrence and Movement of Ground Water: Aquifer and its types, Classification of wells. Steady and transient flow into partially, fully and open wells. Design of open well.

UNIT- II (10 Hrs.)

Groundwater Exploration Techniques: Design, construction and development of tube-wells. Determination of aquifer parameters. Well interference. Multiple well systems. Surface and subsurface exploitation and estimation of ground water potential. Quality of ground water.

UNIT- III (8 Hrs.)

Artificial groundwater recharge planning and modelling. Ground water project formulation.

UNIT- IV (12 Hrs.)

Water Lifting Devices: Types of pump. Design principles, performance curves and selection of centrifugal, submersible, turbine and propeller pumps. Selection of prime mover and pulleys. Trouble shooting in pumping sets. Priming and self-priming devices. Positive displacement pumps and Hydraulic ram.

Recommended Books:

1. H.M. Reghunath, 'Ground Water', Wiley Eastern Ltd., **2003**.
2. A.M. Michael, S.D. Khepar and S.K. Sondhi., 'Water Well and Pumps', 2nd Edn., Tata McGraw Hill, **2008**.
3. A.M. Michael and T.P. Ojha, 'Principles of Agricultural Engineering', Vol-II, 5th Edn., Jain Brothers Publication, New Delhi, **2014**.
4. Todd David Keith and Larry W. Mays., 'Groundwater Hydrology', 3rd Edn., John Wiley & Sons, New York, **2004**.

MICRO IRRIGATION SYSTEMS & DESIGN

Subject Code: BAGE2-733

L T P C
2 1 0 3

Duration: 40 Hrs.

Course Objectives:

1. To introduce the concept of micro – irrigation.
2. To design Sprinkler and Drip irrigation systems.

Course Outcomes:

On completing the course, the student should be able to:

1. Design irrigation systems of various types.

2. Plan and operate existing systems.

UNIT- I (10 Hrs.)

Present and future need of micro-irrigation systems. Role of Govt. for the promotion of micro-irrigation in India. Merits, demerits and types of micro-irrigation system.

UNIT- II (10 Hrs.)

Micro- irrigation system- design, design synthesis, installation, and maintenance. Sprinkler irrigation - types, planning factors, uniformity, hydraulics, lateral, sub-mains and main line design.

UNIT- III (8 Hrs.)

Pump and power unit selection. Drip irrigation - potential, automation and crops suitability. Fertigation- Fertilizer application criteria, suitability of fertilizer compounds, fertilizer mixing, injection duration, rate and frequency and capacity of fertilizer tank.

UNIT- IV (12 Hrs.)

Quality control in micro-irrigation components. Design and maintenance of poly-house. Waste land development - hills, semi-arid, coastal areas and water scarce areas. Benefit and Cost analysis.

Recommended Books:

1. M.L. Choudhary and U.S. Kadam, 'Micro Irrigation for Cash Crops', Westville Publishing House, 2006.
2. M.S. Mane and B.L. Ayare and S.S. Magar, 'Principles of Drip Irrigation Systems', Jain Brothers, New Delhi, 2006.
3. A.M. Michael, 'Irrigation: Theory and Practice', Vikas Publishing House, New Delhi, 2012.
4. R. Suresh, 'Principles of Micro-Irrigation Engineering', Standard Publishers Distributors, New Delhi, 2010.

FOOD PROCESSING PLANT DESIGN & LAYOUT

Subject Code: BAGE2- 734

L T P C
3 1 0 4

Duration: 40 Hrs.

Course Objectives:

Understanding the fundamental aspects of food processing plant design and their layout.

Course Outcomes:

At the end of the course the student:

1. Will have problem evaluation and problem solving skills regarding food processing operations that can affect the quality of foods.
2. Will be able to apply scientific principles in solving food processing problems and improving product quality and safety.
3. Will be able to know and implement good manufacturing practices.
4. Will have developed long-life learning skills, and communication skills.
5. Will be able to know about of design and layout of food plant.

UNIT- I (12 Hrs.)

Meaning and definition of plant layout, Objectives and principles of Layout, Types of layout; Plant installation, power and power transmission, sanitation; Cost analysis, preparation of feasibility report.

UNIT- II (10 Hrs.)

Salient features of processing plants for cereals, pulses oilseeds, horticultural and vegetable crops, poultry, fish and meat products, milk and milk products.

UNIT- III (8 Hrs.)

Location selection criteria, selection of processes, plant capacity, project design, flow diagrams.

UNIT- IV (10 Hrs.)

Selection of equipment, process and controls, handling equipment, plant layout, Plant elevation, requirement of plant building and its components, labour requirement.

Recommended Books:

1. Jasim Ahmed and Mohammad Shafiur Rahman, 'Handbook of Food Process Design Vol-2', 1st Edn., Wiley Blackwell, 2012.
2. 'Handbook of Agricultural Engg.', ICAR, New Delhi, 2012.
3. Antonio Lopez-Gomez, Gustavo V. Barbosa, 'Food Plant Design', 1st Edn., CRC Press, 2005.

GROUNDWATER, WELLS & PUMPS LAB.

Subject Code: BAGE2-735

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

EXPERIMENTS

1. Verification of Darcy's Law.
2. Analysis of Aquifer material and Design of Gravel pack.
3. Determination of specific yield and specific retention.
4. Study of various type of well screens.
5. Drilling of a tube-well and preparation of well log.
6. Study of draw down and recuperation in pumped well.
7. Estimation of aquifer parameters.
8. Study of artificial ground water recharge structures.
9. Study of positive displacements and centrifugal pumps.
10. Study and testing of submersible pump.

MICRO IRRIGATION SYSTEMS & DESIGN LAB.

Subject Code: BAGE2-736

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

EXPERIMENTS

1. Study of different types of micro-irrigation systems.
2. Field visit of micro-irrigation system. Water filtration unit.
3. Discharge measurement study of different micro-irrigation systems.
4. Water distribution and uniformity coefficient.
5. Wetted front and moisture distribution.
6. Design of micro-irrigation system for an orchard and row crops.
7. Automation in micro- irrigation system.
8. Micro climate inside a poly-house.
9. Study of maintenance and cleaning of different components of various systems.
10. Design of sprinkler and landscape irrigation system.

CROP PROCESS ENGINEERING

Subject Code: BTAG2- 839

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

Duration: 38 Hrs.

UNIT- I (8 Hrs.)

Scope and importance of food processing, principles and methods of food processing. Processing of farm crops; cereals, pulses, oil seeds, fruits and vegetables and their products for food and feed, Processing of animal products.

UNIT- II (10 Hrs.)

Principle of size reduction, grain shape, Size reduction machines; crushers, grinders, cutting machines operation, efficiency and power requirement – Rittinger's, Kick's and Bond's equation, fineness modulus.

UNIT- III (10 Hrs.)

Types of separators, size of screens, sieve analysis, capacity and effectiveness of screens, pneumatic separation. Theory of filtration, study of different types of filters, rate of filtration, pressure drop during filtration.

UNIT- IV (10 Hrs.)

Scope & importance of material handling devices, study of different types of material handling systems; belt, chain and screw conveyor, bucket elevator, pneumatic conveying, gravity conveyor- design consideration, capacity and power requirement.

Recommended Books:

1. K.M. Sahay, and K.K. Singh, 'Unit operations of Agricultural Processing', Vikas Publishing House Pvt. Ltd., New Delhi, 1994.
2. Suresh Chandra, Durvesh Kumari, 'Crop Process Engineering', 1st Edn., Jain Brothers, 2018.
3. P.H. Pandey, 'Principles of Agriculture Processing', Kalyani Publishers, Ludhiana, 1994.

WATERSHED PLANNING AND MANAGEMENT

Subject Code: BAGE2- 740

L T P C

Duration: 40 Hrs.

2 1 0 3

Course Objectives:

To discuss different aspects of water resource development and management on watershed basis. To develop skills to analyse various complex problems of watershed using typing watershed modelling techniques for rainfall runoff and soil erosion. To understand sustainable watershed approach for water quality management, storm water management, flood management and drought management.

Course Outcomes:

To acquaint the students about the preparation of the detail report of the problems and causes related to the water, land, vegetation and social aspects of specific area and their remedies through watershed planning and management.

UNIT- I (10 Hrs.)

Watershed Management: Problems and prospects, watershed based land use planning, watershed characteristics, physical and geomorphologic, factors affecting watershed management, hydrologic data for watershed planning.

UNIT- II (12 Hrs.)

Watershed Delineation: Delineation of priority watershed, water yield assessment and measurement from a watershed; hydrologic and hydraulic design of earthen embankments and diversion structures, Micro-catchments farming, Irrigation with saline water, Hi-tech irrigation methods, Reducing water losses, Forestry, Rain water management.

UNIT- III (10 Hrs.)

Sediment yield estimation and measurement from a watershed and sediment yield models; rainwater conservation technologies - in-situ and storage, design of water harvesting tanks and ponds; water budgeting in a watershed; effect of cropping system.

UNIT- IV (8 Hrs.)

Land management and cultural practices on watershed hydrology; evaluation and monitoring of watershed programmes; people's participation in watershed management programmes. Dry land farming, techniques based on watershed characteristics.

Recommended Books:

1. N.V.V. Dhruva, G. Sastry and U.S. Patnaik, 'Watershed Management', Indian Council of Agricultural Research, New Delhi, 1990.
2. R. Suresh, 'Soil and Water Conservation Engineering', Standard Publishers Distributors, New Delhi, 2002.
3. J.V.S. Murty, 'Watershed Management', 2nd Edn., New Age International Publishers, New Delhi, 2004.
4. K.V.S. Rao, 'Watersheds: Comprehensive Development', B.S. Publications, Hyderabad, 2003.
5. G. Singh, C. Venkataraman, G. Sastry and B.P. Joshi, 'Manual of Soil and Water Conservation Practices', Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 1990.

CROP PROCESS ENGINEERING LAB.

Subject Code: BTAG-841

L T P C

0 0 2 1

EXPERIMENTS

1. Preparation of flow and layout charts of a food processing plant
2. Determination of fineness modulus and uniformity index
3. Performance evaluation of hammer mill
4. Performance evaluation of attrition mill
5. Study of cleaning equipment
6. Separation behaviour in pneumatic separation
7. Study of grading equipment
8. Evaluation of performance of indented cylinder and screen pre-cleaner
9. Mixing index and study of mixers
10. Study of conveying equipment
11. Performance evaluation of bucket elevator.

WATERSHED PLANNING AND MANAGEMENT LAB.

Subject Code: BAGE2-742

L T P C

0 0 2 1

EXPERIMENTS

1. Exercises on delineation of watersheds using toposheets.
2. Surveying and preparation of watershed map.
3. Quantitative analysis of watershed characteristics and parameters.
4. Watershed investigations for planning and development.
5. Analysis of hydrologic data for planning watershed management.
6. Water budgeting of watersheds.
7. Prioritization of watersheds based on sediment yield index.
8. Study of functional requirement of watershed development structures.
9. Study of watershed management technologies.
10. Practice on software's for analysis of hydrologic parameters of watershed.
11. Study of role of various functionaries in watershed development programmes.
12. Techno-economic viability analysis of watershed projects. Visit to watershed development project areas.

**B.Sc. AGRICULTURE SYLLABUS 2016 BATCH ONWARDS UPDATED ON
14.11.2018**

6 th SEMESTER		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BAGE1-666	Diseases of Field Crops and their Management	2	0	0	40	60	100	2
BAGE1-667	Introduction to Post Harvest Technology	2	0	0	40	60	100	2
BAGE1-668	Breeding of Field and Horticultural Crops	2	0	0	40	60	100	2
BAGE1-669	Protected Cultivation of Horticultural Crops	2	0	0	40	60	100	2
BAGE1-670	Renewable Energy	1	0	0	40	60	100	1
BAGE1-671	Fundamentals of Agribusiness Management and Entrepreneurship Development	2	1	0	40	60	100	2
BAGE1-672	Environmental Science and Disaster Management	3	0	0	40	60	100	3
BAGE1-673	Fundamentals of Rural Sociology and Educational Psychology	2	1	0	40	60	100	3
BAGE1-674	Diseases of Field Crops and their Management Lab.	0	0	2	40	60	100	2
BAGE1-675	Introduction to Post Harvest Technology Lab.	0	0	2	60	40	100	1
BAGE1-676	Breeding of Field and Horticultural Crops Lab.	0	0	2	60	40	100	1
BAGE1-677	Protected Cultivation of Horticultural Crops Lab.	0	0	2	60	40	100	1
BAGE1-678	Renewable Energy Lab.	0	0	2	60	40	100	1
BAGE1-679	Practical Crop Production-II (Rabi Crops)	0	0	2	60	40	100	1
Total		16	2	14	660	740	1400	24

Overall

Semester	Marks	Credits
1 st	1500	24
2 nd	1500	26
3 rd	1400	25
4 th	1500	24
5 th	1600	23
6 th	1400	24
Total	8900	146

DISEASE OF FIELD CROPS & THEIR MANAGEMENT

Subject Code: BAGE1-666

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

Duration: 27 Hrs.

Unit-I

Symptoms, economic importance, causal organism, etiology, disease cycle and management of major diseases of Rice: blast, brown leaf spot, bacterial leaf blight, False smut, Foot rot, khaira, false smut, sheath rot Maize: bacterial stalk rots and downy mildew.

Symptoms, economic importance, causal organism, etiology, disease cycle and management of major diseases Sorghum: seed rot and seedling mortality. Bajra: downy mildew/ green ear disease, and ergot. Groundnut: Tikka/cercospora leaf spot, collar and seed rot.

Unit-II

Symptoms, economic importance, causal organism, etiology, disease cycle and management of major diseases Mungbean: Yellow bean mosaic disease, cercospora leaf spot, root rot and rhizoctonia blight.

Symptoms, economic importance, causal organism, etiology, disease cycle and management of major diseases of Cotton: cotton leaf curl, wilt, angular leaf spot and root rot of cotton

Unit-III

Symptoms, economic importance, causal organism, etiology, disease cycle and management of major diseases of wheat crops: rusts, loose smut, karnal bunt, flag smut and ear cockle.

Symptoms, economic importance, causal organism, etiology, disease cycle and management of major diseases of Sugarcane: red rot, smut, pineapple disease, red stripe of sugarcane.

Symptoms, economic importance, causal organism, etiology, disease cycle and management of major diseases of following diseases of Mustard: alternaria blight, white rust, downy mildew, phyllody.

Unit-IV

Symptoms, economic importance, causal organism, etiology, disease cycle and management of major diseases of following diseases of Potato: early and late blight, black scurf, leaf curl, and potato scab

Symptoms, economic importance, causal organism, etiology, disease cycle and management of major diseases of Barseem: stem rot

Recommended Books:

1. Chattopadhyaya, 'Introductory Mycology'.
2. SB, 'Fungi and Plant Diseases'.
3. R.S. Singh, 'Plant Diseases'.
4. R.P. Singh, 'Plant Pathology'.
5. G.L. Chopra, 'Fungi'.
6. B.P. Pandey, 'Plant Pathology'.
7. Package of Practices for Crops of Punjab Rabi and Kharif Crops PAU.

INTRODUCTION TO POST HARVEST TECHNOLOGY

Subject Code: BAGE1-667

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

Duration: 27 Hrs.

Unit-1

Food production and consumption trends in India; Causes of food spoilage; importance of Post-Harvest Technology, status of food industry in India; Food safety, adulteration and food laws.

Unit-2

Maturity indices, harvesting and post-harvest handling, Maturity and ripening process- Factors affecting ripening and deterioration of fruits and vegetables, Chemicals used for delaying and hastening, ripening. Methods of storage and low cost storage structures.

Unit-3

Methods and types of cleaning, grading, storage, packing, packaging, cushioning materials; transport, type of containers, post-harvest technology for export of horticultural crops with specific reference to SPS standards. Cost estimation and economic analysis; Winnowing; Groundnut decorticators. Maize and castor shellers.

Unit-4

Value Addition Concept: Principles and method of preservation of fruits and vegetables. Drying / dehydration of fruits and vegetables - concept and methods, osmotic drying.

Recommended Books:

1. S. Saraswathy, 'Post-Harvest Management of Horticulture Crops'.
2. K.P. Sudeer, 'Post-Harvest Technology of Horticulture Crops'.
3. 'Prevention of Post-Harvest Losses, Fruits, Vegetables and Root Crops', FAO.
4. Kallia, Manoranjan and Sood Sangeeta, 'Food Preservation and Processing'.
5. Sadhana Pandey and P.H. Pandey, 'Post-Harvest Management and Horticulture Crops'.
6. P.H. Pandey, 'Principles and Practices of Post-Harvest Technology'.
7. 'Vegetable Products', 2nd Edn., Tata McGraw Hill Publishing Co. Ltd., New Delhi.
8. P.H. Pandey, 'Principles & Practices of Post-Harvest Technology'.

BREEDING OF FIELD AND HORTICULTURAL CROPS

Subject Code: BAGE1-668

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

Duration: 27 Hrs.

Unit-I

Breeding objectives and concepts of breeding self-pollinated, cross-pollinated and vegetative propagated crops; Origin of crops and distribution of species, wild relatives and forms, Cereals, (rice, wheat, maize and millets); Pulses (red gram, green gram, black gram, soybean); Oilseeds (groundnut, sesame, sunflower, brassicas) etc, Fibres (Cotton) etc, Vegetables (tomato, potato, onion, okra); Flower crops (chrysanthemum, rose, gaillardia and marigold); Fruits (citrus, amla, guava, mango, papaya)

Unit-II

Hardy-Weinberg Law; Biometrical genetics- definition and concept; Variability types & method of assessment, gene effects i.e. additive, dominance and epistasis; Genotype x Environment interaction and its significance in crop improvement

Unit-III

Breeding methods for development of varieties/hybrids in various crops; Ideotype concept in crop improvement; Plant genetic resources their conservation and utilization in crop improvement; IPR and its related issues.

Unit-IV

Variability in pathogen and pests; Mechanisms of resistance in plants to pathogens and pests; Genetic basis of adaptability to unfavourable environments; Breeding for resistance to biotic and abiotic stresses.

Recommended Books:

1. G.S. Chahal and S.S. Gosal, 'Principles and Procedures of Plant Breeding'.
2. Walter R. Fehr, 'Principles of Cultivar Development: Theory and Technique', Vol.-1.
3. B.D. Singh, 'Plant Breeding Principles and Methods'.
4. S.S. Singh, 'Handbook of Agriculture Compiled', Kalyani Publishers, New Delhi.

5. Hari Har Ram, 'Vegetable Breeding-Principles and Practices'.
6. P.K. Ray, 'Breeding Tropical and Subtropical Fruits'.

PROTECTED CULTIVATION OF HORTICULTURAL CROPS

Subject Code: BAGE1-669

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

Duration: 27 Hrs.

Unit-I

Protected cultivation introduction, objectives, importance and scope of protected cultivation, planning, design and types of protected structures nursery raising techniques.

Unit-II

Environmental factors affecting the protected cultivation of horticultural crops. Different growing media irrigation and fertigation. Sustainable land use system maximising land use efficiency in protected structure. Materials of construction for traditional and low cost green houses. Different irrigation system used in green houses.

Unit-III

Criteria for selection of crop under the protected cultivation. Problems of growing horticulture crops in protected structures. Different soil sterilization techniques in protected cultivation, nutrient film technique (NFT)/ hydroponics.

Unit-IV

Pest management in green house crops. Varieties suitable for protected cultivation. Specific technology for raising tomato, sweet pepper, cucumber, rose, lillium, chrysanthemum, carnation.

Recommended Books:

1. Adikant Pardan, 'Protected Cultivation'.
2. Brahma Singh & Balraj Singh, 'Advances in Protected Cultivation'.
3. D.K. Singh, 'Protected Cultivation of Horticultural Crops'.
4. Balraj Singh, 'Protected Cultivation of Vegetables'.

RENEWABLE ENERGY

Subject Code: BAGE1-670

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

Duration: 14 Hrs.

UNIT-I

Energy sources- Introduction and classification. Types of biogas plants and utilization of biogas. Agricultural wastes.

UNIT-II

Principles of combustion, pyrolysis and gasification. Types of gasifiers. Producer gas and its utilization. Briquettes- briquetting machine, uses of briquettes.

UNIT-III

Solar energy- solar flat plate and focusing plate collectors. Introduction to solar air heaters, cookers, water heating systems, grain dryers, refrigeration system, ponds, lantern, street lights, fencing and pumping systems.

UNIT-IV

Wind energy- types and application of wind mills. Liquid bio fuels- biodiesel and ethanol from agricultural produce and its uses.

Recommended Books:

1. Kothari, 'Renewable Energy Sources & Emerging Technology'.
2. Solanki, 'Renewable Energy Technologies- A Practical Guide for Beginners'.
3. Boyle, 'Renewable Energy- Power for Suitable Future'.

**FUNDAMENTALS OF AGRI-BUSINESS MANAGEMENT AND
ENTREPRENEURSHIP DEVELOPMENT**

Subject Code: BAGE1-671

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

Duration: 40 Hrs.

Unit-I

Agri-business- meaning, definition, features and structure of agri-business (input, farm and processing sectors); Role of entrepreneurship in business, Importance of agri-business in the Indian economy; Management- definitions, importance and functions.

Unit-II

Planning- meaning, definition and process; Types of plans and characteristics of a sound plan; Introduction to organizing, staffing, directing and controlling. Introduction to marketing management, Components of marketing mix.

Unit-III

Project definitions; Project cycle- identification, formulation, appraisal, implementation, monitoring and evaluation. Entrepreneurship development; Concept of Entrepreneurship development, Entrepreneurship and Managerial Characteristics.

Unit-IV

Overview of Indian social, political and economic systems and implications for decision making by individual entrepreneurs; Procedure and constraints in setting up agro-based industries in India.

Recommended Books:

1. Joginder Singh and R.K. Lekhi, 'Agricultural Marketing, Trade and Prices', Kalyani Publishers, Ludhiana.
2. S.R Panigrahy, 'Objective Agribusiness Management', Amazon India.
3. Shoji Lal Bairwa, 'Fundamentals of Agribusiness Management', Kalyani Publishers.
4. Jay T. Akridge, Freddie Barnard, Frank J. Dooley, 'Agribusiness Management'.

ENVIRONMENTAL SCIENCE AND DISASTER MANAGEMENT

Subject Code: BAGE1-672

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

Duration: 40 Hrs.

Unit-I

Environment: Basic concepts scope and importance. Natural Resources - renewable and non-renewable resources and their sustainable utilization. Ecosystem concepts - types, structure and functions of ecosystem. Pollution of water, air, soil, noise, thermal and nuclear hazard. Types, causes, methods of measurement, standards and management.

Unit-II

Solid and liquid waste management - treatment and disposal. Vulnerability, adaptability and sustainable development; International conventions and treaties. Biodiversity and conservation - value, utilization and threats.

Unit-III

Threatened/endangered species and hotspots. Human population and environment - environment and human health. Environment management laws and conservation projects of Government of India. Climate change - history and future projections, greenhouse gases, effects and mitigation strategies.

Unit-IV

Natural Disasters: Causes, phenomenon and impacts; Global and national events for disaster management; Agricultural Disaster phenomenon, events and their management; Acts and policies in India.

Recommended Books:

1. Menakashi Verma, 'Environmental Studies'.
2. D.K. Asthana, Meena Asthana, 'Text Book of Environmental Studies', S. Chand.
3. Mukesh Kapoor, 'Disaster Management'.

**FUNDAMENTALS OF RURAL SOCIOLOGY AND EDUCATIONAL
PSYCHOLOGY**

Subject Code: BAGE1-673

L T P C

Duration: 40 Hrs.

2 1 0 3

Unit-1

Introduction and importance of rural sociology in agricultural extension; Social characteristics of Indian social groups; Factors in formation and organization of groups; Motivation in group formation and role of social groups in agricultural extension process

Unit-2

Social stratification: class, caste systems, culture, custom, folk ways, mores, taboos, rituals, traditions, social values and attributes; their meaning and role in agriculture development.

Unit-3

Various rural institutions- their functioning and role in the social set-up, Social control, social change and associated parameters

Unit-4

Leadership- different methods of identification of leaders and their training needs, Scope and importance of educational psychology; intelligence and personality; Teaching-learning process, principles of learning and their importance in teaching

Recommended Books:

1. Guha Krishna, 'Principals of Sociology', Kalyani Publishers.
2. R. Velusamy, 'Rural Sociology and Educational Psychology', Amazon India.
3. T.C. Aggarwal, 'Fundamental of Psychological and Philosophical Sociology', Amazon India.

DISEASES OF FIELD CROPS AND THEIR MANAGEMENT LAB.

Subject Code: BAGE1-674

L T P C

Duration: 27 Hrs.

0 0 2 1

Identification and study of symptoms of important diseases of field crops in laboratory covered in theory. Field visit for the diagnosis of field problems. Collection and preservation of plant diseased specimens for herbarium.

INTRODUCTION TO POST HARVEST TECHNOLOGY LAB.

Subject Code: BAGE1-675

L T P C

Duration: 27 Hrs.

0 0 2 1

Judging maturity and physical parameters, machinery use for preservation, storage, drying etc; quality assessment of value added product; precooling of Horticultural crops, effect of ethylene on ripening of fruits; visit to local market, cold storage, packing houses and processing unit of milk. Study of winnowers, groundnut decorticator and maize shellers.

BREEDING OF FIELD AND HORTICULTURAL CROPS LAB.

Subject Code: BAGE1-676

L T P C
0 0 2 1

Duration: 27 Hrs.

Handling of segregating generations-pedigree method, bulk method, back cross methods; Field layout of experiments; Field trials; Estimation of heterosis and inbreeding depression; Estimation of heritability; GCA and SCA; Estimation of variability parameters; Problems on Hardy-Weinberg Law; Study of quality characters; Sources of donors for different characters; Visit to research stations and seed production and certification plots

PROTECTED CULTIVATION OF HORTICULTURAL CROPS LAB.

Subject Code: BAGE1-677

L T P C
0 0 2 1

Duration: 27 Hrs.

Study of different types of greenhouses; Preparation of the Layout of green houses. Basis crop cultivation/ package of practices for cucumber, capsicum, tomato and roses. To get acquainted with the fertilizer application methods in green house. To calculate dosage of water soluble fertilizers in ppm. To study environment factors affecting cultivation of crops in green house. Study of covering material in green house. Visit to commercial green houses. Study about Growing media - their preparation and pasteurization/sterilization.

RENEWABLE ENERGY LAB.

Subject Code: BAGE1-678

L T P C
0 0 2 1

Duration: 27 Hrs.

Constructional details of biogas plants; Constructional details of different types of gasifiers; To study and find the efficiency of solar cooker, dryers, domestic water heater; Performance of wind mills; Field visit to biogas plants and wind mills; Bio-diesel preparation

PRACTICAL CROP PRODUCTION-II LAB.

Subject Code: BAGE1-679

L T P C
0 0 2 1

Duration: 27 Hrs.

Crop planning; Raising field crops in multiple cropping systems using improved agronomic practices; Field preparation, seed treatment, nursery raising, sowing, nutrient management, water management, weed management and management of insect pests and diseases of crops. Harvesting, threshing, drying, winnowing, storage and marketing of produce; Preparation of balance sheet including cost of cultivation, net returns per student.

MRSPTU B. PHARMACY SYLLABUS 2016 BATCH

Total Contact Hours = 36

Total Marks = 1000

Total Credits = 28

SEMESTER 1 st		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BHUM0-104	Communicative English	2	1	0	40	60	100	3
BPHA1101	Pharmacognosy-I	2	1	-	40	60	100	3
BPHA1 102	Pharmaceutical Chemistry-I(Inorganic pharmaceutical Chemistry)	3	1	-	40	60	100	4
BPHA1 103	Pharmaceutical Analysis-I	3	1	-	40	60	100	4
BCAP0 195	Computer Science & Application	2	1	-	40	60	100	3
BPHA1 104	Introduction to Dosage Form	2	1	-	40	60	100	3
BPHA1 105	Pharmacognosy-I Lab.	-	-	4	60	40	100	2
BPHA1 106	Pharmaceutical Chemistry-I Lab. (Inorganic pharmaceutical Chemistry)	-	-	4	60	40	100	2
BPHA1 107	Pharmaceutical Analysis-I Lab.	-	-	4	60	40	100	2
BCAP0196	Computer Science & Applications Lab.	-	-	4	60	40	100	2
Total		14	6	16	480	520	1000	28

Total Contact Hours = 37/39

Total Marks = 1000/1100

Total Credits = 29/30

SEMESTER 2 nd		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BPHA1-208	Human Anatomy and Physiology-I	3	1	-	40	60	100	4
BPHA1-209	Pharmaceutical Organic Chemistry - I	3	1	-	40	60	100	4
BPHA1-210	Biochemistry	3	1	-	40	60	100	4
BPHA1-211	Physical Pharmaceutics-I	3	1	-	40	60	100	4
*BPHA1-212/ *BPHA1-213	Remedial Biology/Remedial Mathematics	2/3	-	-	40	60	100	2/3
BPHA1-214	Environmental Sciences	3	-	-	40	60	100	3
BPHA1-215	Human Anatomy and Physiology –I Lab	-	-	4	60	40	100	2
BPHA1-216	Pharmaceutical Organic Chemistry- I Lab	-	-	4	60	40	100	2
BPHA1-217	Biochemistry – Lab	-	-	4	60	40	100	2
BPHA1-218	Physical Pharmaceutics I - Lab	-	-	4	60	40	100	2
BPHA1-219	Remedial Biology - Lab	-	-	2	60	40	100	1
Total		17/18	4	16/18	480/540	520/560	1000 / 1100	30

* Non-medical students opt for Remedial Biology and Medical students opt for remedial mathematics

MRSPTU B. PHARMACY SYLLABUS 2016 BATCH

Total Contact Hrs. = 36

Total Marks = 900

Total Credits = 28

SEMESTER 3 rd		Contact Hrs..			Marks			Credits
Course Code	Subject Name	L	T	P	Int.	Ext.	Total	
BPHA1-320	Pharmaceutical Organic Chemistry-II	3	1	-	40	60	100	4
BPHA1-321	Pharmaceutical Microbiology	3	1	-	40	60	100	4
BPHA1-322	Pharmaceutical Engineering	3	1	-	40	60	100	4
BPHA1-323	Human Anatomy and Physiology-II	3	1	-	40	60	100	4
BPHA1-324	Pathophysiology	3	1	-	40	60	100	4
BPHA1-325	Pharmaceutical Organic Chemistry-II Lab.	-	-	4	60	40	100	2
BPHA1-326	Pharmaceutical Microbiology Lab.	-	-	4	60	40	100	2
BPHA1-327	Pharmaceutical Engineering Lab.	-	-	4	60	40	100	2
BPHA1-328	Human Anatomy and Physiology-II Lab.	-	-	4	60	40	100	2
Total		15	5	16	440	460	900	28

Total Contact Hours = 36

Total Marks = 900

Total Credits = 28

SEMESTER 4 th		Contact Hrs..			Marks			Credits
Course Code	Subject Name	L	T	P	Int.	Ext.	Total	
BPHA1-429	Pharmaceutical Organic Chemistry –III	3	1	-	40	60	100	4
BPHA1-430	Medicinal Chemistry – I	3	1	-	40	60	100	4
BPHA1-431	Pharmacology-I	3	1	-	40	60	100	4
BPHA1-432	Physical Pharmaceutics-II	3	1	-	40	60	100	4
BPHA1-433	Pharmacognosy and Phytochemistry- I	3	1	-	40	60	100	4
BPHA1-434	Medicinal Chemistry – I Lab.	-	-	4	60	40	100	2
BPHA1-435	Pharmacology-I Lab.	-	-	4	60	40	100	2
BPHA2-436	Physical Pharmaceutics- II Lab.	-	-	4	60	40	100	2
BPHA1-437	Pharmacognosy and Phytochemistry I Lab.	-	-	4	60	40	100	2
Total		15	5	16	440	460	900	28

NOTE: From 5th Semester onwards, Codes of subjects given in scheme will be followed.

Total Contact Hours =32 Total Marks = 800 Total Credits = 26

SEMESTER 5 th		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BPHA1-538	Medicinal Chemistry-II	3	1	-	40	60	100	4
BPHA1-539	Industrial Pharmacy-I	3	1	-	40	60	100	4
BPHA1-540	Pharmacology-II	3	1	-	40	60	100	4
BPHA1-541	Pharmacognosy and Phytochemistry II	3	1	-	40	60	100	4
BPHA1-542	Pharmaceutical Jurisprudence	3	1	-	40	60	100	4
BPHA1-543	Industrial Pharmacy-I Lab.	-	-	4	60	40	100	2
BPHA1-544	Pharmacology-II Lab.	-	-	4	60	40	100	2
BPHA1-545	Pharmacognosy and Phytochemistry-II Lab.	-	-	4	60	40	100	2
Total		15	5	12	380	420	800	26

Total Contact Hours = 36 Total Marks = 900 Total Credits = 30

SEMESTER 6 th		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BPHA1-646	Medicinal Chemistry-III -Theory	3	1	-	40	60	100	4
BPHA1-647	Pharmacology-III -Theory	3	1	-	40	60	100	4
BPHA1-648	Herbal Drug Technology -Theory	3	1	-	40	60	100	4
BPHA1-649	Biopharmaceutical and Pharmacokinetics - Theory	3	1	-	40	60	100	4
BPHA1-650	Pharmaceutical Biotechnology- Theory	3	1	-	40	60	100	4
BPHA1-651	Quality Assurance Theory	3	1	-	40	60	100	4
BPHA1-652	Medicinal Chemistry-III -Practical	-	-	4	60	40	100	2
BPHA1-653	Pharmacology-III -Practical	-	-	4	60	40	100	2
BPHA1-654	Herbal Drug Technology-Practical	-	-	4	60	40	100	2
Total		18	6	12	420	480	900	30

MRSPTU B. PHARMACY SYLLABUS 2016 BATCH

Total Contact Hrs. = 32

Total Marks = 600

Total Credits = 24

SEMESTER 7 th		Contact Hrs..			Marks			Credits
Course Code	Subject Name	L	T	P	Int.	Ext.	Total	
BPHA1-755	Instrumental Methods of Analysis	3	1	-	40	60	100	4
BPHA1-756	Industrial Pharmacy-II	3	1	-	40	60	100	4
BPHA1-757	Pharmacy Practice	3	1	-	40	60	100	4
BPHA1-758	Novel Drug Delivery System	3	1	-	40	60	100	4
BPHA1-759	Instrumental Methods of Analysis-Lab.	-	-	4	40	60	100	2
BPHA1-760	Practice School*	-	-	12	100	-	100	6
Total		12	4	16	300	300	600	24

*non University Examination

Total Contact Hours = 28

Total Marks = 900

Total Credits = 22

SEMESTER 8 th		Contact Hrs..			Marks			Credits
Course Code	Subject Name	L	T	P	Int.	Ext.	Total	
BPHA1-861	Biostatistics and Research Methodology	3	1	-	40	60	100	4
BPHA1-862	Social and Preventive Medicine	3	1	-	40	60	100	4
Departmental Electives (Choose any two)		3+3 = 6	1+1 = 2	-	40+40 = 80	60+60 = 120	100+ 100 =200	4+4=8
BPHA1-863	Pharm Marketing Management							
BPHA1-864	Pharmaceutical Regulatory Sciences							
BPHA1-865	Pharmacovigilance							
BPHA1-866	Quality Control and Standardization of Herbals							
BPHA1-867	Computer aided Drug Design							
BPHA1-868	Cell and Molecular Biology							
BPHA1-869	Cosmetic Sciences							
BPHA1-870	Experimental Pharmacology							
BPHA1-871	Advanced instrumentation Techniques							
BPHA1-872	Dietary Supplements and Nutraceuticals							
BPHA1-873	Project Work*	-	-	12	100	-	100	6
Total		12	4	12	260	240	500	22

* The subject experts shall conduct examinations

Overall

Semester	Marks	Credits
1 st	1000	28
2 nd	1000/1100	30
3 rd	900	28
4 th	900	28
5 th	800	26
6 th	900	30
7 th	600	24
8 th	500	22
Total	6600/6700	216

SEMESTER V

BP501T. MEDICINAL CHEMISTRY – II (Theory)

45 Hours

Scope: This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.

Objectives: Upon completion of the course the student shall be able to

1. Understand the chemistry of drugs with respect to their pharmacological activity
2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
3. Know the Structural Activity Relationship of different class of drugs
4. Study the chemical synthesis of selected drugs

Course Content:

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (*)

UNIT- I

10 Hours

Antihistaminic agents: Histamine, receptors and their distribution in the humanbody

H₁-antagonists: Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamines succinate, Clemastine fumarate, Diphenylphyraline hydrochloride, Tripelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Buclizine hydrochloride, Chlorpheniramine maleate, Triprolidine hydrochloride*, Phenidamine tartarate, Promethazine hydrochloride*, Trimeprazine tartrate, Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetrazine Cromolyn sodium

H₂-antagonists: Cimetidine*, Famotidine, Ranitidin.

Gastric Proton pump inhibitors: Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole

Anti-neoplastic agents:

Alkylating agents: Meclourethamine*, Cyclophosphamide, Melphalan,

Chlorambucil, Busulfan, Thiotepa

Antimetabolites: Mercaptopurine*, Thioguanine, Fluorouracil, Floxuridine, Cytarabine, Methotrexate*, Azathioprine

Antibiotics: Dactinomycin, Daunorubicin, Doxorubicin, Bleomycin

Plant products: Etoposide, Vinblastin sulphate, Vincristin sulphate

Miscellaneous: Cisplatin, Mitotane.

UNIT – II

10 Hours

Anti-anginal:

Vasodilators: Amyl nitrite, Nitroglycerin*, Pentaerythritol tetranitrate, Isosorbide dinitrite*, Dipyridamole.

Calcium channel blockers: Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine.

Diuretics:

Carbonic anhydrase inhibitors: Acetazolamide*, Methazolamide, Dichlorphenamide.

Thiazides: Chlorthiazide*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide,

Loop diuretics: Furosemide*, Bumetanide, Ethacrynic acid.

Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride.

Osmotic Diuretics: Mannitol

Anti-hypertensive Agents: Timolol, Captopril, Lisinopril, Enalapril, Benazepril hydrochloride, Quinapril hydrochloride, Methyldopate hydrochloride,* Clonidine hydrochloride, Guanethidine monosulphate, Guanabenz acetate, Sodium nitroprusside, Diazoxide, Minoxidil, Reserpine, Hydralazine hydrochloride.

UNIT- III

10 Hours

Anti-arrhythmic Drugs: Quinidine sulphate, Procainamide hydrochloride, Disopyramide phosphate*, Phenytoin sodium, Lidocaine hydrochloride, Tocainide hydrochloride, Mexiletine hydrochloride, Lorcaïnide hydrochloride, Amiodarone, Sotalol.

Anti-hyperlipidemic agents: Clofibrate, Lovastatin, Cholesteramine and Cholestipol

Coagulant & Anticoagulants: Menadione, Acetomenadione, Warfarin*, Anisindione, clopidogrel

Drugs used in Congestive Heart Failure: Digoxin, Digitoxin, Nesiritide, Bosentan, Tezosentan.

UNIT- IV**08 Hours****Drugs acting on Endocrine system**

Nomenclature, Stereochemistry and metabolism of steroids

Sex hormones: Testosterone, Nandralone, Progesterones, Oestriol, Oestradiol, Oestrione, Diethyl stilbestrol.**Drugs for erectile dysfunction:** Sildenafil, Tadalafil.**Oral contraceptives:** Mifepristone, Norgestril, Levonorgestrol**Corticosteroids:** Cortisone, Hydrocortisone, Prednisolone, Betamethasone, Dexamethasone**Thyroid and antithyroid drugs:** L-Thyroxine, L-Thyronine, Propylthiouracil, Methimazole.**UNIT – V****07 Hours****Antidiabetic agents:**

Insulin and its preparations

Sulfonyl ureas: Tolbutamide*, Chlorpropamide, Glipizide, Glimepiride.

Biguanides: Metformin.

Thiazolidinediones: Pioglitazone, Rosiglitazone.

Meglitinides: Repaglinide, Nateglinide.

Glucosidase inhibitors: Acarbose, Voglibose.

Local Anesthetics: SAR of Local anesthetics**Benzoic Acid derivatives;** Cocaine, Hexylcaine, Meprylcaine, Cyclomethycaine, Piperocaine.**Amino Benzoic acid derivatives:** Benzocaine*, Butamben, Procaine*, Butacaine, Propoxycaine, Tetracaine, Benoxinate.**Lidocaine/Anilide derivatives:** Lignocaine, Mepivacaine, Prilocaine, Etidocaine.**Miscellaneous:** Phenacaine, Dipiperodon, Dibucaine.***Recommended Books (Latest Editions)**

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1to 5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

BP 502 T. Industrial PharmacyI (Theory)

45 Hours

Scope: Course enables the student to understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.

Objectives: Upon completion of the course the student shall be able to

1. Know the various pharmaceutical dosage forms and their manufacturing techniques.
2. Know various considerations in development of pharmaceutical dosage forms
3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality

Course content:

3 hours/ week

UNIT-I

07 Hours

Preformulation Studies: Introduction to preformulation, goals and objectives, study of physicochemical characteristics of drug substances.

a. Physical properties: Physical form (crystal & amorphous), particle size, shape, flow properties, solubility profile (pKa, pH, partition coefficient), polymorphism

b. Chemical Properties: Hydrolysis, oxidation, reduction, racemisation, polymerization

BCS classification of drugs & its significant

Application of preformulation considerations in the development of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.

UNIT-II

10 Hours

Tablets:

- a. Introduction, ideal characteristics of tablets, classification of tablets. Excipients, Formulation of tablets, granulation methods, compression and processing problems. Equipments and tablet tooling.
- b. Tablet coating: Types of coating, coating materials, formulation of coating composition, methods of coating, equipment employed and defects in coating.
- c. Quality control tests: In process and finished product tests

Liquid orals: Formulation and manufacturing consideration of syrups and elixirs suspensions and emulsions; Filling and packaging; evaluation of liquid orals official in pharmacopoeia

UNIT-III

08 Hours

Capsules:

- a. **Hard gelatin capsules:** Introduction, Production of hard gelatin capsule shells. size of capsules, Filling, finishing and special techniques of formulation of hard gelatin capsules, manufacturing defects. In process and final product quality control tests for capsules.
- b. **Soft gelatin capsules:** Nature of shell and capsule content, size of capsules, importance of base adsorption and minim/gram factors, production, in process and final product quality control tests. Packing, storage and stability testing of soft gelatin capsules and their applications.

Pellets: Introduction, formulation requirements, pelletization process, equipments for manufacture of pellets

UNIT-IV

10 Hours

Parenteral Products:

- a. Definition, types, advantages and limitations. Preformulation factors and essential requirements, vehicles, additives, importance of isotonicity
- b. Production procedure, production facilities and controls, aseptic processing
- c. Formulation of injections, sterile powders, large volume parenterals and lyophilized products.
- d. Containers and closures selection, filling and sealing of ampoules, vials and infusion fluids. Quality control tests of parenteral products.

Ophthalmic Preparations: Introduction, formulation considerations; formulation of eye drops, eye ointments and eye lotions; methods of preparation; labeling, containers; evaluation of ophthalmic preparations

UNIT-V

10 Hours

Cosmetics: Formulation and preparation of the following cosmetic preparations: lipsticks, shampoos, cold cream and vanishing cream, tooth pastes, hair dyes and sunscreens.

Pharmaceutical Aerosols: Definition, propellants, containers, valves, types of aerosol systems; formulation and manufacture of aerosols; Evaluation of aerosols; Quality control and stability studies.

Packaging Materials Science: Materials used for packaging of pharmaceutical products, factors influencing choice of containers, legal and official requirements for containers, stability aspects of packaging materials, quality control tests.

BP 506 P. Industrial PharmacyI (Practical)

4 Hours/week

1. Preformulation studies on paracetamol/asparin/or any other drug
2. Preparation and evaluation of Paracetamol tablets
3. Preparation and evaluation of Aspirin tablets
4. Coating of tablets- film coating of tables/granules
5. Preparation and evaluation of Tetracycline capsules
6. Preparation of Calcium Gluconate injection
7. Preparation of Ascorbic Acid injection
8. Qulaity control test of (as per IP) marketed tablets and capsules
9. Preparation of Eye drops/ and Eye ointments
10. Preparation of Creams (cold / vanishing cream)
11. Evaluation of Glass containers (as per IP)

Recommended Books: (Latest Editions)

1. Pharmaceutical dosage forms - Tablets, volume 1 -3 by H.A. Liberman, Leon Lachman &J.B.Schwartz
2. Pharmaceutical dosage form - Parenteral medication vol- 1&2 by Liberman & Lachman
3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman
4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition
5. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS)
6. Theory and Practice of Industrial Pharmacy by Liberman & Lachman
7. Pharmaceutics- The science of dosage form design by M.E.Aulton, Churchill livingstone, Latest edition
8. Introduction to Pharmaceutical Dosage Forms by H. C.Ansel, Lea &Febiger, Philadelphia, 5thedition, 2005
9. Drug stability - Principles and practice by Cartensen & C.J. Rhodes, 3rd Edition, Marcel Dekker Series, Vol 107.

BP503.T. PHARMACOLOGY-II (Theory)

45 Hours

Scope: This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body and in addition, emphasis on the basic concepts of bioassay.

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

1. Understand the mechanism of drug action and its relevance in the treatment of different diseases
2. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
3. Demonstrate the various receptor actions using isolated tissue preparation
4. Appreciate correlation of pharmacology with related medical sciences

Course Content:

UNIT-I

10hours

1. Pharmacology of drugs acting on cardio vascular system

- a. Introduction to hemodynamic and electrophysiology of heart.
- b. Drugs used in congestive heart failure
- c. Anti-hypertensive drugs.
- d. Anti-anginal drugs.
- e. Anti-arrhythmic drugs.
- f. Anti-hyperlipidemic drugs.

UNIT-II

10hours

1. Pharmacology of drugs acting on cardio vascular system

- a. Drug used in the therapy of shock.
- b. Hematinics, coagulants and anticoagulants.
- c. Fibrinolytics and anti-platelet drugs
- d. Plasma volume expanders

2. Pharmacology of drugs acting on urinary system

- a. Diuretics
- b. Anti-diuretics.

UNIT-III

10hours

3. Autocoids and related drugs

- a. Introduction to autocoids and classification
- b. Histamine, 5-HT and their antagonists.
- c. Prostaglandins, Thromboxanes and Leukotrienes.
- d. Angiotensin, Bradykinin and Substance P.
- e. Non-steroidal anti-inflammatory agents
- f. Anti-gout drugs
- g. Antirheumatic drugs

UNIT-IV**08hours****5. Pharmacology of drugs acting on endocrine system**

- a. Basic concepts in endocrine pharmacology.
- b. Anterior Pituitary hormones- analogues and their inhibitors.
- c. Thyroid hormones- analogues and their inhibitors.
- d. Hormones regulating plasma calcium level- Parathormone, Calcitonin and Vitamin-D.
- d. Insulin, Oral Hypoglycemic agents and glucagon.
- e. ACTH and corticosteroids.

UNIT-V**07hours****5. Pharmacology of drugs acting on endocrine system**

- a. Androgens and Anabolic steroids.
- b. Estrogens, progesterone and oral contraceptives.
- c. Drugs acting on the uterus.

6. Bioassay

- a. Principles and applications of bioassay.
- b. Types of bioassay
- c. Bioassay of insulin, oxytocin, vasopressin, ACTH, d-tubocurarine, digitalis, histamine and 5-HT

BP 507 P. PHARMACOLOGY-II (Practical)

4Hrs/Week

1. Introduction to *in-vitro* pharmacology and physiological salt solutions.
2. Effect of drugs on isolated frog heart.
3. Effect of drugs on blood pressure and heart rate of dog.
4. Study of diuretic activity of drugs using rats/mice.
5. DRC of acetylcholine using frog rectus abdominis muscle.
6. Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively.
7. Bioassay of histamine using guinea pig ileum by matching method.
8. Bioassay of oxytocin using rat uterine horn by interpolation method.
9. Bioassay of serotonin using rat fundus strip by three point bioassay.
10. Bioassay of acetylcholine using rat ileum/colon by four point bioassay.
11. Determination of PA₂ value of prazosin using rat anococcygeus muscle (by Schild's plot method).
12. Determination of PD₂ value using guinea pig ileum.
13. Effect of spasmogens and spasmolytics using rabbit jejunum.
14. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model.
15. Analgesic activity of drug using central and peripheral methods

Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos

Recommended Books (Latest Editions)

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins.
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology.
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
8. Modern Pharmacology with clinical Applications, by Charles R.Craig & Robert.
9. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
10. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan.

BP504 T. PHARMACOGNOSY AND PHYTOCHEMISTRY II (Theory)

45Hours

Scope: The main purpose of subject is to impart the students the knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially. Also this subject involves the study of producing the plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine

Objectives: Upon completion of the course, the student shall be able

1. to know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents
2. to understand the preparation and development of herbal formulation.
3. to understand the herbal drug interactions
4. to carryout isolation and identification of phytoconstituents

Course Content:

UNIT-I

7 Hours

Metabolic pathways in higher plants and their determination

- a) Brief study of basic metabolic pathways and formation of different secondary metabolites through these pathways- Shikimic acid pathway, Acetate pathways and Amino acid pathway.
- b) Study of utilization of radioactive isotopes in the investigation of Biogenetic studies.

UNIT-II

14 Hours

General introduction, composition, chemistry & chemical classes, biosources, therapeutic uses and commercial applications of following secondary metabolites:

Alkaloids: Vinca, Rauwolfia, Belladonna, Opium,

Phenylpropanoids and Flavonoids: Lignans, Tea, Ruta

Steroids, Cardiac Glycosides & Triterpenoids: Liquorice, Dioscorea, Digitalis

Volatile oils: Mentha, Clove, Cinnamon, Fennel, Coriander,

Tannins: Catechu, Pterocarpus

Resins: Benzoin, Guggul, Ginger, Asafoetida, Myrrh, Colophony

Glycosides: Senna, Aloes, Bitter Almond

Iridoids, Other terpenoids & Naphthaquinones: Gentian, Artemisia, taxus, carotenoids

UNIT-III

06 Hours

Isolation, Identification and Analysis of Phytoconstituents

- a) Terpenoids: Menthol, Citral, Artemisin
- b) Glycosides: Glycyrrhetic acid & Rutin
- c) Alkaloids: Atropine, Quinine, Reserpine, Caffeine
- d) Resins: Podophyllotoxin, Curcumin

UNIT-IV

10 Hours

Industrial production, estimation and utilization of the following phytoconstituents:

Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, Taxol, Vincristine and Vinblastine

UNIT V

8 Hours

Basics of Phytochemistry

Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs.

BP 508 P. PHARMACOGNOSY AND PHYTOCHEMISTRY II (Practical)

4 Hours/Week

1. Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander
2. Exercise involving isolation & detection of active principles
 - a. Caffeine - from tea dust.
 - b. Diosgenin from Dioscorea
 - c. Atropine from Belladonna
 - d. Sennosides from Senna
3. Separation of sugars by Paper chromatography
4. TLC of herbal extract
5. Distillation of volatile oils and detection of phytoconstituents by TLC
6. Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh

Recommended Books: (Latest Editions)

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Saunders & Co., London, 2009.
2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
4. Herbal drug industry by R.D. Choudhary (1996), 1st Edn, Eastern Publisher, New Delhi.
5. Essentials of Pharmacognosy, Dr.SH.Ansari, 1st edition, Birla publications, New Delhi, 2007
6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.
7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.
8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994.
9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.
10. The formulation and preparation of cosmetic, fragrances and flavours.
11. Remington's Pharmaceutical sciences.
12. Text Book of Biotechnology by Vyas and Dixit.
13. Text Book of Biotechnology by R.C. Dubey.

BP 505 T. PHARMACEUTICAL JURISPRUDENCE (Theory)

45 Hours

Scope: This course is designed to impart basic knowledge on important legislations related to the profession of pharmacy in India.

Objectives: Upon completion of the course, the student shall be able to understand:

1. The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
2. Various Indian pharmaceutical Acts and Laws
3. The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
4. The code of ethics during the pharmaceutical practice

Course Content:

UNIT-I

10 Hours

Drugs and Cosmetics Act, 1940 and its rules 1945:

Objectives, Definitions, Legal definitions of schedules to the Act and Rules

Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties.

Manufacture of drugs – Prohibition of manufacture and sale of certain drugs,

Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license.

UNIT-II

10 Hours

Drugs and Cosmetics Act, 1940 and its rules 1945.

Detailed study of Schedule G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F & DMR (OA)

Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties

Labeling & Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics, List of permitted colors. Offences and penalties.

Administration of the Act and Rules – Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors

UNIT-III

10 Hours

- **Pharmacy Act –1948:** Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils; constitution and functions, Registration of Pharmacists, Offences and

Penalties

- **Medicinal and Toilet Preparation Act –1955:** Objectives, Definitions, Licensing, Manufacture In bond and Outside bond, Export of alcoholic preparations, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties.
- **Narcotic Drugs and Psychotropic substances Act-1985 and Rules:** Objectives, Definitions, Authorities and Officers, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw, manufacture, sale and export of opium, Offences and Penalties

UNIT-IV

08 Hours

- **Study of Salient Features of Drugs and Magic Remedies Act and its rules:** Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties
- **Prevention of Cruelty to animals Act-1960:** Objectives, Definitions, Institutional Animal Ethics Committee, CPCSEA guidelines for Breeding and Stocking of Animals, Performance of Experiments, Transfer and acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties
- **National Pharmaceutical Pricing Authority:** Drugs Price Control Order (DPCO)-2013. Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM)

UNIT-V

07 Hours

- **Pharmaceutical Legislations** – A brief review, Introduction, Study of drugs enquiry committee, Health survey and development committee, Hathi committee and Mudaliar committee
- **Code of Pharmaceutical ethics** Definition, Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath
- **Medical Termination of Pregnancy Act**
- **Right to Information Act**
- **Introduction to Intellectual Property Rights (IPR)**

Recommended books: (Latest Edition)

1. Forensic Pharmacy by B. Suresh

2. Text book of Forensic Pharmacy by B.M. Mithal
3. Hand book of drug law-by M.L. Mehra
4. A text book of Forensic Pharmacy by N.K. Jain
5. Drugs and Cosmetics Act/Rules by Govt. of India publications.
6. Medicinal and Toilet preparations act 1955 by Govt. of India publications.
7. Narcotic drugs and psychotropic substances act by Govt. of India publications
8. Drugs and Magic Remedies act by Govt. of India publication
9. Bare Acts of the said laws published by Government. Reference books (Theory)

SEMESTER VI

BP601T. MEDICINAL CHEMISTRY – III (Theory)

45 Hours

Scope: This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasis on modern techniques of rational drug design like quantitative structure activity relationship (QSAR), Prodrug concept, combinatorial chemistry and Computer aided drug design (CADD). The subject also emphasizes on the chemistry, mechanism of action, metabolism, adverse effects, Structure Activity Relationships (SAR), therapeutic uses and synthesis of important drugs.

Objectives: Upon completion of the course student shall be able to

1. Understand the importance of drug design and different techniques of drug design.
2. Understand the chemistry of drugs with respect to their biological activity.
3. Know the metabolism, adverse effects and therapeutic value of drugs.
4. Know the importance of SAR of drugs.

Course Content:

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted by (*)

UNIT – I

10 Hours

Antibiotics

Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes.

-Lactam antibiotics: Penicillin, Cephalosporins, - Lactamase inhibitors, Monobactams

Aminoglycosides: Streptomycin, Neomycin, Kanamycin

Tetracyclines: Tetracycline, Oxytetracycline, Chlortetracycline, Minocycline, Doxycycline

UNIT – II

10 Hours

Antibiotics

Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes.

Macrolide: Erythromycin Clarithromycin, Azithromycin.

Miscellaneous: Chloramphenicol*, Clindamycin.

Prodrugs: Basic concepts and application of prodrugs design.

Antimalarials: Etiology of malaria.

Quinolines: SAR, Quinine sulphate, Chloroquine*, Amodiaquine, Primaquine phosphate, Pamaquine*, Quinacrine hydrochloride, Mefloquine.

Biguanides and dihydro triazines: Cycloguanil pamoate, Proguanil.

Miscellaneous: Pyrimethamine, Artesunate, Artemether, Atovaquone.

UNIT – III

10 Hours

Anti-tubercular Agents

Synthetic anti tubercular agents: Isoniazid*, Ethionamide, Ethambutol, Pyrazinamide, Para amino salicylic acid.*

Anti tubercular antibiotics: Rifampicin, Rifabutin, Cycloserine Streptomycine, Capreomycin sulphate.

Urinary tract anti-infective agents

Quinolones: SAR of quinolones, Nalidixic Acid, Norfloxacin, Enoxacin, Ciprofloxacin*, Ofloxacin, Lomefloxacin, Sparfloxacin, Gatifloxacin, Moxifloxacin

Miscellaneous: Furazolidine, Nitrofurantoin*, Methanamine.

Antiviral agents:

Amantadine hydrochloride, Rimantadine hydrochloride, Idoxuridine trifluoride, Acyclovir*, Gancyclovir, Zidovudine, Didanosine, Zalcitabine, Lamivudine, Loviride, Delavirding, Ribavirin, Saquinavir, Indinavir, Ritonavir.

UNIT – IV

08 Hours

Antifungal agents:

Antifungal antibiotics: Amphotericin-B, Nystatin, Natamycin, Griseofulvin.

Synthetic Antifungal agents: Clotrimazole, Econazole, Butoconazole, Oxiconazole Tioconazole, Miconazole*, Ketoconazole, Terconazole, Itraconazole, Fluconazole, Naftifine hydrochloride, Tolnaftate*.

Anti-protozoal Agents: Metronidazole*, Tinidazole, Ornidazole, Diloxanide, Iodoquinol, Pentamidine Isethionate, Atovaquone, Eflornithine.

Anthelmintics: Diethylcarbamazine citrate*, Thiabendazole, Mebendazole*, Albendazole, Niclosamide, Oxamniquine, Praziquantal, Ivermectin.

Sulphonamides and Sulfones

Historical development, chemistry, classification and SAR of Sulfonamides: Sulphamethizole, Sulfoxazole, Sulphamethizine, Sulfacetamide*, Sulphapyridine, Sulfamethoxazole*, Sulphadiazine, Mefenide acetate, Sulfasalazine.

Folate reductase inhibitors: Trimethoprim*, Cotrimoxazole.

Sulfones: Dapsone*.

UNIT – V

07 Hours

Introduction to Drug Design

Various approaches used in drug design.

Physicochemical parameters used in quantitative structure activity relationship (QSAR) such as partition coefficient, Hammett's electronic parameter, Taft's steric parameter and Hansch analysis.

Pharmacophore modeling and docking techniques.

Combinatorial Chemistry: Concept and applications of combinatorial chemistry: solid phase and solution phase synthesis.

BP607P. MEDICINAL CHEMISTRY- III (Practical)

4 Hours / week

I Preparation of drugs and intermediates

- 1 Sulphanilamide
- 2 7-Hydroxy, 4-methyl coumarin
- 3 Chlorobutanol
- 4 Triphenyl imidazole
- 5 Tolbutamide
- 6 Hexamine

II Assay of drugs

- 1 Isonicotinic acid hydrazide
- 2 Chloroquine
- 3 Metronidazole
- 4 Dapsone
- 5 Chlorpheniramine maleate
- 6 Benzyl penicillin

III Preparation of medicinally important compounds or intermediates by Microwave irradiation technique

IV Drawing structures and reactions using chem draw®

V Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5)

Recommended Books (Latest Editions)

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.

7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

BP602 T. PHARMACOLOGY-III (Theory)

45 Hours

Scope: This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on respiratory and gastrointestinal system, infectious diseases, immuno-pharmacology and in addition, emphasis on the principles of toxicology and chronopharmacology.

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

1. understand the mechanism of drug action and its relevance in the treatment of different infectious diseases
2. comprehend the principles of toxicology and treatment of various poisonings and
3. appreciate correlation of pharmacology with related medical sciences.

Course Content:

UNIT-I

10hours

1. Pharmacology of drugs acting on Respiratory system

- a. Anti -asthmatic drugs
- b. Drugs used in the management of COPD
- c. Expectorants and antitussives
- d. Nasal decongestants
- e. Respiratory stimulants

2. Pharmacology of drugs acting on the Gastrointestinal Tract

- a. Antiulcer agents.
- b. Drugs for constipation and diarrhoea.
- c. Appetite stimulants and suppressants.
- d. Digestants and carminatives.
- e. Emetics and anti-emetics.

UNIT-II

10hours

3. Chemotherapy

- a. General principles of chemotherapy.
- b. Sulfonamides and cotrimoxazole.
- c. Antibiotics- Penicillins, cephalosporins, chloramphenicol, macrolides, quinolones and fluoroquinolins, tetracycline and aminoglycosides

UNIT-III

10hours

3. Chemotherapy

- a. Antitubercular agents
- b. Antileprotic agents

- c. Antifungal agents
- d. Antiviral drugs
- e. Anthelmintics
- f. Antimalarial drugs
- g. Antiamoebic agents

UNIT-IV

08hours

3. Chemotherapy

- l. Urinary tract infections and sexually transmitted diseases.
- m. Chemotherapy of malignancy.

4. Immunopharmacology

- a. Immunostimulants
- b. Immunosuppressant

Protein drugs, monoclonal antibodies, target drugs to antigen, biosimilars

UNIT-V

07hours

5. Principles of toxicology

- a. Definition and basic knowledge of acute, subacute and chronic toxicity.
- b. Definition and basic knowledge of genotoxicity, carcinogenicity, teratogenicity and mutagenicity
- c. General principles of treatment of poisoning
- d. Clinical symptoms and management of barbiturates, morphine, organophosphorus compound and lead, mercury and arsenic poisoning.

6. Chronopharmacology

- a. Definition of rhythm and cycles.
- b. Biological clock and their significance leading to chronotherapy.

BP 608 P. PHARMACOLOGY-III (Practical)

4Hrs/Week

1. Dose calculation in pharmacological experiments
2. Antiallergic activity by mast cell stabilization assay
3. Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.
4. Study of effect of drugs on gastrointestinal motility
5. Effect of agonist and antagonists on guinea pig ileum
6. Estimation of serum biochemical parameters by using semi- autoanalyser
7. Effect of saline purgative on frog intestine
8. Insulin hypoglycemic effect in rabbit
9. Test for pyrogens (rabbit method)
10. Determination of acute oral toxicity (LD50) of a drug from a given data
11. Determination of acute skin irritation / corrosion of a test substance
12. Determination of acute eye irritation / corrosion of a test substance
13. Calculation of pharmacokinetic parameters from a given data
14. Biostatistics methods in experimental pharmacology(student's t test, ANOVA)
15. Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon Signed Rank test)

**Experiments are demonstrated by simulated experiments/videos*

Recommended Books (Latest Editions)

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs. The Point Lippincott Williams & Wilkins
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher Modern Pharmacology with clinical Applications, by Charles R.Craig & Robert,
8. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata,
9. Kulkarni SK. Handbook of experimental pharmacology. VallabhPrakashan,
10. N.Udupa and P.D. Gupta, Concepts in Chronopharmacology.

BP 603 T. HERBAL DRUG TECHNOLOGY (Theory)

45 hours

Scope: This subject gives the student the knowledge of basic understanding of herbal drug industry, the quality of raw material, guidelines for quality of herbal drugs, herbal cosmetics, natural sweeteners, nutraceutical etc. The subject also emphasizes on Good Manufacturing Practices (GMP), patenting and regulatory issues of herbal drugs

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

1. understand raw material as source of herbal drugs from cultivation to herbal drug product
2. know the WHO and ICH guidelines for evaluation of herbal drugs
3. know the herbal cosmetics, natural sweeteners, nutraceuticals
4. appreciate patenting of herbal drugs, GMP .

Course content:

UNIT-I

11 Hours

Herbs as raw materials

Definition of herb, herbal medicine, herbal medicinal product, herbal drug preparation

Source of Herbs

Selection, identification and authentication of herbal materials

Processing of herbal raw material

Biodynamic Agriculture

Good agricultural practices in cultivation of medicinal plants including Organic farming.

Pest and Pest management in medicinal plants: Biopesticides/Bioinsecticides.

Indian Systems of Medicine

a) Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy

b) Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika, Churna, Lehya and Bhasma.

UNIT-II

7 Hours

Nutraceuticals

General aspects, Market, growth, scope and types of products available in the market. Health benefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases, Cancer, Irritable bowel syndrome and various Gastro intestinal diseases.

Study of following herbs as health food: Alfaalfa, Chicory, Ginger, Fenugreek, Garlic, Honey, Amla, Ginseng, Ashwagandha, Spirulina

Herbal-Drug and Herb-Food Interactions: General introduction to interaction and classification. Study of following drugs and their possible side effects and interactions: Hypercium, kava-kava, Ginkobiloba, Ginseng, Garlic, Pepper & Ephedra.

UNIT-III

10 Hours

Herbal Cosmetics

Sources and description of raw materials of herbal origin used via, fixed oils, waxes, gums colours, perfumes, protective agents, bleaching agents, antioxidants in products such as skin care, hair care and oral hygiene products.

Herbal excipients:

Herbal Excipients – Significance of substances of natural origin as excipients – colorants, sweeteners, binders, diluents, viscosity builders, disintegrants, flavors & perfumes.

Herbal formulations :

Conventional herbal formulations like syrups, mixtures and tablets and Novel dosage forms like phytosomes

UNIT- IV

10 Hours

Evaluation of Drugs WHO & ICH guidelines for the assessment of herbal drugs
Stability testing of herbal drugs.

Patenting and Regulatory requirements of natural products:

- a) Definition of the terms: Patent, IPR, Farmers right, Breeder's right, Bioprospecting and Biopiracy
- b) Patenting aspects of Traditional Knowledge and Natural Products. Case study of Curcuma & Neem.

Regulatory Issues - Regulations in India (ASU DTAB, ASU DCC), Regulation of manufacture of ASU drugs - Schedule Z of Drugs & Cosmetics Act for ASU drugs.

UNIT-V

07 Hours

General Introduction to Herbal Industry

Herbal drugs industry: Present scope and future prospects.

A brief account of plant based industries and institutions involved in work on medicinal and aromatic plants in India.

Schedule T – Good Manufacturing Practice of Indian systems of medicine

Components of GMP (Schedule – T) and its objectives

Infrastructural requirements, working space, storage area, machinery and equipments, standard operating procedures, health and hygiene, documentation and records.

BP 609 P. HERBAL DRUG TECHNOLOGY (Practical)

4 hours/ week

1. To perform preliminary phytochemical screening of crude drugs.
2. Determination of the alcohol content of Asava and Arista
3. Evaluation of excipients of natural origin
4. Incorporation of prepared and standardized extract in cosmetic formulations like creams, lotions and shampoos and their evaluation.
5. Incorporation of prepared and standardized extract in formulations like syrups, mixtures and tablets and their evaluation as per Pharmacopoeial requirements.
6. Monograph analysis of herbal drugs from recent Pharmacopoeias
7. Determination of Aldehyde content
8. Determination of Phenol content
9. Determination of total alkaloids

Recommended Books: (Latest Editions)

1. Textbook of Pharmacognosy by Trease & Evans.
2. Textbook of Pharmacognosy by Tyler, Brady & Robber.
3. Pharmacognosy by Kokate, Purohit and Gokhale
4. Essential of Pharmacognosy by Dr.S.H.Ansari
5. Pharmacognosy & Phytochemistry by V.D.Rangari
6. Pharmacopoeal standards for Ayurvedic Formulation (Council of Research in Indian Medicine & Homeopathy)
7. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.

BP 604 T. BIOPHARMACEUTICS AND PHARMACOKINETICS (Theory)

45 Hours

Scope: This subject is designed to impart knowledge and skills of Biopharmaceutics and pharmacokinetics and their applications in pharmaceutical development, design of dose and dosage regimen and in solving the problems arising therein.

Objectives: Upon completion of the course student shall be able to:

1. Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.
2. Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
3. To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
4. Understand various pharmacokinetic parameters, their significance & applications.

Course Content:

UNIT-I Hours

10

Introduction to Biopharmaceutics

Absorption: Mechanisms of drug absorption through GIT, factors influencing drug absorption through GIT, absorption of drug from Non per oral extra-vascular routes, **Distribution** Tissue permeability of drugs, binding of drugs, apparent, volume of drug distribution, plasma and tissue protein binding of drugs, factors affecting protein-drug binding. Kinetics of protein binding, Clinical significance of protein binding of drugs

UNIT- II Hours

10

Elimination: Drug metabolism and basic understanding metabolic pathways renal excretion of drugs, factors affecting renal excretion of drugs, renal clearance, Non renal routes of drug excretion of drugs

Bioavailability and Bioequivalence: Definition and Objectives of bioavailability, absolute and relative bioavailability, measurement of bioavailability, *in-vitro* drug dissolution models, *in-vitro-in-vivo* correlations, bioequivalence studies, methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.

UNIT- III

10 Hours

Pharmacokinetics: Definition and introduction to Pharmacokinetics, Compartment models, Non compartment models, physiological models, One compartment open model. (a). Intravenous Injection (Bolus) (b). Intravenous infusion and (c) Extra vascular administrations. Pharmacokinetics parameters - K_E , $t_{1/2}$, V_d , AUC , K_a , Cl_t and CL_R - definitions methods of eliminations, understanding of their significance and application

UNIT- IV**08 Hours**

Multicompartment models: Two compartment open model. IV bolus

Kinetics of multiple dosing, steady state drug levels, calculation of loading and maintenance doses and their significance in clinical settings.

UNIT- V**07 Hours**

Nonlinear Pharmacokinetics: a. Introduction, b. Factors causing Non-linearity. c. Michaelis-menton method of estimating parameters, Explanation with example of drugs.

Recommended Books: (Latest Editions)

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. Merceel Dekker Inc.
6. Hand Book of Clinical Pharmacokinetics, By Milo Gibaldi and Laurie Prescott by ADIS Health Science Press.
7. Biopharmaceutics; By Swarbrick
8. Clinical Pharmacokinetics, Concepts and Applications: By Malcolm Rowland and Thomas, N. Tozen, Lea and Febrger, Philadelphia, 1995.
10. Dissolution, Bioavailability and Bioequivalence, By Abdou H.M, Mack, Publishing Company,Pennsylvania 1989.
11. Biopharmaceutics and Clinical Pharmacokinetics-An introduction 4th edition Revised and expanded by Robert F Notari Marcel Dekker Inc, New York and Basel, 1987.
12. Remington's Pharmaceutical Sciences, By Mack Publishing Company, Pennsylvania

BP 605 T. PHARMACEUTICAL BIOTECHNOLOGY (Theory)

45 Hours

Scope:

- Biotechnology has a long promise to revolutionize the biological sciences and technology.
- Scientific application of biotechnology in the field of genetic engineering, medicine and fermentation technology makes the subject interesting.
- Biotechnology is leading to new biological revolutions in diagnosis, prevention and cure of diseases, new and cheaper pharmaceutical drugs.
- Biotechnology has already produced transgenic crops and animals and the future promises lot more.
- It is basically a research-based subject.

Objectives: Upon completion of the subject student shall be able to;

1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries
2. Genetic engineering applications in relation to production of pharmaceuticals
3. Importance of Monoclonal antibodies in Industries
4. Appreciate the use of microorganisms in fermentation technology

Unit I

10 Hours

- a) Brief introduction to Biotechnology with reference to Pharmaceutical Sciences.
- b) Enzyme Biotechnology- Methods of enzyme immobilization and applications.
- c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries.
- d) Brief introduction to Protein Engineering.
- e) Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase.
- f) Basic principles of genetic engineering.

Unit II

10 Hours

- a) Study of cloning vectors, restriction endonucleases and DNA ligase.
- b) Recombinant DNA technology. Application of genetic engineering in medicine.
- c) Application of r DNA technology and genetic engineering in the production of:
 - i) Interferon
 - ii) Vaccines- hepatitis- B
 - iii) Hormones-Insulin.
- d) Brief introduction to PCR

Unit III

10 Hours

Types of immunity- humoral immunity, cellular immunity

- a) Structure of Immunoglobulins
- b) Structure and Function of MHC
- c) Hypersensitivity reactions, Immune stimulation and Immune suppressions.
- d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity.
- e) Storage conditions and stability of official vaccines
- f) Hybridoma technology- Production, Purification and Applications
- g) Blood products and Plasma Substitutes.

Unit IV

08Hours

- a) Immuno blotting techniques- ELISA, Western blotting, Southern blotting.
- b) Genetic organization of Eukaryotes and Prokaryotes
- c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons.
- d) Introduction to Microbial biotransformation and applications.
- e) Mutation: Types of mutation/mutants.

Unit V

07 Hours

- a) Fermentation methods and general requirements, study of media, equipments, sterilization methods, aeration process, stirring.
- b) Large scale production fermenter design and its various controls.
- c) Study of the production of - penicillins, citric acid, Vitamin B12, Glutamic acid, Griseofulvin,
- d) Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substitutes.

Recommended Books (Latest edition):

1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.
2. RA Goldshy et. al., : Kuby Immunology.
3. J.W. Goding: Monoclonal Antibodies.
4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology by Royal

Society of Chemistry.

5. Zaborsky: Immobilized Enzymes, CRC Press, Degraland, Ohio.
6. S.B. Primrose: Molecular Biotechnology (Second Edition) Blackwell Scientific Publication.
7. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, 2nd edition, Aditya books Ltd., New Delhi

BP606TPHARMACEUTICAL QUALITY ASSURANCE (Theory)

45 Hours

Scope: This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It deals with the important aspects like cGMP, QC tests, documentation, quality certifications and regulatory affairs.

Objectives: Upon completion of the course student shall be able to:

- understand the cGMP aspects in a pharmaceutical industry
- appreciate the importance of documentation
- understand the scope of quality certifications applicable to pharmaceutical industries
- understand the responsibilities of QA & QC departments

Course content:

UNIT – I

10 Hours

Quality Assurance and Quality Management concepts: Definition and concept of Quality control, Quality assurance and GMP

Total Quality Management (TQM): Definition, elements, philosophies

ICH Guidelines: purpose, participants, process of harmonization, Brief overview of QSEM, with special emphasis on Q-series guidelines, ICH stability testing guidelines

Quality by design (QbD): Definition, overview, elements of QbD program, tools

ISO 9000 & ISO14000: Overview, Benefits, Elements, steps for registration

NABL accreditation : Principles and procedures

UNIT - II

10 Hours

Organization and personnel: Personnel responsibilities, training, hygiene and personal records.

Premises: Design, construction and plant layout, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination.

Equipments and raw materials: Equipment selection, purchase specifications, maintenance, purchase specifications and maintenance of stores for raw materials.

UNIT – III

10 Hours

Quality Control: Quality control test for containers, rubber closures and secondary packing

materials.

Good Laboratory Practices: General Provisions, Organization and Personnel, Facilities, Equipment, Testing Facilities Operation, Test and Control Articles, Protocol for Conduct of a Nonclinical Laboratory Study, Records and Reports, Disqualification of Testing Facilities

UNIT – IV

08 Hours

Complaints: Complaints and evaluation of complaints, Handling of return good, recalling and waste disposal.

Document maintenance in pharmaceutical industry: Batch Formula Record, Master Formula Record, SOP, Quality audit, Quality Review and Quality documentation, Reports and documents, distribution records.

UNIT – V

07 Hours

Calibration and Validation: Introduction, definition and general principles of calibration, qualification and validation, importance and scope of validation, types of validation, validation master plan. Calibration of pH meter, Qualification of UV-Visible spectrophotometer, General principles of Analytical method Validation.

Warehousing: Good warehousing practice, materials management

Recommended Books: (Latest Edition)

1. Quality Assurance Guide by organization of Pharmaceutical Products of India.
2. Good Laboratory Practice Regulations, 2nd Edition, Sandy Weinberg Vol. 69.
3. Quality Assurance of Pharmaceuticals- A compendium of Guide lines and Related materials Vol I WHO Publications.
4. A guide to Total Quality Management- Kushik Maitra and Sedhan K Ghosh
5. How to Practice GMP's – P P Sharma.
6. ISO 9000 and Total Quality Management – Sadhank G Ghosh
7. The International Pharmacopoeia – Vol I, II, III, IV- General Methods of Analysis and Quality specification for Pharmaceutical Substances, Excipients and Dosage forms
8. Good laboratory Practices – Marcel Deckker Series
9. ICH guidelines, ISO 9000 and 14000 guidelines

SEMESTER VII

BP701T. INSTRUMENTAL METHODS OF ANALYSIS (Theory)

45 Hours

Scope: This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs. This subject is designed to impart a fundamental knowledge on the principles and instrumentation of spectroscopic and chromatographic technique. This also emphasizes on theoretical and practical knowledge on modern analytical instruments that are used for drug testing.

Objectives: Upon completion of the course the student shall be able to

1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
2. Understand the chromatographic separation and analysis of drugs.
3. Perform quantitative & qualitative analysis of drugs using various analytical instruments.

Course Content:

UNIT –I

10 Hours

UV Visible spectroscopy

Electronic transitions, chromophores, auxochromes, spectral shifts, solvent effect on absorption spectra, Beer and Lambert's law, Derivation and deviations.

Instrumentation - Sources of radiation, wavelength selectors, sample cells, detectors- Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode.

Applications - Spectrophotometric titrations, Single component and multi component analysis

Fluorimetry

Theory, Concepts of singlet, doublet and triplet electronic states, internal and external conversions, factors affecting fluorescence, quenching, instrumentation and applications

UNIT –II

10 Hours

IR spectroscopy

Introduction, fundamental modes of vibrations in poly atomic molecules, sample handling, factors affecting vibrations

Instrumentation - Sources of radiation, wavelength selectors, detectors - Golay cell, Bolometer, Thermocouple, Thermister, Pyroelectric detector and applications

Flame Photometry-Principle, interferences, instrumentation and applications

Atomic absorption spectroscopy- Principle, interferences, instrumentation and applications

Nepheloturbidometry- Principle, instrumentation and applications

UNIT –III

10 Hours

Introduction to chromatography

Adsorption and partition column chromatography-Methodology, advantages, disadvantages and applications.

Thin layer chromatography- Introduction, Principle, Methodology, Rf values, advantages, disadvantages and applications.

Paper chromatography-Introduction, methodology, development techniques, advantages, disadvantages and applications

Electrophoresis– Introduction, factors affecting electrophoretic mobility, Techniques of paper, gel, capillary electrophoresis, applications

UNIT –IV

08 Hours

Gas chromatography - Introduction, theory, instrumentation, derivatization, temperature programming, advantages, disadvantages and applications

High performance liquid chromatography (HPLC)-Introduction, theory, instrumentation, advantages and applications.

UNIT –V

07 Hours

Ion exchange chromatography- Introduction, classification, ion exchange resins, properties, mechanism of ion exchange process, factors affecting ion exchange, methodology and applications

Gel chromatography- Introduction, theory, instrumentation and applications

Affinity chromatography- Introduction, theory, instrumentation and applications

BP705P. INSTRUMENTAL METHODS OF ANALYSIS (Practical)

4 Hours/Week

- 1 Determination of absorption maxima and effect of solvents on absorption maxima of organic compounds
- 2 Estimation of dextrose by colorimetry
- 3 Estimation of sulfanilamide by colorimetry
- 4 Simultaneous estimation of ibuprofen and paracetamol by UV spectroscopy
- 5 Assay of paracetamol by UV- Spectrophotometry
- 6 Estimation of quinine sulfate by fluorimetry
- 7 Study of quenching of fluorescence
- 8 Determination of sodium by flame photometry
- 9 Determination of potassium by flame photometry
- 10 Determination of chlorides and sulphates by nephelo turbidometry
- 11 Separation of amino acids by paper chromatography
- 12 Separation of sugars by thin layer chromatography
- 13 Separation of plant pigments by column chromatography
- 14 Demonstration experiment on HPLC
- 15 Demonstration experiment on Gas Chromatography

Recommended Books (Latest Editions)

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
6. Organic Chemistry by I. L. Finar
7. Organic spectroscopy by William Kemp
8. Quantitative Analysis of Drugs by D. C. Garrett
9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
10. Spectrophotometric identification of Organic Compounds by Silverstein

BP 702 T. INDUSTRIAL PHARMACYII (Theory)

45 Hours

Scope: This course is designed to impart fundamental knowledge on pharmaceutical product development and translation from laboratory to market

Objectives: Upon completion of the course, the student shall be able to:

1. Know the process of pilot plant and scale up of pharmaceutical dosage forms
2. Understand the process of technology transfer from lab scale to commercial batch
3. Know different Laws and Acts that regulate pharmaceutical industry
4. Understand the approval process and regulatory requirements for drug products

Course Content:

UNIT-I

10 Hours

Pilot plant scale up techniques: General considerations - including significance of personnel requirements, space requirements, raw materials, Pilot plant scale up considerations for solids, liquid orals, semi solids and relevant documentation, SUPAC guidelines, Introduction to platform technology

UNIT-II

10 Hours

Technology development and transfer: WHO guidelines for Technology Transfer(TT): Terminology, Technology transfer protocol, Quality risk management, Transfer from R & D to production (Process, packaging and cleaning), Granularity of TT Process (API, excipients, finished products, packaging materials) Documentation, Premises and equipments, qualification and validation, quality control, analytical method transfer, Approved regulatory bodies and agencies, Commercialization - practical aspects and problems (case studies), TT agencies in India - APCTD, NRDC, TIFAC, BCIL, TBSE / SIDBI; TT related documentation - confidentiality agreement, licensing, MoUs, legal issues

UNIT-III

10 Hours

Regulatory affairs: Introduction, Historical overview of Regulatory Affairs, Regulatory authorities, Role of Regulatory affairs department, Responsibility of Regulatory Affairs Professionals

Regulatory requirements for drug approval: Drug Development Teams, Non-Clinical Drug Development, Pharmacology, Drug Metabolism and Toxicology, General considerations of Investigational New Drug (IND) Application, Investigator's Brochure (IB) and New Drug Application (NDA), Clinical research / BE studies, Clinical Research Protocols, Biostatistics in Pharmaceutical Product Development, Data Presentation for FDA Submissions, Management of Clinical Studies.

UNIT-IV**08 Hours**

Quality management systems: Quality management & Certifications: Concept of Quality, Total Quality Management, Quality by Design (QbD), Six Sigma concept, Out of Specifications (OOS), Change control, Introduction to ISO 9000 series of quality systems standards, ISO 14000, NABL, GLP

UNIT-V**07 Hours**

Indian Regulatory Requirements: Central Drug Standard Control Organization (CDSCO) and State Licensing Authority: Organization, Responsibilities, Certificate of Pharmaceutical Product (COPP), Regulatory requirements and approval procedures for New Drugs.

Recommended Books: (Latest Editions)

1. Regulatory Affairs from Wikipedia, the free encyclopedia modified on 7th April available at http://en.wikipedia.org/wiki/Regulatory_Affairs.
2. International Regulatory Affairs Updates, 2005. available at <http://www.iraup.com/about.php>
3. Douglas J Pisano and David S. Mantus. Text book of FDA Regulatory Affairs A Guide for Prescription Drugs, Medical Devices, and Biologics' Second Edition.
4. Regulatory Affairs brought by learning plus, inc. available at <http://www.cgmp.com/ra.htm>.

BP 703T. PHARMACY PRACTICE (Theory)

45 Hours

Scope: In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug information, and therapeutic drug monitoring for improved patient care. In community pharmacy, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counselling for improved patient care in the community set up.

Objectives: Upon completion of the course, the student shall be able to

1. know various drug distribution methods in a hospital
2. appreciate the pharmacy stores management and inventory control
3. monitor drug therapy of patient through medication chart review and clinical review
4. obtain medication history interview and counsel the patients
5. identify drug related problems
6. detect and assess adverse drug reactions
7. interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states
8. know pharmaceutical care services
9. do patient counseling in community pharmacy;
10. appreciate the concept of Rational drug therapy.

Unit I:

10 Hours

a) Hospital and its organization

Definition, Classification of hospital- Primary, Secondary and Tertiary hospitals, Classification based on clinical and non- clinical basis, Organization Structure of a Hospital, and Medical staffs involved in the hospital and their functions.

b) Hospital pharmacy and its organization

Definition, functions of hospital pharmacy, Organization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacists.

c) Adverse drug reaction

Classifications - Excessive pharmacological effects, secondary pharmacological effects, idiosyncrasy, allergic drug reactions, genetically determined toxicity, toxicity following sudden withdrawal of drugs, Drug interaction- beneficial interactions, adverse interactions, and pharmacokinetic drug interactions, Methods for detecting

drug interactions, spontaneous case reports and record linkage studies, and Adverse drug reaction reporting and management.

d) Community Pharmacy

Organization and structure of retail and wholesale drug store, types and design, Legal requirements for establishment and maintenance of a drug store, Dispensing of proprietary products, maintenance of records of retail and wholesale drug store.

Unit II:

10 Hours

a) Drug distribution system in a hospital

Dispensing of drugs to inpatients, types of drug distribution systems, charging policy and labelling, Dispensing of drugs to ambulatory patients, and Dispensing of controlled drugs.

b) Hospital formulary

Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary.

c) Therapeutic drug monitoring

Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring.

d) Medication adherence

Causes of medication non-adherence, pharmacist role in the medication adherence, and monitoring of patient medication adherence.

e) Patient medication history interview

Need for the patient medication history interview, medication interview forms.

f) Community pharmacy management

Financial, materials, staff, and infrastructure requirements.

Unit III:

10 Hours

a) Pharmacy and therapeutic committee

Organization, functions, Policies of the pharmacy and therapeutic committee in including drugs into formulary, inpatient and outpatient prescription, automatic stop order, and emergency drug list preparation.

b) information services

Drug

Drug and Poison information centre, Sources of drug information, Computerised services, and storage and retrieval of information.

c) Patient counseling

Definition of patient counseling; steps involved in patient counseling, and Special cases that require the pharmacist

d) Education and training program in the hospital

Role of pharmacist in the education and training program, Internal and external training program, Services to the nursing homes/clinics, Code of ethics for community pharmacy, and Role of pharmacist in the interdepartmental communication and community health education.

e) Prescribed medication order and communication skills

Prescribed medication order- interpretation and legal requirements, and Communication skills- communication with prescribers and patients.

Unit IV 8 Hours

a) Budget preparation and implementation

Budget preparation and implementation

b) Clinical Pharmacy

Introduction to Clinical Pharmacy, Concept of clinical pharmacy, functions and responsibilities of clinical pharmacist, Drug therapy monitoring - medication chart review, clinical review, pharmacist intervention, Ward round participation, Medication history and Pharmaceutical care.

Dosing pattern and drug therapy based on Pharmacokinetic & disease pattern.

c) Over the counter (OTC) sales

Introduction and sale of over the counter, and Rational use of common over the counter medications.

Unit V 7 Hours

a) Drug store management and inventory control

Organisation of drug store, types of materials stocked and storage conditions, Purchase and inventory control: principles, purchase procedure, purchase order, procurement and stocking, Economic order quantity, Reorder quantity level, and Methods used for the analysis of the drug expenditure

b) Investigational use of drugs

Description, principles involved, classification, control, identification, role of hospital pharmacist, advisory committee.

c) Interpretation of Clinical Laboratory Tests

Blood chemistry, hematology, and urinalysis

Recommended Books (Latest Edition):

1. Merchant S.H. and Dr. J.S.Quadry. *A textbook of hospital pharmacy*, 4th ed. Ahmadabad: B.S. Shah Prakakshan; 2001.
2. Parthasarathi G, Karin Nyfort-Hansen, Milap C Nahata. *A textbook of Clinical Pharmacy Practice- essential concepts and skills*, 1st ed. Chennai: Orient Longman Private Limited; 2004.
3. William E. Hassan. *Hospital pharmacy*, 5th ed. Philadelphia: Lea & Febiger; 1986.
4. Tipnis Bajaj. *Hospital Pharmacy*, 1st ed. Maharashtra: Career Publications; 2008.
5. Scott LT. *Basic skills in interpreting laboratory data*, 4th ed. American Society of Health System Pharmacists Inc; 2009.
6. Parmar N.S. *Health Education and Community Pharmacy*, 18th ed. India: CBS Publishers & Distributers; 2008.

Journals:

1. Therapeutic drug monitoring. ISSN: 0163-4356
2. Journal of pharmacy practice. ISSN : 0974-8326
3. American journal of health system pharmacy. ISSN: 1535-2900 (online)
4. Pharmacy times (Monthly magazine)

BP 704T: NOVEL DRUG DELIVERY SYSTEMS (Theory)

45 Hours

Scope: This subject is designed to impart basic knowledge on the area of novel drug delivery systems.

Objectives: Upon completion of the course student shall be able

1. To understand various approaches for development of novel drug delivery systems.
2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation

Course content:

Unit-I

10 Hours

Controlled drug delivery systems: Introduction, terminology/definitions and rationale, advantages, disadvantages, selection of drug candidates. Approaches to design controlled release formulations based on diffusion, dissolution and ion exchange principles. Physicochemical and biological properties of drugs relevant to controlled release formulations

Polymers: Introduction, classification, properties, advantages and application of polymers in formulation of controlled release drug delivery systems.

Unit-II

10 Hours

Microencapsulation: Definition, advantages and disadvantages, microspheres /microcapsules, microparticles, methods of microencapsulation, applications

Mucosal Drug Delivery system: Introduction, Principles of bioadhesion / mucoadhesion, concepts, advantages and disadvantages, transmucosal permeability and formulation considerations of buccal delivery systems

Implantable Drug Delivery Systems: Introduction, advantages and disadvantages, concept of implants and osmotic pump

Unit-III

10 Hours

Transdermal Drug Delivery Systems: Introduction, Permeation through skin, factors affecting permeation, permeation enhancers, basic components of TDDS, formulation approaches

Gastroretentive drug delivery systems: Introduction, advantages, disadvantages, approaches for GRDDS – Floating, high density systems, inflatable and gastroadhesive systems and their applications

Nasopulmonary drug delivery system: Introduction to Nasal and Pulmonary routes of drug delivery, Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers

Unit-IV

08 Hours

Targeted drug Delivery: Concepts and approaches advantages and disadvantages, introduction to liposomes, niosomes, nanoparticles, monoclonal antibodies and their applications

Unit-V

07 Hours

Ocular Drug Delivery Systems: Introduction, intra ocular barriers and methods to overcome –Preliminary study, ocular formulations and ocuserts

Intrauterine Drug Delivery Systems: Introduction, advantages and disadvantages, development of intra uterine devices (IUDs) and applications

Recommended Books: (Latest Editions)

1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992.
3. Encyclopedia of Controlled Delivery. Edith Mathiowitz, Published by Wiley Interscience Publication, John Wiley and Sons, Inc, New York. Chichester/Weinheim
4. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
5. S.P. Vyas and R.K. Khar, Controlled Drug Delivery -concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002.

Journals

1. Indian Journal of Pharmaceutical Sciences (IPA)
2. Indian Drugs (IDMA)
3. Journal of Controlled Release (Elsevier Sciences)
4. Drug Development and Industrial Pharmacy (Marcel & Decker)
5. International Journal of Pharmaceutics (Elsevier Sciences)

SEMESTER VIII

BP801T. BIOSTATISTICS AND RESEARCH METHODOLOGY (Theory)

45 Hours

Scope: To understand the applications of Biostatistics in Pharmacy. This subject deals with descriptive statistics, Graphics, Correlation, Regression, logistic regression Probability theory, Sampling technique, Parametric tests, Non Parametric tests, ANOVA, Introduction to Design of Experiments, Phases of Clinical trials and Observational and Experimental studies, SPSS, R and MINITAB statistical software's, analyzing the statistical data using Excel.

Objectives: Upon completion of the course the student shall be able to

- Know the operation of M.S. Excel, SPSS, R and MINITAB[®], DoE (Design of Experiment)
- Know the various statistical techniques to solve statistical problems
- Appreciate statistical techniques in solving the problems.

Course content:

Unit-I

10 Hours

Introduction: Statistics, Biostatistics, Frequency distribution

Measures of central tendency: Mean, Median, Mode- Pharmaceutical examples

Measures of dispersion: Dispersion, Range, standard deviation, Pharmaceutical problems

Correlation: Definition, Karl Pearson's coefficient of correlation, Multiple correlation - Pharmaceuticals examples

Unit-II

10 Hours

Regression: Curve fitting by the method of least squares, fitting the lines $y = a + bx$ and $x = a + by$, Multiple regression, standard error of regression- Pharmaceutical Examples

Probability: Definition of probability, Binomial distribution, Normal distribution, Poisson's distribution, properties - problems

Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM) - Pharmaceutical examples

Parametric test: t-test(Sample, Pooled or Unpaired and Paired), ANOVA, (One way and Two way), Least Significance difference

Unit-III

10 Hours

Non Parametric tests: Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test

Introduction to Research: Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism

Graphs: Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph

Designing the methodology: 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.

Unit-IV

8 Hours

Blocking and confounding system for Two-level factorials

Regression modeling: Hypothesis testing in Simple and Multiple regression models

Introduction to Practical components of Industrial and Clinical Trials Problems:

Statistical Analysis Using Excel, SPSS, MINITAB[®], DESIGN OF EXPERIMENTS, R - Online Statistical Software's to Industrial and Clinical trial approach

Unit-V

7Hours

Design and Analysis of experiments:

Factorial Design: Definition, 2^2 , 2^3 design. Advantage of factorial design

Response Surface methodology: Central composite design, Historical design, Optimization Techniques

Recommended Books (Latest edition):

1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc. New York.
2. Fundamental of Statistics – Himalaya Publishing House- S.C.Guptha
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

BP 802T SOCIAL AND PREVENTIVE PHARMACY

Hours: 45

Scope:

The purpose of this course is to introduce to students a number of health issues and their challenges. This course also introduced a number of national health programmes. The roles of the pharmacist in these contexts are also discussed.

Objectives:

After the successful completion of this course, the student shall be able to:

- Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.
- Have a critical way of thinking based on current healthcare development.
- Evaluate alternative ways of solving problems related to health and pharmaceutical issues

Course content:

Unit I:

10 Hours

Concept of health and disease: Definition, concepts and evaluation of public health. Understanding the concept of prevention and control of disease, social causes of diseases and social problems of the sick.

Social and health education: Food in relation to nutrition and health, Balanced diet, Nutritional deficiencies, Vitamin deficiencies, Malnutrition and its prevention.

Sociology and health: Socio cultural factors related to health and disease, Impact of urbanization on health and disease, Poverty and health

Hygiene and health: personal hygiene and health care; avoidable habits

Unit II:

10 Hours

Preventive medicine: General principles of prevention and control of diseases such as cholera, SARS, Ebola virus, influenza, acute respiratory infections, malaria, chicken guinea, dengue, lymphatic filariasis, pneumonia, hypertension, diabetes mellitus, cancer, drug addiction-drug substance abuse

Unit III:

10 Hours

National health programs, its objectives, functioning and outcome of the following: HIV AND AIDS control programme, TB, Integrated disease surveillance program (IDSP), National leprosy control programme, National mental health program, National

programme for prevention and control of deafness, Universal immunization programme, National programme for control of blindness, Pulse polio programme.

Unit IV:

08 Hours

National health intervention programme for mother and child, National family welfare programme, National tobacco control programme, National Malaria Prevention Program, National programme for the health care for the elderly, Social health programme; role of WHO in Indian national program

Unit V:

07 Hours

Community services in rural, urban and school health: Functions of PHC, Improvement in rural sanitation, national urban health mission, Health promotion and education in school.

Recommended Books (Latest edition):

1. Short Textbook of Preventive and Social Medicine, Prabhakara GN, 2nd Edition, 2010, ISBN: 9789380704104, JAYPEE Publications
2. Textbook of Preventive and Social Medicine (Mahajan and Gupta), Edited by Roy Rabindra Nath, Saha Indranil, 4th Edition, 2013, ISBN: 9789350901878, JAYPEE Publications
3. Review of Preventive and Social Medicine (Including Biostatistics), Jain Vivek, 6th Edition, 2014, ISBN: 9789351522331, JAYPEE Publications
4. Essentials of Community Medicine—A Practical Approach, Hiremath Lalita D, Hiremath Dhananjaya A, 2nd Edition, 2012, ISBN: 9789350250440, JAYPEE Publications
5. Park Textbook of Preventive and Social Medicine, K Park, 21st Edition, 2011, ISBN-14: 9788190128285, BANARSIDAS BHANOT PUBLISHERS.
6. Community Pharmacy Practice, Ramesh Adepu, BSP publishers, Hyderabad

Recommended Journals:

1. Research in Social and Administrative Pharmacy, Elsevier, Ireland

BP803ET. PHARMA MARKETING MANAGEMENT (Theory)

45 Hours

Scope:

The pharmaceutical industry not only needs highly qualified researchers, chemists and, technical people, but also requires skilled managers who can take the industry forward by managing and taking the complex decisions which are imperative for the growth of the industry. The Knowledge and Know-how of marketing management groom the people for taking a challenging role in Sales and Product management.

Course Objective: The course aims to provide an understanding of marketing concepts and techniques and their applications in the pharmaceutical industry.

Unit I

10 Hours

Marketing:

Definition, general concepts and scope of marketing; Distinction between marketing & selling; Marketing environment; Industry and competitive analysis; Analyzing consumer buying behavior; industrial buying behavior.

Pharmaceutical market:

Quantitative and qualitative aspects; size and composition of the market; demographic descriptions and socio-psychological characteristics of the consumer; market segmentation & targeting. Consumer profile; Motivation and prescribing habits of the physician; patients' choice of physician and retail pharmacist. Analyzing the Market; Role of market research.

Unit II

10 Hours

Product decision:

Classification, product line and product mix decisions, product life cycle, product portfolio analysis; product positioning; New product decisions; Product branding, packaging and labeling decisions, Product management in pharmaceutical industry.

Unit III

10 Hours

Promotion:

Methods, determinants of promotional mix, promotional budget; An overview of personal selling, advertising, direct mail, journals, sampling, retailing, medical exhibition, public relations, online promotional techniques for OTC Products.

Unit IV**10 Hours****Pharmaceutical marketing channels:**

Designing channel, channel members, selecting the appropriate channel, conflict in channels, physical distribution management: Strategic importance, tasks in physical distribution management.

Professional sales representative (PSR):

Duties of PSR, purpose of detailing, selection and training, supervising, norms for customer calls, motivating, evaluating, compensation and future prospects of the PSR.

Unit V**10 Hours****Pricing:**

Meaning, importance, objectives, determinants of price; pricing methods and strategies, issues in price management in pharmaceutical industry. An overview of DPCO (Drug Price Control Order) and NPPA (National Pharmaceutical Pricing Authority).

Emerging concepts in marketing:

Vertical & Horizontal Marketing; Rural Marketing; Consumerism; Industrial Marketing; Global Marketing.

Recommended Books: (Latest Editions)

1. Philip Kotler and Kevin Lane Keller: Marketing Management, Prentice Hall of India, New Delhi
2. Walker, Boyd and Larreche : Marketing Strategy- Planning and Implementation, Tata MC GrawHill, New Delhi.
3. Dhruv Grewal and Michael Levy: Marketing, Tata MC Graw Hill
4. Arun Kumar and N Menakshi: Marketing Management, Vikas Publishing, India
5. Rajan Saxena: Marketing Management; Tata MC Graw-Hill (India Edition)
6. Ramaswamy, U.S & Nanakamari, S: Marketing Managemnt:Global Perspective, IndianContext,Macmilan India, New Delhi.
7. Shanker, Ravi: Service Marketing, Excell Books, New Delhi
8. Subba Rao Changanti, Pharmaceutical Marketing in India (GIFT – Excel series) Excel Publications.

BP804 ET: PHARMACEUTICAL REGULATORY SCIENCE (Theory)

45Hours

Scope: This course is designed to impart the fundamental knowledge on the regulatory requirements for approval of new drugs, and drug products in regulated markets of India & other countries like US, EU, Japan, Australia, UK etc. It prepares the students to learn in detail on the regulatory requirements, documentation requirements, and registration procedures for marketing the drug products.

Objectives: Upon completion of the subject student shall be able to;

1. Know about the process of drug discovery and development
2. Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
3. Know the regulatory approval process and their registration in Indian and international markets

Course content:

Unit I

10Hours

New Drug Discovery and development

Stages of drug discovery, Drug development process, pre-clinical studies, non-clinical activities, clinical studies, Innovator and generics, Concept of generics, Generic drug product development.

Unit II

10Hours

Regulatory Approval Process

Approval processes and timelines involved in Investigational New Drug (IND), New Drug Application (NDA), Abbreviated New Drug Application (ANDA). Changes to an approved NDA / ANDA.

Regulatory authorities and agencies

Overview of regulatory authorities of India, United States, European Union, Australia, Japan, Canada (Organization structure and types of applications)

Unit III

10Hours

Registration of Indian drug product in overseas market

Procedure for export of pharmaceutical products, Technical documentation, Drug Master Files (DMF), Common Technical Document (CTD), electronic Common Technical

Document (eCTD), ASEAN Common Technical Document (ACTD)research.

Unit IV

08Hours

Clinical trials

Developing clinical trial protocols, Institutional Review Board / Independent Ethics committee - formation and working procedures, Informed consent process and procedures, GCP obligations of Investigators, sponsors & Monitors, Managing and Monitoring clinical trials, Pharmacovigilance - safety monitoring in clinical trials

Unit V

07Hours

Regulatory Concepts

Basic terminology, guidance, guidelines, regulations, Laws and Acts, Orange book, Federal Register, Code of Federal Regulatory, Purple book

Recommended books (Latest edition):

1. Drug Regulatory Affairs by Sachin Itkar, Dr. N.S. Vyawahare, Nirali Prakashan.
2. The Pharmaceutical Regulatory Process, Second Edition Edited by Ira R. Berry and Robert P. Martin, Drugs and the Pharmaceutical Sciences, Vol.185. Informa Health care Publishers.
3. New Drug Approval Process: Accelerating Global Registrations By Richard A Guarino, MD, 5th edition, Drugs and the Pharmaceutical Sciences, Vol.190.
4. Guidebook for drug regulatory submissions / Sandy Weinberg. By John Wiley & Sons. Inc.
5. FDA Regulatory Affairs: a guide for prescription drugs, medical devices, and biologics /edited by Douglas J. Pisano, David Mantus.
6. Generic Drug Product Development, Solid Oral Dosage forms, Leon Shargel and Isader Kaufer, Marcel Dekker series, Vol.143
7. Clinical Trials and Human Research: A Practical Guide to Regulatory Compliance By Fay A. Rozovsky and Rodney K. Adams
8. Principles and Practices of Clinical Research, Second Edition Edited by John I. Gallin and Frederick P. Ognibene
9. Drugs: From Discovery to Approval, Second Edition By Rick Ng

BP 805T: PHARMACOVIGILANCE (Theory)

45 hours

Scope: This paper will provide an opportunity for the student to learn about development of pharmacovigilance as a science, basic terminologies used in pharmacovigilance, global scenario of Pharmacovigilance, train students on establishing pharmacovigilance programme in an organization, various methods that can be used to generate safety data and signal detection. This paper also develops the skills of classifying drugs, diseases and adverse drug reactions.

Objectives:

At completion of this paper it is expected that students will be able to (know, do, and appreciate):

1. Why drug safety monitoring is important?
2. History and development of pharmacovigilance
3. National and international scenario of pharmacovigilance
4. Dictionaries, coding and terminologies used in pharmacovigilance
5. Detection of new adverse drug reactions and their assessment
6. International standards for classification of diseases and drugs
7. Adverse drug reaction reporting systems and communication in pharmacovigilance
8. Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle
9. Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation
10. Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India
11. ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning
12. CIOMS requirements for ADR reporting
13. Writing case narratives of adverse events and their quality.

Course Content

Unit I

10 Hours

Introduction to Pharmacovigilance

- History and development of Pharmacovigilance
- Importance of safety monitoring of Medicine
- WHO international drug monitoring programme
- Pharmacovigilance Program of India(PvPI)

Introduction to adverse drug reactions

- Definitions and classification of ADRs
- Detection and reporting
- Methods in Causality assessment
- Severity and seriousness assessment
- Predictability and preventability assessment
- Management of adverse drug reactions

Basic terminologies used in pharmacovigilance

- Terminologies of adverse medication related events
- Regulatory terminologies

Unit II

10 hours

Drug and disease classification

- Anatomical, therapeutic and chemical classification of drugs
- International classification of diseases
- Daily defined doses
- International Non proprietary Names for drugs

Drug dictionaries and coding in pharmacovigilance

- WHO adverse reaction terminologies
- MedDRA and Standardised MedDRA queries
- WHO drug dictionary
- Eudravigilance medicinal product dictionary

Information resources in pharmacovigilance

- Basic drug information resources
- Specialised resources for ADRs

Establishing pharmacovigilance programme

- Establishing in a hospital
- Establishment & operation of drug safety department in industry
- Contract Research Organisations (CROs)
- Establishing a national programme

Unit III

10 Hours

Vaccine safety surveillance

- Vaccine Pharmacovigilance
- Vaccination failure
- Adverse events following immunization

Pharmacovigilance methods

- Passive surveillance – Spontaneous reports and case series
- Stimulated reporting
- Active surveillance – Sentinel sites, drug event monitoring and registries
- Comparative observational studies – Cross sectional study, case control study and cohort study
- Targeted clinical investigations

Communication in pharmacovigilance

- Effective communication in Pharmacovigilance
- Communication in Drug Safety Crisis management
- Communicating with Regulatory Agencies, Business Partners, Healthcare facilities & Media

Unit IV

8 Hours

Safety data generation

- Pre clinical phase
- Clinical phase
- Post approval phase (PMS)

ICH Guidelines for Pharmacovigilance

- Organization and objectives of ICH
- Expedited reporting
- Individual case safety reports
- Periodic safety update reports
- Post approval expedited reporting
- Pharmacovigilance planning
- Good clinical practice in pharmacovigilance studies

Unit V

7 hours

Pharmacogenomics of adverse drug reactions

- Genetics related ADR with example focusing PK parameters.

Drug safety evaluation in special population

- Paediatrics
- Pregnancy and lactation
- Geriatrics

CIOMS

- CIOMS Working Groups
- CIOMS Form

CDSCO (India) and Pharmacovigilance

- D&C Act and Schedule Y
- Differences in Indian and global pharmacovigilance requirements

Recommended Books (Latest edition):

1. Textbook of Pharmacovigilance: S K Gupta, Jaypee Brothers, Medical Publishers.
2. Practical Drug Safety from A to Z By Barton Cobert, Pierre Biron, Jones and Bartlett Publishers.
3. Mann's Pharmacovigilance: Elizabeth B. Andrews, Nicholas, Wiley Publishers.
4. Stephens' Detection of New Adverse Drug Reactions: John Talbot, Patrick Walle, Wiley Publishers.
5. An Introduction to Pharmacovigilance: Patrick Waller, Wiley Publishers.
6. Cobert's Manual of Drug Safety and Pharmacovigilance: Barton Cobert, Jones & Bartlett Publishers.
7. Textbook of Pharmacoepidemiology edited by Brian L. Strom, Stephen E Kimmel, Sean Hennessy, Wiley Publishers.
8. A Textbook of Clinical Pharmacy Practice -Essential Concepts and Skills: G. Parthasarathi, Karin Nyfort Hansen, Milap C. Nahata
9. National Formulary of India
10. Text Book of Medicine by Yashpal Munjal

11. Text book of Pharmacovigilance: concept and practice by GP Mohanta and PK Manna

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12. <http://www.who.umc.org/DynPage.aspx?id=105825&mn1=7347&mn2=7259&mn3=7297>
13. <http://www.ich.org/>
14. <http://www.cioms.ch/>
15. <http://cdsco.nic.in/>
16. http://www.who.int/vaccine_safety/en/
17. http://www.ipc.gov.in/PvPI/pv_home.html

BP 806 ET. QUALITY CONTROL AND STANDARDIZATION OF HERBALS (Theory)

Scope: In this subject the student learns about the various methods and guidelines for evaluation and standardization of herbs and herbal drugs. The subject also provides an opportunity for the student to learn cGMP, GAP and GLP in traditional system of medicines.

Objectives: Upon completion of the subject student shall be able to;

1. know WHO guidelines for quality control of herbal drugs
2. know Quality assurance in herbal drug industry
3. know the regulatory approval process and their registration in Indian and international markets
4. appreciate EU and ICH guidelines for quality control of herbal drugs

Unit I

10 hours

Basic tests for drugs – Pharmaceutical substances, Medicinal plants materials and dosage forms

WHO guidelines for quality control of herbal drugs.

Evaluation of commercial crude drugs intended for use

Unit II

10 hours

Quality assurance in herbal drug industry of cGMP, GAP, GMP and GLP in traditional system of medicine.

WHO Guidelines on current good manufacturing Practices (cGMP) for Herbal Medicines

WHO Guidelines on GACP for Medicinal Plants.

Unit III

10 hours

EU and ICH guidelines for quality control of herbal drugs.

Research Guidelines for Evaluating the Safety and Efficacy of Herbal Medicines

Unit IV

08 hours

Stability testing of herbal medicines. Application of various chromatographic techniques in standardization of herbal products.

Preparation of documents for new drug application and export registration

GMP requirements and Drugs & Cosmetics Act provisions.

Unit V

07 hours

Regulatory requirements for herbal medicines.

WHO guidelines on safety monitoring of herbal medicines in pharmacovigilance systems

Comparison of various Herbal Pharmacopoeias.

Role of chemical and biological markers in standardization of herbal products

Recommended Books: (Latest Editions)

1. Pharmacognosy by Trease and Evans
2. Pharmacognosy by Kokate, Purohit and Gokhale
3. Rangari, V.D., Text book of Pharmacognosy and Phytochemistry Vol. I , Carrier Pub., 2006.
4. Aggrawal, S.S., Herbal Drug Technology. Universities Press, 2002.
5. EMEA. Guidelines on Quality of Herbal Medicinal Products/Traditional Medicinal Products,
6. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.
7. Shinde M.V., Dhalwal K., Potdar K., Mahadik K. Application of quality control principles to herbal drugs. International Journal of Phytomedicine 1(2009); p. 4-8.
8. WHO. Quality Control Methods for Medicinal Plant Materials, World Health Organization, Geneva, 1998. WHO. Guidelines for the Appropriate Use of Herbal Medicines. WHO Regional Publications, Western Pacific Series No 3, WHO Regional office for the Western Pacific, Manila, 1998.
9. WHO. The International Pharmacopeia, Vol. 2: Quality Specifications, 3rd edn. World Health Organization, Geneva, 1981.
10. WHO. Quality Control Methods for Medicinal Plant Materials. World Health Organization, Geneva, 1999.
11. WHO. WHO Global Atlas of Traditional, Complementary and Alternative Medicine. 2 vol. set. Vol. 1 contains text and Vol. 2, maps. World Health Organization, Geneva, 2005.
12. WHO. Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants. World Health Organization, Geneva, 2004.

BP 807 ET. COMPUTER AIDED DRUG DESIGN (Theory)

45 Hours

Scope: This subject is designed to provide detailed knowledge of rational drug design process and various techniques used in rational drug design process.

Objectives: Upon completion of the course, the student shall be able to understand

- Design and discovery of lead molecules
- The role of drug design in drug discovery process
- The concept of QSAR and docking
- Various strategies to develop new drug like molecules.
- The design of new drug molecules using molecular modeling software

Course Content:

UNIT-I

10 Hours

Introduction to Drug Discovery and Development

Stages of drug discovery and development

Lead discovery and Analog Based Drug Design

Rational approaches to lead discovery based on traditional medicine, Random screening, Non-random screening, serendipitous drug discovery, lead discovery based on drug metabolism, lead discovery based on clinical observation.

Analog Based Drug Design: Bioisosterism, Classification, Bioisosteric replacement. Any three case studies

UNIT-II

10 Hours

Quantitative Structure Activity Relationship (QSAR)

SAR versus QSAR, History and development of QSAR, Types of physicochemical parameters, experimental and theoretical approaches for the determination of physicochemical parameters such as Partition coefficient, Hammett's substituent constant and Taft's steric constant. Hansch analysis, Free Wilson analysis, 3D-QSAR approaches like COMFA and COMSIA.

UNIT-III

10 Hours

Molecular Modeling and virtual screening techniques

Virtual Screening techniques: Drug likeness screening, Concept of pharmacophore mapping and pharmacophore based Screening,

Molecular docking: Rigid docking, flexible docking, manual docking, Docking based screening. *De novo* drug design.

UNIT-IV**08 Hours****Informatics & Methods in drug design**

Introduction to Bioinformatics, chemoinformatics. ADME databases, chemical, biochemical and pharmaceutical databases.

UNIT-V**07 Hours**

Molecular Modeling: Introduction to molecular mechanics and quantum mechanics. Energy Minimization methods and Conformational Analysis, global conformational minima determination.

Recommended Books (Latest Editions)

1. Robert GCK, ed., "Drug Action at the Molecular Level" University Park Press Baltimore.
2. Martin YC. "Quantitative Drug Design" Dekker, New York.
3. Delgado JN, Remers WA eds "Wilson & Gisvold's Text Book of Organic Medicinal & Pharmaceutical Chemistry" Lippincott, New York.
4. Foye WO "Principles of Medicinal chemistry" Lea & Febiger.
5. Koro Ikovas A, Burckhalter JH. "Essentials of Medicinal Chemistry" Wiley Interscience.
6. Wolf ME, ed "The Basis of Medicinal Chemistry, Burger's Medicinal Chemistry" John Wiley & Sons, New York.
7. Patrick Graham, L., An Introduction to Medicinal Chemistry, Oxford University Press.
8. Smith HJ, Williams H, eds, "Introduction to the principles of Drug Design" Wright Boston.
9. Silverman R.B. "The organic Chemistry of Drug Design and Drug Action" Academic Press New York.

BP808ET: CELL AND MOLECULAR BIOLOGY (Elective subject)

45 Hours

Scope:

- Cell biology is a branch of biology that studies cells – their physiological properties, their structure, the organelles they contain, interactions with their environment, their life cycle, division, death and cell function.
- This is done both on a microscopic and molecular level.
- Cell biology research encompasses both the great diversity of single-celled organisms like bacteria and protozoa, as well as the many specialized cells in multi-cellular organisms such as humans, plants, and sponges.

Objectives: Upon completion of the subject student shall be able to;

- Summarize cell and molecular biology history.
- Summarize cellular functioning and composition.
- Describe the chemical foundations of cell biology.
- Summarize the DNA properties of cell biology.
- Describe protein structure and function.
- Describe cellular membrane structure and function.
- Describe basic molecular genetic mechanisms.
- Summarize the Cell Cycle

Course content:

Unit I

10Hours

- a) Cell and Molecular Biology: Definitions theory and basics and Applications.
- b) Cell and Molecular Biology: History and Summation.
- c) Properties of cells and cell membrane.
- d) Prokaryotic versus Eukaryotic
- e) Cellular Reproduction
- f) Chemical Foundations – an Introduction and Reactions (Types)

Unit II

10 Hours

- a) DNA and the Flow of Molecular Information
- b) DNA Functioning
- c) DNA and RNA
- d) Types of RNA
- e) Transcription and Translation

Unit III

10 Hours

- a) Proteins: Defined **and** Amino Acids
- b) Protein Structure

- c) Regularities in Protein Pathways
- d) Cellular Processes
- e) Positive Control and significance of Protein Synthesis

Unit IV

08 Hours

- a) Science of Genetics
- b) Transgenics and Genomic Analysis
- c) Cell Cycle analysis
- d) Mitosis and Meiosis
- e) Cellular Activities and Checkpoints

Unit V

07 Hours

- a) Cell Signals: Introduction
- b) Receptors for Cell Signals
- c) Signaling Pathways: Overview
- d) Misregulation of Signaling Pathways
- e) Protein-Kinases: Functioning

Recommended Books (latest edition):

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Pepler: Microbial Technology.
9. Edward: Fundamentals of Microbiology.
10. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
11. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company
12. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.
13. RA Goldshy et. al., : Kuby Immunology.

BP809ET. COSMETIC SCIENCE(Theory)

45Hours

UNIT I

10Hours

Classification of cosmetic and cosmeceutical products

Definition of cosmetics as per Indian and EU regulations, Evolution of cosmeceuticals from cosmetics, cosmetics as quasi and OTC drugs

Cosmetic excipients: Surfactants, rheology modifiers, humectants, emollients, preservatives. Classification and application

Skin: Basic structure and function of skin.

Hair: Basic structure of hair. Hair growth cycle.

Oral Cavity: Common problem associated with teeth and gums.

UNIT II

10 Hours

Principles of formulation and building blocks of skin care products:

Face wash,

Moisturizing cream, Cold Cream, Vanishing cream and their advantages and disadvantages. Application of these products in formulation of cosmeceuticals.

Antiperspirants & deodorants- Actives & mechanism of action.

Principles of formulation and building blocks of Hair care products:

Conditioning shampoo, Hair conditioner, anti-dandruff shampoo.

Hair oils.

Chemistry and formulation of Para-phenylene diamine based hair dye.

Principles of formulation and building blocks of oral care products:

Toothpaste for bleeding gums, sensitive teeth. Teeth whitening, Mouthwash.

UNIT III

10 Hours

Sun protection, Classification of Sunscreens and SPF.

Role of herbs in cosmetics:

Skin Care: Aloe and turmeric

Hair care: Henna and amla.

Oral care: Neem and clove

Analytical cosmetics: BIS specification and analytical methods for shampoo, skin-cream and toothpaste.

UNIT IV

08 Hours.

Principles of Cosmetic Evaluation: Principles of sebumeter, corneometer. Measurement of TEWL, Skin Color, Hair tensile strength, Hair combing properties

Soaps, and syndet bars. Evolution and skin benefits.

UNIT V

07 Hours

Oily and dry skin, causes leading to dry skin, skin moisturisation. Basic understanding of the terms Comedogenic, dermatitis.

Cosmetic problems associated with Hair and scalp: Dandruff, Hair fall causes

Cosmetic problems associated with skin: blemishes, wrinkles, acne, prickly heat and body odor.

Antiperspirants and Deodorants- Actives and mechanism of action

References

- 1) Harry's Cosmeticology, Wilkinson, Moore, Seventh Edition, George Godwin.
- 2) Cosmetics – Formulations, Manufacturing and Quality Control, P.P. Sharma, 4th Edition, Vandana Publications Pvt. Ltd., Delhi.
- 3) Text book of cosmeticology by Sanju Nanda & Roop K. Khar, Tata Publishers.

BP810 ET. EXPERIMENTAL PHARMACOLOGY

45 Hours

Scope: This subject is designed to impart the basic knowledge of preclinical studies in experimental animals including design, conduct and interpretations of results.

Objectives

Upon completion of the course the student shall be able to,

- Appreciate the applications of various commonly used laboratory animals.
- Appreciate and demonstrate the various screening methods used in preclinical research
- Appreciate and demonstrate the importance of biostatistics and research methodology
- Design and execute a research hypothesis independently

Unit –I	08 Hours
Laboratory Animals: Study of CPCSEA and OECD guidelines for maintenance, breeding and conduct of experiments on laboratory animals, Common lab animals: Description and applications of different species and strains of animals. Popular transgenic and mutant animals. Techniques for collection of blood and common routes of drug administration in laboratory animals, Techniques of blood collection and euthanasia.	
Unit –II	10 Hours
Preclinical screening models a. Introduction: Dose selection, calculation and conversions, preparation of drug solution/suspensions, grouping of animals and importance of sham negative and positive control groups. Rationale for selection of animal species and sex for the study. b. Study of screening animal models for Diuretics, nootropics, anti-Parkinson's, antiasthmatics, Preclinical screening models: for CNS activity- analgesic, antipyretic, anti-inflammatory, general anaesthetics, sedative and hypnotics, antipsychotic, antidepressant, antiepileptic, antiparkinsonism, alzheimer's disease	

<p>Unit –III</p> <p>Preclinical screening models: for ANS activity, sympathomimetics, sympatholytics, parasympathomimetics, parasympatholytics, skeletal muscle relaxants, drugs acting on eye, local anaethetics</p>	
<p>Unit –IV</p> <p>Preclinical screening models: for CVS activity- antihypertensives, diuretics, antiarrhythmic, antidyslepidemic, anti aggregatory, coagulants, and anticoagulants Preclinical screening models for other important drugs like antiulcer, antidiabetic, anticancer and antiasthmatics.</p>	
<p>Research methodology and Bio-statistics Selection of research topic, review of literature, research hypothesis and study design Pre-clinical data analysis and interpretation using Students ‘t’ test and One-way ANOVA. Graphical representation of data</p>	05 Hours

Recommended Books (latest edition):

1. Fundamentals of experimental Pharmacology-by M.N.Ghosh
2. Hand book of Experimental Pharmacology-S.K.Kulakarni
3. CPCSEA guidelines for laboratory animal facility.
4. Drug discovery and Evaluation by Vogel H.G.
5. Drug Screening Methods by Suresh Kumar Gupta and S. K. Gupta
6. Introduction to biostatistics and research methods by PSS Sundar Rao and J Richard

BP 811 ET. ADVANCED INSTRUMENTATION TECHNIQUES

45 Hours

Scope: This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs. This subject is designed to impart advanced knowledge on the principles and instrumentation of spectroscopic and chromatographic hyphenated techniques. This also emphasizes on theoretical and practical knowledge on modern analytical instruments that are used for drug testing.

Objectives: Upon completion of the course the student shall be able to

- understand the advanced instruments used and its applications in drug analysis
- understand the chromatographic separation and analysis of drugs.
- understand the calibration of various analytical instruments
- know analysis of drugs using various analytical instruments.

Course Content:

UNIT-I

10 Hours

Nuclear Magnetic Resonance spectroscopy

Principles of H-NMR and C-NMR, chemical shift, factors affecting chemical shift, coupling constant, Spin - spin coupling, relaxation, instrumentation and applications

Mass Spectrometry- Principles, Fragmentation, Ionization techniques – Electron impact, chemical ionization, MALDI, FAB, Analyzers-Time of flight and Quadrupole, instrumentation, applications

UNIT-II

10 Hours

Thermal Methods of Analysis: Principles, instrumentation and applications of Thermogravimetric Analysis (TGA), Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC)

X-Ray Diffraction Methods: Origin of X-rays, basic aspects of crystals, X-ray

Crystallography, rotating crystal technique, single crystal diffraction, powder diffraction, structural elucidation and applications.

UNIT-III

10 Hours

Calibration and validation-as per ICH and USFDA guidelines

Calibration of following Instruments

Electronic balance, UV-Visible spectrophotometer, IR spectrophotometer,

Fluorimeter, Flame Photometer, HPLC and GC

UNIT-IV

08 Hours

Radio immune assay:Importance, various components, Principle, different methods, Limitation and Applications of Radio immuno assay

Extraction techniques:General principle and procedure involved in the solid phase extraction and liquid-liquid extraction

UNIT-V

07 Hours

Hyphenated techniques-LC-MS/MS, GC-MS/MS, HPTLC-MS.

Recommended Books (Latest Editions)

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
6. Organic Chemistry by I. L. Finar
7. Organic spectroscopy by William Kemp
8. Quantitative Analysis of Drugs by D. C. Garrett
9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
10. Spectrophotometric identification of Organic Compounds by Silverstein

BP 812 ET. DIETARY SUPPLEMENTS AND NUTRACEUTICALS

No. of hours :3

Tutorial:1

Credit point:4

Scope :

This subject covers foundational topics that are important for understanding the need and requirements of dietary supplements among different groups in the population.

Objective:

This module aims to provide an understanding of the concepts behind the theoretical applications of dietary supplements. By the end of the course, students should be able to :

1. Understand the need of supplements by the different group of people to maintain healthy life.
2. Understand the outcome of deficiencies in dietary supplements.
3. Appreciate the components in dietary supplements and the application.
4. Appreciate the regulatory and commercial aspects of dietary supplements including health claims.

UNIT I

07 hours

- a. Definitions of Functional foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e. weight control, diabetes, cancer, heart disease, stress, osteoarthritis, hypertension etc.
- b. Public health nutrition, maternal and child nutrition, nutrition and ageing, nutrition education in community.
- c. Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as nutraceuticals/functional foods: Spirulina, Soyabean, Ginseng, Garlic, Broccoli, Gingko, Flaxseeds

UNIT II

15 hours

Phytochemicals as nutraceuticals: Occurrence and characteristic features(chemical nature medicinal benefits) of following

- a) Carotenoids- and -Carotene, Lycopene, Xanthophylls, leutin
- b) Sulfides: Diallyl sulfides, Allyl trisulfide.
- c) Polyphenolics: Resveratrol
- d) Flavonoids- Rutin , Naringin, Quercetin, Anthocyanidins, catechins, Flavones
- e) Prebiotics / Probiotics.: Fructo oligosaccharides, Lacto bacillum
- f) Phyto estrogens : Isoflavones, daidzein, Geobustin, lignans
- g) Tocopherols
- h) Proteins, vitamins, minerals, cereal, vegetables and beverages as functional foods: oats, wheat bran, rice bran, sea foods, coffee, tea and the like.

UNIT III

07 hours

- a) Introduction to free radicals: Free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids.

- b) Dietary fibres and complex carbohydrates as functional food ingredients..

UNIT IV

10 hours

- a) Free radicals in Diabetes mellitus, Inflammation, Ischemic reperfusion injury, Cancer, Atherosclerosis, Free radicals in brain metabolism and pathology, kidney damage, muscle damage. Free radicals involvement in other disorders. Free radicals theory of ageing.
- b) Antioxidants: Endogenous antioxidants – enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, catalase, Glutathione peroxidase, Glutathione Vitamin C, Vitamin E, - Lipoic acid, melatonin
Synthetic antioxidants: Butylated hydroxy Toluene, Butylated hydroxy Anisole.
- c) Functional foods for chronic disease prevention

UNIT V

06 hours

- a) Effect of processing, storage and interactions of various environmental factors on the potential of nutraceuticals.
- b) Regulatory Aspects; FSSAI, FDA, FPO, MPO, AGMARK. HACCP and GMPs on Food Safety. Adulteration of foods.
- c) Pharmacopoeial Specifications for dietary supplements and nutraceuticals.

References:

1. Dietetics by Sri Lakshmi
2. Role of dietary fibres and nutraceuticals in preventing diseases by K.T Agusti and P.Faizal: BSPublication.
3. Advanced Nutritional Therapies by Cooper. K.A., (1996).
4. The Food Pharmacy by Jean Carper, Simon & Schuster, UK Ltd., (1988).
5. Prescription for Nutritional Healing by James F.Balch and Phyllis A.Balch 2nd Edn., Avery Publishing Group, NY (1997).
6. G. Gibson and C.williams Editors *2000 Functional foods* Woodhead Publ.Co.London.
7. Goldberg, I. *Functional Foods*. 1994. Chapman and Hall, New York.
8. Labuza, T.P. 2000 Functional Foods and Dietary Supplements: Safety, Good Manufacturing Practice (GMPs) and Shelf Life Testing in *Essentials of Functional Foods* M.K. Sachmidl and T.P. Labuza eds. Aspen Press.
9. Handbook of Nutraceuticals and Functional Foods, Third Edition (Modern Nutrition)
10. Shils, ME, Olson, JA, Shike, M. 1994 *Modern Nutrition in Health and Disease*. Eighth edition. Lea and Febiger

Semester 1 st		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
MBADM1-101	Corporate Social Responsibility & Sustainability	4	0	0	40	60	100	4
MBADM1-102	Organization Behaviour	4	0	0	40	60	100	4
MBADM1-103	Financial Reporting, Statements and Analysis	4	0	0	40	60	100	4
MBADM1-104	Business Statistics and Analytics for Decision Making	4	0	0	40	60	100	4
MBADM1-105	Managerial Economics	4	0	0	40	60	100	4
MBADM1-106	Marketing Management	4	0	0	40	60	100	4
MHUMA0-104	Business Communications	2	0	2	40	60	100	3
MCAPP0-191	Computer Applications for Business	2	0	2	40	60	100	3
Total		28	0	4	320	480	800	30

Semester 2 nd		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
MBADM1-207	Indian Ethos and Business Ethics	4	0	0	40	60	100	4
MBADM1-208	Indian Economy and Policy	4	0	0	40	60	100	4
MBADM1-209	Marketing Research	4	0	0	40	60	100	4
MBADM1-210	Corporate Finance	4	0	0	40	60	100	4
MBADM1-211	Human Resource Management	4	0	0	40	60	100	4
MBADM1-212	Operations Management	4	0	0	40	60	100	4
MBADM1-213	Minor Research Project – I	3	0	0	100	0	100	3
Open Elective – I		3	0	0	40	60	100	3
Total		30	0	0	380	420	800	30

**Summer/Industrial Training for 6-8 weeks at the end of 2nd semester*

Overall

Semester	Marks	Credits
1 st	800	30
2 nd	800	30
Total	1600	60

INSTRUCTIONS TO THE PAPER SETTERS

There will be '*Three Sections*' of Question Paper - Section A, Section B and Section C

1. Section A (20 Marks)

It consists of 10 compulsory short notes of two marks each, that covers all the UNITS equally.

2. Section B (32 Marks)

It consists of 08 questions (Ques. 2 to Ques. 9) of 8 marks each. (Two questions from each UNIT as mentioned below)

- a) Question 2 and Question 3 from UNIT I (Choice between 2 and 3 only)
- b) Question 4 and Question 5 from UNIT II (Choice between 4 and 5 only)
- c) Question 6 and Question 7 from UNIT III (Choice between 6 and 7 only)
- d) Question 8 and Question 9 from UNIT IV (Choice between 8 and 9 only)

3. Section C (8 Marks)

A short Case Study related to the syllabus

Note: In numerical based papers the paper setter should set one numerical question from each UNIT wherever it is possible.

MRSPTU

CORPORATE SOCIAL RESPONSIBILITY & SUSTAINABILITY**Subject Code: MBADM1-101****L T P C
4 0 0 4****Duration: 40 Hrs.**

Learning Objectives: This course aims to provide a thorough and systematic coverage of management theory and practice. The course aims at providing fundamental knowledge and exposure of the concepts, theories and practices in the field of management. It focuses on the basic roles, skills and functions of management, with special attention to managerial responsibility for effective and efficient achievement of goals.

UNIT-I (10 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.

UNIT-II (10 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-innovative practices-Case studies with lessons learnt.

UNIT-III (10 Hrs.)

Sustainability: Meaning and Scope, Corporate Social Responsibility and Corporate Sustainability-Sustainability Terminologies and Meanings-Why is Sustainability an Imperative-Sustainability Case Studies-Triple Bottom Line (TBL).

UNIT-IV (10 Hrs.)

Corporate Sustainability Reporting Frameworks, Global Reporting Initiative Guidelines, National Voluntary Guidelines on Social, Environmental and Economic Responsibilities of Business International Standards, Sustainability Indices-Principles of Responsible Investment-Challenges in Mainstreaming Sustainability Reporting-Sustainability Reporting Case Studies.

Recommended Books:

1. C.V. Baxi and Ajit Prasad, 'Corporate Social Responsibility: Concepts and Cases: The Indian Experience', Excel Books India, New Delhi, 2005.
2. Mike Blowfield and Alan Murray, 'Corporate Responsibility', Oxford University Press, 2011.
3. J.P. Sharma, 'Corporate Governance, Business Ethics & CSR', 2nd Edn., Ane Books Pvt. Ltd., New Delhi, 2016.

ORGANIZATION BEHAVIOUR**Subject Code: MBADM1-102****L T P C
4 0 0 4****Duration: 45 Hrs.**

Learning 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.

UNIT-I (10 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 (13 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.

Negotiations - Meaning & Definition, Negotiations Process; Issues in Negotiations.

UNIT-IV (10 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.

Course Outcomes: After studying this course the students will equip with ability to Identify, explore and examine factors impinge on individual and group behavior in organizations in the new millennium; explain the terminology associated with organizational behavior. 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 Behaviour at work place.

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, 'Organizational Behaviour', Himalaya Publications.
5. L.M. Prasad, 'Organizational Behaviour', Sultan Chand.
6. Parikh, Gupta, 'Organisational Behaviour', Tata McGraw Hill.

FINANCIAL REPORTING, STATEMENT AND ANALYSIS

Subject Code: MBADM1-103

L T P C

Duration: 45 Hrs.

4 0 0 4

Learning Objectives: This course aims to acquaint the students regarding various accounting concepts and its application in managerial decision making. The course attempts to build potential to use appropriate accounting tools and techniques of financial accounting and management accounting for preparing and analyzing financial statements.

UNIT-I (10 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 (10 Hrs.)

Readings of Financial Statements: Income Statement, Balance Sheet, Statement of Retained Earnings, Fund Flow Statement, Cash Flow Statement,

Cost Analysis: Preparation of Cost Sheet, Marginal Costing, Break Even Analysis, Standard Costing, Variance Analysis, Introduction to Budgets and its Types.

UNIT-III (10 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 (10 Hrs.)

Financial Reporting System: Content of Annual Reports, Quality of Financial Reporting, Reporting regulation of companies in India, Indian Financial Reporting System, Ethical Issues in Financial Reporting (Window Dressing, Quality of Earnings, Financial Scams etc.)

Course Outcomes: After completing the subject students will be able to analyze a company's financial statements and come to a reasoned conclusion about the financial situation of the company. Students will also learn how to use the accounting and business terminology.

Recommended Books:

1. R. Narayanaswamy, 'Financial Accounting – A Managerial Perspective', 5th Edn., Prentice Hall of India, 2015.
2. Gerald White, Ashwinderpaul Sondhi and Dov Fried, 'The Analysis and Use of Financial Statements', Wiley India Edn., 2010.
3. Gokul Sinha, 'Financial Statement Analysis', Prentice Hall of India, New Delhi, 2009.
4. John J. Wild, K.R. Subramanyam and Robert F. Halsey, 'Financial Statement Analysis', Tata McGraw Hill Publishing Company Ltd. New Delhi, 2004.
5. Stephen H. Penman, 'Financial Statement Analysis and Security Valuation', Tata McGraw Hill Publishing Company Ltd. New Delhi, 2007.
6. ICAI Notes on Financial Analysis & Business Valuation.

BUSINESS STATISTICS AND ANALYTICS FOR DECISION MAKING

Subject Code: MBADM1-104

L T P C
4 0 0 4

Duration: 40 Hrs.

Learning Objectives: Statistical methods are applied in all functional areas of business: accounting, finance, management and marketing. The main objective of the course is to enable students to understand the role and importance of Statistics in improving managerial decisions.

UNIT-I (12 Hrs.)

Statistics: An Overview- Concept, Significance and Limitations, Importance and Scope of Statistics in Decision Making, Especially in Business Management, Identification of Problem, Review of Literature, Distribution of Data - Normal Distribution

Measure of Central Tendency: Objectives of Averaging, Requisites of Measure of Central Tendency, Mathematical Averages – Arithmetic Mean (Simple and Weighted), Geometric Mean, Harmonic Mean, Averages of Position-Median and Mode, Partition Values- Quartiles, Deciles and Percentiles, Relationship Between Mean, Median and Mode, Comparison Between Measures of Central Tendency.

Measure of Dispersion: Significance of Measuring Dispersion (Variation), Classification of Measure of Dispersion, Dispersion Measures- Range and Inter Quartile Range or Deviation. Average Deviation Measures- Mean Absolute Deviation, Variance and Standard Deviation, Chebyshev's Theorem, Coefficient of Variation, Skewness, Moments and Kurtosis: Measures of Skewness, Moments: about Mean, Arbitrary Point, Zero or Origin. Measures of Kurtosis.

UNIT-II (10 Hrs.)

Correlation: Significance, Types, Methods of Correlation Analysis: Scatter Diagrams, Graphic Method, Karl Pearson's Correlation Co-efficient, Rank Correlation Coefficient, Properties of Correlation, Karl Pearson's Co-efficient of Correlation and Rank Correlation

Regression: Concept of Regression and The Difference between Correlation and Regression, Lines and Equations of Regression. Regression as a Predicting Tool.

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.

UNIT-III (8 Hrs.)

Index Numbers: Different Methods of Constructing Price and Quantity Index Numbers. Fixed Base and Chain Base Index Numbers, Problems of Reversibility in Index Numbers

Probability: Definition, Types of Probability, Classical Approach, Relative Frequency and Subjective Approach to Probability, Theorems of Probability, Addition, Multiplication and Bays Theorem and Its Application.

Probability Distribution Function: Discrete Probability Distribution (Binomial Distribution and Poisson Distribution), Continuous Probability Distribution (Approximation of Binomial and Poisson Distribution of Normal Distribution).

UNIT-IV (10 Hrs.)

Sampling: Concepts of Census and Sampling, Types of Sampling – Probability and Non Probability Sampling Central Limit Theorem, Determination of Sample Size and Sample Error.

Hypotheses Design: Formulation of Null and Alternative Hypothesis, Level of Significance. Concept of Standard Error of Mean, Confidence Limits

Hypotheses Testing: Type I and Type II Errors, Student's 'T' Test in Small Samples, Z-Test, Chi-Square Test, Analysis of Variance (Numerical Using Statistical Tables).

Course Outcomes: Student will be able to understand the measurement systems variability, control processes (as in statistical process control or SPC), for summarizing data, and to make data-driven decisions.

Recommended Books:

1. Levin & Rubin, 'Statistics for Management', Prentice Hall.
2. Beri, 'Business Statistics', Tata McGraw 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
Subject Code: MBADM1-105**L T P C****Duration: 40 Hrs.****4 0 0 4**

Learning Objectives: This course is intended to make students 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 (10 Hrs.)

Managerial Economics: Meaning, Nature, Scope & Relationship with Other Disciplines, Role of Managerial Economics in Decision Making, Opportunity Cost Principle, Production Possibility Curve, Incremental Concept.

Marginal Analysis: Law of Diminishing Marginal Utility, Law of Equi-Marginal Utility.

Indifference Curve Analysis: Meaning Assumptions Properties, Consumer Equilibrium and its Application.

UNIT-II (10Hrs)

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.

UNIT-III (8 Hrs.)

Theory of Production: Production Function, Short Run and Long Run Production, Analysis, Isoquants, Optimal Combination of Inputs, Application in Managerial Decision Making.

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.

UNIT-IV (12 Hrs.)

Price Determination under Perfect Competition- Introduction, Market and Market Structure, Perfect Competition, Price-Output Determination under Perfect Competition, Short-run Industry Equilibrium under Perfect Competition, Short-run Firm Equilibrium under Perfect Competition, Long-run Industry Equilibrium under Perfect Competition, Long-run Firm Equilibrium under Perfect Competition.

Pricing Under Imperfect Competition- Introduction, Monopoly, Price Discrimination under Monopoly, Bilateral Monopoly, Monopolistic Competition, Oligopoly, Collusive Oligopoly and Price Leadership, Duopoly, Industry Analysis

Behavior of Firms: Nash Equilibrium, Prisoner's Dilemma, Asymmetric Information.

Course Outcomes: After studying the subject the students will be able to understand and explain the concept of economics and its managerial perspective including the real insight of the consumer's economic behavior leading them to estimate the demand for the new product as well as changes in the existing products.

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.
6. D.N. Dwivedi, 'Managerial Economic', Vikas Publications.

MARKETING MANAGEMENT**Subject Code: MBADM1-106****L T P C
4 0 0 4****Duration: 45 Hrs.**

Learning Objectives: The course aims at making students understand concepts, philosophies, processes and techniques of managing the marketing operations of a firm in turbulent business environment. This course will 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.

UNIT-I (12 Hrs)

Understanding Marketing and Consumers: Definition, Importance, Scope, Various Marketing Concepts, Marketing Mix, Marketing vs Selling, Effect of Liberalization and Globalization, Creating Customer Value. 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 (12 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 (11 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 (10 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

Note: Relevant Case Studies should be discussed in class.

Course Outcomes: This course will equip students to review marketing issues with respect to understand basic concepts of Marketing, understand target segmentation and consumer decision making design of products that meet consumer needs understand pricing, channels of distribution understand marketing communication.

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: MHUMA0-104

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

Duration: 28 Hrs.

Learning Objectives: This course is designed to give students a comprehensive view of communication, its scope and importance in business, the role of communication in establishing a favourable image of the organization. The aim is to develop students' ability to communicate correctly and effectively on matters having relevance to day-to-day business operations. This course will make student conversant with fundamentals of communication, help them honing oral, written and non-verbal communication skills and to transform their communication abilities.

UNIT- I (7 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 (7 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, Summaries.

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 (7 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 (7 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, Frequently Asked Questions 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.

Course Outcome: After studying this course the students will enable to:

1. Know the dynamics of communication in the business world
2. Practice the different tools of communication
3. Enable them to speak effectively suited to the situation
4. Improve their competence in English

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. Baugh, Frayer & Thomas, 'How to write first class Business Correspondence', Viva Book.
7. Taylor, 'English Conversion Practice', Tata McGraw Hill.
8. Devaraj, 'Executive Communication', Tata McGraw Hill.
9. Ober, 'Effective Bossiness Communication', Cengage Learning.

COMPUTER APPLICATIONS FOR BUSINESS

Subject Code: MCAPP0-191

L T P C

Duration: 30 Hrs.

2 0 2 3

Learning Objectives: The objective of this course is to provide an insight into basic features of computer systems and their applications in Managerial Decision Making. It also provides technical framework to students for understanding the emerging world of e-Business.

UNIT-I (5 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, Introduction to Electron Display Gadgets

Operating System: Types of Operating System: Windows, Linux, Mac and features.

UNIT-II (12 Hrs.)

MS Applications: MS Word – Basics, Formatting Text and Documents, Mail Merge, Hyperlinks, Bookmark.

MS Excel – Introduction, creating a List, Graphs and Charts, Sorting, Filtering Data, Pivot Tables, Freezing Panes, Basic Statistical Formulae in Excel and Macros

MS PowerPoint – Introduction–Toolbar, their Icons and Commands– Navigating in Power Point–Creation of slides, animation, and Templates–Designing Presentations–Slide show controls–Making notes on Pages and Handouts–Printing Presentations–Customizing Presentations–Auto Content Wizard.

UNIT-III (5 Hrs.)

Internet and E-Business: Introduction to internet and its applications, Intranet and Extranet, World Wide Web, Internet Applications. E – business - E-Business framework, Infrastructure for E-Business, Electronic Data Interchange.

UNIT-IV (8 Hrs.)

Computer Networks and Security: Introduction: Cryptography, Ethical Hacking, Cyber Crime, Digital Signatures, E Wallets, Point of Sales.

Poster Making with Photoshop: Opening new and existing files, exploring tool box, various Operations: Zooming, Cropping, adjusting colours with adjustment panels, understanding pixel and resolution, image size command, resizing for print and web.

Course Outcomes: Students will be able to understand the concepts of computer and various software related to it. The use of MS Office (Excel, Access & Power point) helps in different type of analysis and projection of reports related to the business management. The software helps in planning & coordinating the supply chain of the company.

Recommended Books:

1. Rainer and Potter, 'Introduction to Information Technology', John Wiley and Sons.
2. Roger Jennings, 'Microsoft Access 2010', Pearson Education.
3. Forouzan, 'Basics of Computer Science', Cengage Learning.
4. Joseph Brady & Ellen F Monk, 'Problem Solving Cases in Microsoft', Excel Thomson Learning.
5. K. Saini & Pradeep Kumar, 'Computer Applications in Management', Anmol Publications.
6. Deepak Bharihoke, 'Fundamentals of Information Technology', Excel Books.

INDIAN ETHOS AND BUSINESS ETHICS

Subject Code: MBADM1-207

L T P C
4 0 0 4

Duration: 45 Hrs.

Learning Objectives: Well thought-out decision making in a business organization requires the proper knowledge of the environment in which it has to function. This course aims at exposing the students to the corporate business environment forces that may affect their future decision making.

UNIT – I (12 Hrs.)

History & Relevance, Principles Practiced by Indian Companies, Role of Indian Ethos in Managerial Practices, Management Lessons from Vedas, Mahabharata, Bible, Quran, Kautilya's Arthashastra, Indian Heritage in Business, Management-Production and Consumption. Ethics v/s Ethos, Indian v/s Western Management, Work Ethos and Values for Indian Managers- Relevance of Value Based Management in Global Change- Impact of Values on Stakeholders, Trans-Cultural Human Values, Secular v/s Spiritual Values, Value System in Work Culture

UNIT - II (10 Hrs.)

Stress Management-Meditation for mental health, Yoga, Contemporary Approaches to Leadership- Joint Hindu Family Business–Leadership Qualities of Karta, Indian Systems of Learning-Gurukul System of Learning, Advantages- Disadvantages of Karma, importance of Karma to Managers-Nishkama Karma, Laws of Karma, Law of Creation- Law of Humility- Law of Growth- Law of Responsibility- Law of Connection-Corporate Karma Leadership.

UNIT - III (8 Hrs.)

Understanding the need for ethics, Ethical values, myths and ambiguity, ethical codes, Ethical Principles in Business; Theories of Ethics, Absolutism versus Relativism, Teleological approach, the Deontological approach, Kohlberg's six stages of moral development (CMD).

UNIT - IV (10 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. Manuel G. Velasquez, 'Business Ethics', Pearson Education.

2. Biswanath Ghosh, 'Ethics in Management and Indian Ethos', 2nd Edn., Vikas Publication, 2011.
3. S. Balachandaran, 'Ethics, Indian Ethos and Management', 2nd Edn. Shroff Publishers & Distributors 2003
4. Aanda Das Gupta, 'Business Ethics Text and Cases from Indian Perspectives', Springer.

INDIAN ECONOMY AND POLICY

Subject Code: MBADM1-208

L T P C

Duration: 45 Hrs.

4 0 0 4

Learning Objectives: This course will teach students the basic tools of macroeconomics and apply them to real world economic policy. The goals of the course are for students to understand how to evaluate macroeconomic conditions, understand how monetary policy and fiscal policy can be used to influence short-run macroeconomic conditions.

UNIT-I (11 Hrs.)

Nature of Macro-Economic System: Colonialism and development of the Indian Economy-De-industrialization of Indian Economy-Business Enterprises-Growth and economic reforms-Poverty, Role of Macro Economics for Managerial Decision Making Circular Flow of Income;

National Income: Concepts and Measurement, Keynesian Theory of Income Determination, Consumption Function, Keynes' Psychological Law of Consumption, Income-Consumption Relationship: Relative Income, Life Cycle and Permanent Income Hypothesis.

UNIT-II (10 Hrs.)

Saving and Investment Functions; Marginal Efficiency of Capital; Multiplier, Accelerator and Investment Behavior, Balance of Payment and Exchange Rate Determination Applications: India's Experience With Exchange Rate, Impact of Fluctuations in Exchange Rate on Export, Import and Growth of Domestic Industry

Introduction to Demand and Supply of Money: Motive for Holding Money; Liquidity Preference.

UNIT-III (10 Hrs.)

Inflation and Unemployment: Concepts of Inflation-Demand Pull and Cost Push; Introduction to Philips Curve as Relation between Inflation and Unemployment.

Business Cycle: Features and Phases, Effects and Control.

Macro Economic Policy: Understanding of Macroeconomic Stabilization and Structural Reforms. Central Banking Operations and Aspects of Monetary Management; Growth and Stabilization Effects of Monetary Policy Operations;

UNIT-IV (14 Hrs.)

Fiscal Policy: Nature and Components of Fiscal Policy; Fiscal Policy Operations for Macro-Economic Growth and Stabilization; Fiscal Deficit and Its Management; Public Debt Operations and Their Impact, Co-Ordination of Fiscal and Monetary Policies for Effective Macro-Management; Corporate Adjustments to Monetary and Fiscal Variations.

Financial Sector Performance and Impending Reforms, Economic reforms towards more Liberalization-Agriculture, industry and services, Government reforms and the emerging energy-economy-environment regulatory framework.

Course Outcomes: Upon successful completion of the course, the student should be able to demonstrate a basic understanding of news relating to the economy as a whole, the economic implications of changes in government fiscal or monetary policy; how interest rates are determined and the role of interest rates in personal and corporate decision-making; and critically apply economic concepts when participating as a citizen in a democratic society. In

particular, the students should be able to calculate equilibrium national income levels, calculate and use various multipliers, convert nominal values to real values.

Recommended Books:

1. Olivier Blanchard, 'Macroeconomics Updated Englewood Cliffs:' Prentice Hall 5th edition, **2011**
2. Dimand, Robert W. Durlauf, Steven N.; Blume, Lawrence E., eds. "Macroeconomics, Origins and History" **2008**
3. D.N. Dwivedi, 'Macroeconomics: Theory and Policy', Tata McGraw Hill, New Delhi, **2001**
4. John Bouman, 'Principles of Macroeconomics – free fully comprehensive Principles of Microeconomics and Macroeconomics Texts'

MARKETING RESEARCH

Subject Code: MBADM1-209

L T P C

Duration: 40 Hrs.

4 0 0 4

UNIT-I (10 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 (10 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 (10 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 (10 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, Mini Tab or MATLAB Software in Data Analysis.

Recommended Books:

1. R.I. Levin and D.S. Rubin, 'Statistics for Management', 7th Edn., Pearson Education, New Delhi.
2. N.K. Malhotra, 'Marketing Research—An Applied Orientation', 4th Edn., Pearson Education New Delhi.
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', 2nd Edn., New Age International Publishers.

CORPORATE FINANCE

Subject Code: MBAD1-210

L T P C
4 0 0 4

Duration: 40 Hrs.

Learning Objectives: To provide an understanding of the function, the roles, the goals and the processes of corporate financial management, covering the sourcing of finances and their issues in investment and operations. Problem-solving methodology will be used to illustrate the theories and tools in financial decision making.

UNIT-I (10 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 (10 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 (10 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, Receivable Management.

Long term Sources of Funds: Equity share, Preference shares, Debentures, Bonds, Warrants, Venture capital, Convertible Bonds/Debentures.

Short Term Sources of Funds: Commercial Paper, Certificate of Deposit, Treasury Bills

Course Outcome: After completing this course the students should be able to make optimum decisions pertaining to raising funds, making investments & managing the assets of a corporation, big or small, with an ultimate goal of creating value.

Recommended Books:

1. Brigham, 'Financial Management: Text & Cases', Cengage Learning.
2. Brealy & Myres, 'Principles of Corporate Finance', Tata McGraw Hill.
3. J. John, '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: MBADM1- 211****L T P C****Duration: 40 Hrs.****4 0 0 4**

Learning Objectives: The objective of the paper is to make student aware of the various functions and importance of the HR Department in any organization. It is basically concerned with managing the human resources, whereby the underlying objective is to attract retain and motivate the human resources in any organization, which is the most challenging and daunting look for any organization today.

UNIT-I (10 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 (10 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 (10 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.

Course Outcome: 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.

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.

OPERATIONS MANAGEMENT**Subject Code: MBADM1-212****L T P C****Duration: 40 Hrs****4 0 0 4**

Learning Objective: It is a subject where a student learns various steps of product design, development, production, plant location, storage, production planning and control. The students are motivated to apply concepts and principles of management to become more effective professional.

UNIT – I (10 Hrs)

Operations Management: Concept, Functions. Transformation Process Model: Inputs, Process and Outputs; Classification of Operations; Responsibilities of Operations Manager, Nature of International Operations Management, Sustainable Operations Management.

Difference between Manufacturing and Service Operations.

Operations Strategy: Operations Strategy, Competitive Capabilities and Core Competencies, Operations Strategy as a Competitive Weapon, Linkage between Corporate, Business, and Operations Strategy, Developing Operations Strategy, Elements or Components of Operations Strategy, Global Strategies and Role of Operations Strategy.

UNIT – II (10 Hrs)

Facility Location – Importance, Factors in Location Analysis, Location Analysis Techniques. Product Design and Development – Product Design and Its Characteristics, Product Development Process (Technical), Product Development Techniques

Process Selection- Project, Job, Batch, Mass and Process Types of Production Systems, Operations Management in Corporate Profitability and Competitiveness.

UNIT – III (10 Hrs)

Capacity Planning: Concepts, Factors affecting Capacity Planning, Capacity Planning Decisions.

Inventory Management: Deterministic Demand Model, EOQ, Re-order level, ABC analysis, Continuous and Periodic Review Inventory models

Supply Chain Management; Lean vs Agile supply chains; Aggregate Production Planning;

Master Production Schedule (MPS) and Material Requirement Planning (MRP), JIT Approach, Implementation requirements, Services, Kanban System

UNIT – IV (10 Hrs)

Quality Management: Introduction, Meaning, Quality Characteristics of Goods and Services, Jurans' Quality Trilogy, Deming's 14 Principles, Tools and Techniques for Quality Improvement, Statistical Process Control Chart, Quality Assurance, Total Quality Management (TQM) Model. Introduction to Six Sigma.

Project Management: Project Lifecycle Understanding, Project Definition, WBS (Work Breakdown Structure), Planning Scope-Planning Schedule.

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.

Recommended Books:

1. Buffa & Sarin, 'Modern Production/Operations Management', 8th Edn., John Wiley.
2. Chary, 'Production and Operations Management', Tata McGraw Hill.
3. Krajewski & Ritzman, 'Operations Management', 5th Edn., Pearson Education.
4. Adam and Eben, 'Production & Operations', 5th Edn., Prentice Hall.

MINOR PROJECT - I

Subject Code: MBADM1-213

L T P C

3 0 0 3

1. Students have to prepare a research report on their interest area (Finance, HR, Marketing etc.)
2. Students will have to apply all research report components like Introduction, Review of literature, Research Methodology, Statistical Techniques (Learn in Market Research), Findings etc. Students have to use Statistical Software like SPSS should be used to apply statistical techniques.
3. The students will have to give presentation of 15-20 minute on the research report.

MRSPTU M.Sc. (CLINICAL RESEARCH) SYLLABUS 2018 BATCH ONWARDS

1 st Semester		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
MPHA8-101	Dosage Form Design	3	1	0	40	60	100	4
MPHA8-102	Clinical Research - I	3	1	0	40	60	100	4
MPHA8-103	Clinical Studies – I	3	1	0	40	60	100	4
MPHA8-104	Seminar/Assignments	0	0	8	100	0	100	4
MPHA8-105	Clinical Research Lab.-I	0	0	8	60	40	100	4
Total		9	3	16	280	220	500	20

2 nd Semester		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
MPHA8-206	Epidemiology: The Basic Science of Public Health	3	1	0	40	60	100	4
MPHA8-207	Clinical Research - II	3	1	0	40	60	100	4
MPHA8-208	Clinical Studies – II	2	2	0	40	60	100	4
MPHA8-209	Seminar/Assignments	0	0	8	100	0	100	4
MPHA8-210	Clinical Research Lab.-II	0	0	8	60	40	100	4
Total		8	4	16	280	220	500	20

3 rd Semester		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
MPHA8-311	Research Methodology & Biostatistics	3	1	0	40	60	100	4
MPHA8-312	Clinical Research - III	3	1	0	40	60	100	4
MPHA8-313	Research Work/Minor Project	0	0	14	100	0	100	7
MPHA8-314	Seminar/Assignments	0	0	8	100	0	100	4
MPHA8-315	Journal Club	0	0	2	100	0	100	1
Total		6	2	24	380	120	500	20

4 th Semester		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Thesis Evaluation	Viva-Voce	Total	
MPHA8-416	Dissertation/Major Project	0	0	40	100	200	300	20
Total		0	0	40	100	200	300	20

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

Total Marks: 1800

Total Credits: 80

DOSAGE FORM DESIGN

Subject Code: MPHA8-101

L T P C
3 1 0 4

Contact Hrs.: 45

- 1. Introduction:** Definitions and brief – (pharmacology, pharmacokinetics, pharmacodynamics, drug, pharmacotherapeutics, clinical pharmacology, chemotherapy, pharmacy and toxicology), drug Nomenclature (chemical name, non-proprietary name and proprietary name) and essential drugs concepts.
- 2. Routes of Drug Administration:** Local routes (topical, deeper tissues and arterial supply etc.), systemic routes (Oral, sublingual, rectal, cutaneous, inhalation, nasal, parenteral etc.)
- 3. Sources of Drugs:** Natural sources and synthetic sources.
Pharmacokinetics: Brief of absorption, distribution, metabolism and excretion
Pharmacodynamics: Principles of drug action and mechanism of drug action, dose response curve and adverse drug reaction.
- 4. Dosage Forms of Drug:** Definition and brief about the dosage forms – solid dosage forms (powder, tablets, capsules, lozenges, pills, cachets), liquid dosage forms (suspension, emulsion, elixirs, syrups, lotions, inhalations, eye drops, ear drops, enemas, mouth washes etc.), semisolid dosage forms (ointments, creams, pastes, gels, suppositories, etc.), sterile products (Injectable, ophthalmic etc.), gas (aerosols, inhalations, sprays etc.) and novel drug delivery system (liposome, nanosome, nanoparticles, microspheres, osmotic pumps, transdermal, implants, intrauterine devices).
- 5. Factors Modifying Drug Action:** Body size, age, sex, species and race, genetics, environmental factors, psychological factor, pathological states, other drugs, cummulation, tolerance, etc.

Recommended Books:

1. Humphrey P. Rang, Maureen M. Dale, James M. Ritter, Rod J. Flower and Graeme Henderson, 'Rang & Dale's Pharmacology', 8th Edn., Elsevier.
2. Laurence Brunton, Bruce Chabner, Bjorn Knollman, 'Goodman and Gilman's The Pharmacological Basis of Therapeutics', 12th Edn., McGraw Hill.
3. K.D. Tripathi, 'Essentials of Medical Pharmacology', 7th Edn., Jaypee.
4. 'Remington', 22nd Edn., Pharmaceutical Press.
5. Cooper and Gunn's, 'Dispensing for Pharmaceutical Students', 12th Edn., CBS Publishers.
6. Suresh P. Vyas & Roop K. Khar, 'Controlled Drug Delivery', 2nd Edn., Vallabh Prakashan.
7. Herbert A. Lieberman & Leon Lachman, 'Pharmaceutical Dosage Form', Vol-1, 2, 3, 2nd Edn., Informa Healthcare.

CLINICAL RESEARCH - I

Subject Code: MPHA8-102

L T P C
3 1 0 4

Contact Hrs.: 45

- 1. Drug Discovery & Development:** Introduction to drug development process, drug design- ligand based, structure based, active site identification, rational drug discovery & high throughput screening,
- 2. Introduction to Preclinical Study Guidelines:** Introduction to ICH Guidelines for Quality, Safety and Efficacy.

3. **History & Origin of Clinical Research:** Origin and Principles of International Conference on Harmonization - Good Clinical Practice (ICH-GCP) guidelines; The Belmont Report; The Nuremberg Code, Principles of ICH-GCP;
4. **Guidelines:** Biomedical Research and Human Participant- Schedule Y, ICMR, Indian Good Clinical Practices.
5. **Clinical Trial Application Requirements for**
 - **Investigational New Drug (IND):** Classifications, IND application submission check list, FDA IND review check list, IND application process, Information for sponsors-investigator submitting IND, IND forms and instructions.
 - **New Drug Application (NDA):** Pre NDA meeting, NDA submission Check list, FDA NDA review check list.
 - **Abbreviated New Drug Application (ANDA):** ANDA content, ANDA Submission check list, FDA ANDA review check list, ANDA process for generic drugs, guidance documents for ANDAs, ANDA forms and electronic submissions.
 - **Orphan Drugs Application:** Submission check list, FDA orphan drug review check list, FDA documents.

Recommended Books:

1. Sandy Welnberg, 'Guideline for Drug Regulatory Submissions'.
2. Alan A. Chalmers, 'International Pharmaceutical Registration'.
3. Felicity Smith, Sally Anne Francis, Ellen Schathecute, 'International Research in Health Care'.
4. Graham D. Ogg, 'Quality Management in Clinical Trial Research', e-book.
5. 'International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use. ICH Harmonized Tripartite Guideline. Guideline for Good Clinical Practice', E6; May, 1996.
6. Lawrence M. Friedman, Curt D. Furberg, David L. DeMets, David M. Reboussin, Christopher B. Granger, 'Fundamentals of Clinical Trials', 4th Edn., Springer.
7. N.G. Rick, 'Drugs from Discovery to Approval', 3rd Edn., Wiley-Blackwell.

CLINICAL RESEARCH - I

Subject Code: MPHA8-103

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

Contact Hrs.: 45

Course Objectives: Understand the clinical studies and other aspects of highly prevalent disease including,

- Definition
 - Clinical features
 - Clinical terminologies
 - Case reports/case study of any one representative case report/study in relation to following diseases &
 - How to design clinical trial/Research protocols in relation to following diseases.
1. **Psychological and Mood Disorders:** Schizophrenia and Depression.
 2. **Neurodegenerative disorders:** Alzheimer's & Parkinson's disease.
 3. **Atherosclerosis, Hypertension & Renal diseases.**
 4. **Coronary artery diseases & Congestive Heart Failure** including surgical treatments & stents.

5. Cerebrovascular diseases: Stroke.

Recommended Books:

1. Goodman and Gillman's, 'The Pharmacological Basis of Therapeutics'.
2. David E. Golan, Armen H. Tashjian Jr., Ehrin J. Armstrong, April W. Armstrong, Wolters, 'Principles of Pharmacology. The Pathophysiological Basis of Drug Therapy', Kluwer-Lippincott Williams & Wilkins Publishers.
3. B.G. Katzung, 'Basic and Clinical Pharmacology'.
4. Graham Smith, 'Oxford Textbook of Clinical Pharmacology'.
5. 'Dipiro Pharmacology, Pathophysiological Approach'.
6. 'Green Pathophysiology for Pharmacists'.

SEMINAR/ASSIGNMENTS

Subject Code: MPHA8-104

L T P C

0 0 8 4

The candidate needs to prepare seminar from syllabus and present in front of class room gathering. At least five assignments to be submitted as per the given instruction of teachers and shall be submitted accordingly.

CLINICAL RESEARCH LAB.-I

Subject Code: MPHA8-105

L T P C

0 0 8 4

1. **MS-Excel:** Introduction to MS Office; Word; Power point; Publisher; and Excel
2. **Soft Skills:** Introduction and definition, motivation, SWOT analysis, goal setting, business etiquettes, business dressing, business communication, understanding body language and gestures, listening skill, giving and accepting feedback, group discussion.
3. **Clinical Data Management:** Overview, regulation, data management plan, data acquisition and CRF designing, database designing and implementation, data entry and verification and data analysis and use of statistics in treatment of clinical data.
4. **Introduction to Scientific Writing and Reports:** Importance of research papers and reports and their role in scientific developments to be given. Basic information on the structure and contents of individual sections to be given by experts.

Recommended Books:

1. June Jamrich Parsons, Dan Oja., 'Practical Computer Literacy', 3rd Edn., CENGAGE Learning.
2. Simon Cook, 'Clinical Studies Management'.
3. Duolao Wand, 'Clinical Trials', e-books.
4. Josef Kolman, Paul Meng, 'Good Clinical Practice'.
5. Graham D. Ogg, 'Quality Management in Clinical Trial Research'. E-book.

EPIDEMIOLOGY: THE BASIC SCIENCE OF PUBLIC HEALTH

Subject Code: MPHA8-206

L T P C

Contact Hrs.: 45

3 1 0 4

- 1. Epidemiology:** Introduction and history of Epidemiology, Pioneers of epidemiology (history), Examples of Research areas using Epidemiology, Definitions, Person, place, time and population perspective.
- 2. Prevalence:** Prevalent vs incident cases, Prevalence, Risks, Rates, Odds.
- 3. Study Designs:** Experimental study design [part 1, part 2 & part 3]; Cohort study design, Case control study design, Cross-sectional studies, Ecologic studies.
- 4. Measures of Association and Confidence Intervals:** Measures of Association, Odds Ratio, Interpreting Measures of Association, Confidence Intervals, Confidence Intervals examples
- 5. Causality:** Introduction to causality, Bradford Hill criteria, Additional resources (study materials).

Recommended Books:

1. Editor Brian L Storm, 'Pharmacoepidemiology', 4th Edn., John Wiley and Sons, Ltd.
2. Brian Haynes, David L. Sachett, Lippinkot, 'Clinical Epidemiology - How to do Clinical Practice Research', 3rd Edn.
3. B. Waning, M. Montagne, W.W. McCloskey, 'Pharmacoepidemiology: Principles and Practice', 2001.
4. K.G. Revikumar, 'Harmacoepidemiology and Pharmacoeconomics Concepts and Practice', Paperback, 2016.
5. Brian L. Strom, Stephen E. Kimmel, 'Textbook of Pharmacoepidemiology', 1st Edn.,.

CLINICAL RESEARCH - II

Subject Code: MPHA8-207

L T P C

Contact Hrs.: 45

3 1 0 4

- 1. Clinical Trials: Types and Phases:** Types of trials: Prevention Trials, diagnostic trial, Treatment trial, Observational studies, Quality of life trials etc.; **Micro-dosing** - Phase 0 and importance in relation to clinical research; Phases of clinical trials- Phase 1, Phase 2, Phase 3, Phase 4.
- 2. 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.
- 3. 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.
- 4. 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

5. Operations in BABE: Role of quality assurance & quality control in BA/BE studies, role of medical writing 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. David Machin, Simon Day and Sylvan, 'Textbook of Clinical Trials'.
2. Giovanna di Ignazio, Di Giovanna and Haynes, 'Principles of Clinical Research'.
3. 'Ethical Guidelines for Biomedical Research on Human Subjects 2000', Indian Council of Medical Research, New Delhi.
4. Duolao Wand, Ameet Bakhai Remedica, 'Clinical Trials' – e-books.
5. Duolao Wang & Ameet Bakhai, 'Clinical Trials: A Practical Guide to Design, Analysis & Reporting'.
6. Peter G. Welling, Francis L.S. Tse, Shrikant V. Dighe, 'Pharmaceutical Bioequivalence', 1st Edn., Informa Healthcare.
7. Sarfaraz K. Niazi, 'Handbook of Bioequivalence Testing'.

CLINICAL STUDIES - II

Subject Code: MPHA8-208

L T P C
2 2 0 4

Contact Hrs.: 45

Course Objectives: Understand the clinical studies and other aspects of highly prevalent disease including,

- Definition
- Clinical features
- Clinical terminologies
- Case reports/case studies of any one representative case report/study in relation to following diseases &
- How to design clinical trial/Research protocols in relation to following diseases.

1. Diabetes mellitus

2. Arthritis- Rheumatoid arthritis, osteoarthritis

3. Inflammatory Bowel Disease and Irritable Bowel Syndrome

4. Malignancies & AIDS

5. Common infections like Tuberculosis & Malaria

Recommended Books:

1. Dan Longo, Anthony Fauci, Dennis Kasper, Stephen Hauser, J. Jameson, Joseph Loscalzo, 'Harrison's Principles of Internal Medicine', 18th Edn., McGraw Hill.
2. Brian R. Walker, Nicki R. Colledge, Stuart H. Ralston, Ian Penman, 'Davidson's Principles and Practice of Medicine', 22nd Edn., Churchill Livingstone, Elsevier.
3. Murray Longmore, Ian Wilkinson, Andrew Baldwin, and Elizabeth Wallin, 'Oxford Handbook of Clinical Medicine', 9th Edn., Oxford Medical Handbooks.

Follow the links for Case Studies:

www.ohsu.edu/xd/research/about/integrity/irb/upload/UP-Case-Studies.pdf

www.fcrindia.org/case-studies

<https://www.firmaclinicalresearch.com/case-studies/>

www.crc.gov.my/.../05_Final_Edited_Ethics_Ethical_problems_in_clinical_trial.pdf

<https://www2.rnsa.org/.../Graham%20Case%20Studies%20Multicntr%20Clin%20Trial...>

<https://www.fda.gov/downloads/AboutFDA/ReportsManualsForms/.../UCM535780.pdf...>

www.cliantha.in/pdf/case-study/Biosimilars-Case-Studies.pdf

SEMINAR/ASSIGNMENTS

Subject Code: MPHA8-209

L T P C
0 0 8 4

The candidate needs to prepare seminar from syllabus and present in front of class room gathering. At least five assignments to be submitted as per the given instruction of teachers and shall be submitted accordingly.

CLINICAL RESEARCH LAB.-II

Subject Code: MPHA8-210

L T P C
0 0 8 4

Clinical Exercises:

- Case studies solutions
- Technical and soft skill presentations
- Term search
- Development of Clinical research documents
 - ✓ SOPs development
 - ✓ CRFs & ICFs Preparation
 - ✓ Dummy clinical research and bioequivalence protocols etc.
- Role played by clinical research stake holders like Clinical research associate, investigator, project manager, volunteer, clinical research coordinator, auditor etc.

Industrial/Hospital/Laboratory Exposure:

- Visits and overview of the facility, infrastructure, flow of activity, visiting different areas like screening room, medical examination room, phlebotomy room, dining area, baggage and body area, clinical pharmacological unit, dosing area, investigator`s cabin, drug store, plasma separation and storage room.
- On site exposure which includes observation of actual in-process activities like blood collection, plasma separation, screening of volunteers, informed consent process.
- A visit to Analytical Department and Central Laboratory to have know-how of the tests/investigations conducted and other procedures performed in respective departments.

Recommended Books:

1. Julia Lloyd and Ann Raven Ed. Churchill Livingstone, 'Handbook of Clinical Research'.
2. Duolao Wang & Ameet Bakhai, 'Clinical Trials: A Practical Guide to Design, Analysis & Reporting'.
3. David Machin & Michael Campbell, 'The Design for Studies for Medical Research'.

Follow the links for Case Studies:

1. www.ohsu.edu/xd/research/about/integrity/irb/upload/UP-Case-Studies.pdf
2. www.fcindia.org/case-studies
3. <https://www.firmaclinicalresearch.com/case-studies/>
4. www.crc.gov.my/.../05_Final_Edited_Ethics_Ethical_problems_in_clinical_trial.pdf
5. <https://www2.rsna.org/.../Graham%20Case%20Studies%20Multicntr%20Clin%20Trial...>
6. <https://www.fda.gov/downloads/AboutFDA/ReportsManualsForms/.../UCM535780.pdf...>
7. www.cliantha.in/pdf/case-study/Biosimilars-Case-Studies.pdf.

RESEARCH METHODOLOGY & BIostatISTICS

Subject Code: MPHA8-311

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

Contact Hrs.: 45

- 1. General Research Methodology:** Research, objective, requirements, practical difficulties, review of literature, study design, types of studies, strategies to eliminate errors/bias, controls, randomization, crossover design, placebo, blinding techniques.
- 2. Introduction to Biostatistics & its Role in Clinical Research:** Population & Sample, Parameter & Statistic, Types of variables, Measures of Central Tendency-Mean, different types of mean, Median, Mode, Histograms, Scatter Plots, Construction & Labeling of graphs, Normal & Binomial Distribution, Research Hypothesis testing, Sample size calculation & Power, p-value, Confidence Interval, Randomization methods, Blinding in Clinical research.
- 3. Medical Research:** History, values in medical ethics, autonomy, beneficence, non-maleficence, double effect, conflicts between autonomy and beneficence/non-maleficence, euthanasia, informed consent, confidentiality, criticisms of orthodox medical ethics, importance of communication, control resolution, guidelines, ethics committees, cultural concerns, truth telling, online business practices, conflicts of interest, referral, vendor relationships, treatment of family members, sexual relationships, fatality.
- 4. Patents Regulations & Intellectual Property Rights (IPR):** Patent Laws, trade related aspects of intellectual property rights (TRIPS), patent extension rules, implications; copyright, trademarks, patents: requirement, objectives, patent implications, recent scenario and case studies.
- 5. Declaration of Helsinki:** History, introduction, basic principles for all medical research, and additional principles for medical research combined with medical care.

Recommended Books:

1. Todd A. Durham & J. Rick Turner, 'Introduction to Statistics in Pharmaceutical Clinical Trials'.
2. Sanford Bolton, 'Pharmaceutical Statistics; Practical and Clinical Application'.
3. Sisanne Proucha, 'Practical Guide to - Clinical Data Management'.
4. 'Universal's Concise Commentary, The Patents Act, 1970', 1st Edn., Universal Law Publishing.
5. C.V.S. Subrahmanyam, 'Pharmaceutical Regulatory Affairs', 1st Edn., Vallabh Prakashan.
6. <https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/>

CLINICAL RESEARCH – III

Subject Code: MPHA8-312

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

Contact Hrs.: 45

- 1. Regulatory Submissions:** Drugs Controller General of India (DCGI)/Central Drugs Standard Control Organization (CDSCO) submissions, e-CTD (Common Technical Document). USFDA & EMA Guidelines.
- 2. Designs of Clinical Trials & Clinical Trial Study Team:** Experimental Study- RCT and Non-RCT, Observation Study: Cohort, Case Control, Cross sectional; Clinical Trial Study Team: Roles and responsibilities of Clinical Trial Personnel: Investigator, Study Coordinator, Sponsor, Contract Research Organization and its management.

3. **Informed Consent Process & Operation of Institutional Review Board (IRB)/ Independent Ethics Committee (IEC):** Structure and content of an Informed Consent Process Ethical principles governing informed consent process; Defining Scope of IRB/IEC Authority, Responsibilities of IRB/IEC, Composition of IRB/IEC, Basic Functions, Operation and Procedure of IRB/IEC, Communication with IRB, IRB/IEC Records.
4. **Pharmacovigilance Overview:** Introduction, history, Definitions of Adverse Event (AE), Adverse Drug Reaction (ADR), Serious Adverse Event (SAE), Serious unexpected and Related events (SUR), Suspected-unexpected serious Adverse reaction (SUSAR), Reporter's Causality, Company's Causality and Listedness, Methods of ADR Reporting, PRAC and Pharmacovigilance Guidelines (GVP modules), Pharmacovigilance centers in India, CDSCO Indian PV Guidelines-National Pharmacovigilance Program (NPP).
5. **Management of Pharmacovigilance Reports:**
 - a. **Individual Case Safety Reports (ICSRs):** Definition of ICSRs, Types of ICSRs and Various Sources of ICSRs, Processing of ICSRs: Triage, Initiation, Medical Regulatory Assessment, Narrative writing, Quality Check and Submission of ICSRs to Health Authorities. Introduction to various safety databases: Argus, Aris G and VigiFlow.
 - b. **Periodic/Aggregate Safety Reports:** Overview of Periodic Benefit Risk Evaluation Reports (PBRERs), PRAC Reports, Ad-hoc Reports, RMPs (Risk Management Plan) and Addendum to Clinical Overview (ACO).

Recommended Books:

1. Alan A. Chalmers, 'International Pharmaceutical Registration'.
2. Sandy Weiberg, 'Guideline for Drug Regulatory Submissions'.
3. Duolao Wang & Ameet Bakhai, 'Clinical Trials: A Practical Guide to Design, Analysis & Reporting'.
4. Susan S. Ellenberg, Thomas R. Flemming, David L. Demets, 'Data Monitoring Committees in Clinical Trials', e-book.
5. Shayne C. Gad, 'Drug Safety Evaluation'.
6. David Machin & Michael Campbell, 'The Design for Studies for Medical Research'.
7. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4231554>.
8. <https://gmch.gov.in/e-study/.../ADRs%20&%20Pharmacovigilance%20lecture.pdf>.
9. <https://www.pmda.go.jp/files/000215600.pdf>.
10. www.ema.europa.eu/ema/

RESEARCH WORK/MINOR PROJECT

Subject Code: MPHA8-313

L T P C

0 0 14 7

The student will be assigned with minor project or Research work pertaining to clinical research. Final report should be submitted following its presentation.

SEMINAR/ASSIGNMENTS

Subject Code: MPHA8-314

L T P C

0 0 8 4

The student needs to prepare seminar from syllabus and present in front of class room gathering. At least five assignments to be submitted as per the given instruction of teachers and shall be submitted accordingly.

JOURNAL CLUB

Subject Code: MPHA8-315

L T P C

0 0 2 1

Student shall present clinical research papers to be given in the classroom.

MRSPTU

**MRSPTU MASTERS IN HOSPITALITY AND TOURISM ADMINISTRATION
SYLLABUS 2018 BATCH ONWARDS**

1 st Semester		Contact Hrs.			Marks			Credits
Code	Course	L	T	P	Int.	Ext.	Total	
MHOM1-101	Management & Organizational Behaviour	4	0	0	40	60	100	4
MHOM1-102	Basics of Tourism	4	0	0	40	60	100	4
MHOM1-103	Tourism Geography & Resources of India	4	0	0	40	60	100	4
MHOM1-104	Introduction to Hospitality Management	4	0	0	40	60	100	4
MHOM1-105	Managerial Economics	4	0	0	40	60	100	4
MHOM1-106	Interpersonal & leadership Skills in Hospitality & Tourism	4	0	0	40	60	100	4
MHOM1-107	Business Communications	4	0	0	40	60	100	4
MHOM1-108	Tourism Products of Punjab	2	0	0	40	60	100	2
MHOM1-109	Comprehensive Viva Voce	0	0	0	100	0	100	2
Total		30	0	0	420	480	900	32

2 nd Semester		Contact Hrs.			Marks			Credits
Code	Course	L	T	P	Int.	Ext.	Total	
MHOM1-210	Travel Agency & Tour Operations	4	0	0	40	60	100	4
MHOM1-211	Tourism Policy, Planning & Development	4	0	0	40	60	100	4
MHOM1-212	Entrepreneurship Development	4	0	0	40	60	100	4
MHOM1-213	Marketing for Hospitality & Tourism	4	0	0	40	60	100	4
MHOM1-214	Financial Management & Accounting	4	0	0	40	60	100	4
MHOM1-215	Human Resource Management	4	0	0	40	60	100	4
MHOM1-216	Business Research Methods	4	0	0	40	60	100	4
MHOM1-217	Comprehensive Viva Voce	0	0	0	100	0	100	2
MHUM1-101	Foreign Language (French)	2	0	0	40	60	100	2
Total		30	0	0	420	480	900	32

*The students will undergo training after completion of 2nd semester for 6 weeks, the evaluation for which will be done in 3rd semester

**MRSPTU MASTERS IN HOSPITALITY AND TOURISM ADMINISTRATION
SYLLABUS 2018 BATCH ONWARDS**

3 rd Semester		Contact Hrs.			Marks			Credits
Code	Course	L	T	P	Int.	Ext.	Total	
MHOM1-318	Customer Relationship Management	4	0	0	40	60	100	4
MHOM1-319	Business Ethics and Etiquettes	4	0	0	40	60	100	4
MHOM1-320	*Summer Training Report and Viva	0	0	0	60	40	100	4
HOSPITALITY (Compulsory)								
MHOM1-321	Rooms Division Management	4	0	0	40	60	100	4
TOURISM (Compulsory)								
MHOM1-322	Tourism Resources of India	4	0	0	40	60	100	4
HOSPITALITY (Departmental Elective-I)								
MHOM1-356	Hotel Guest Safety and Security	4	0	0	40	60	100	4
MHOM1-357	Resort Management							
MHOM1-358	Revenue Management							
TOURISM (Departmental Elective-I)								
MHOM1-359	Destination Management	4	0	0	40	60	100	4
MHOM1-360	Tourism Impacts							
MHOM1-361	Event Management							
Open Elective-I								
		4	0	0	40	60	100	4
Total		28	0	0	340	460	800	32

4 th Semester		Contact Hrs.			Marks			Credits
Code	Course	L	T	P	Int.	Ext.	Total	
MHOM1-423	Strategic Management	4	0	0	40	60	100	4
MHOM1-424	Production and Operations Management	4	0	0	40	60	100	4
MHOM1-425	Dissertation	0	0	0	60	40	100	4
HOSPITALITY (Compulsory)								
MHOM1-426	Food and Beverage Division Management	4	0	0	40	60	100	4
TOURISM (Compulsory)								
MHOM1-427	Tourism Transportation	4	0	0	40	60	100	4
HOSPITALITY (Departmental Elective-II)								
MHOM1-462	Menu Engineering and Bar Management	4	0	0	40	60	100	4
MHOM1-463	Facility Planning							
MHOM1-464	Kitchen Management							
TOURISM (Departmental Elective-II)								
MHOM1-464	Airfare Ticketing and Cargo Management	4	0	0	40	60	100	4
MHOM1-465	Travel Documentation							
MHOM1-466	Itinerary preparation and tour guiding							
Open Elective-II								
		4	0	0	40	60	100	4
Total		28	0	0	340	460	800	32

Total Credits = 32 + 30 + 32 + 32 = 126

MANAGEMENT & ORGANISATIONAL BEHAVIOUR

Subject Code: MHOM1-101

L T P C

Duration: 45 Hrs.

4 0 0 4

Course Objectives: This is the basic introductory course for learners of business management. This course helps learners to use management skills and techniques in all routine managerial activities in all aspects of businesses effectively and efficiently. Besides, the awareness about manager's role in handling the individuals in an organization will also be the focus of course.

UNIT-I

Concepts of Management: Definition, meaning, nature and scope of management, Evolution of management thought. Contribution of Henry Fayol and F.W. Taylor. Different Approaches to management, Corporate Social Responsibility. Meaning of TQM, Systems Theory, Quality Circles and Kaizen.

UNIT-II

Process of Management: Functions of Management. Planning- Nature, Scope, steps and hierarchy of plans;

Organizing: Types of organization, line and staff organization, Span of management, Centralization, Decentralization. Delegation of Authority, Management by Objective (MBO), Organization Culture and Effectiveness,

Directing: Nature, Principle and Techniques

Controlling: Types of Control, Controlling for organizational effectiveness.

UNIT-III

Motivation & Leadership: Theories of motivation, Maslow's Need Hierarchy, Herzberg's two factor theory, Need theories, Goal theories. Equity Theory, Expectancy Theory.

Leadership: Concept and theories, Trait Theory, Autocrat and Democrat. Leadership; Blake and Mouton's managerial Grid, P Hersey and Kenneth Blanchard's Situational Leadership.

UNIT-IV

Organizational Behaviour: Definition, Importance, Fundamental Concepts of Organizational Behaviour, Influence of Socio-cultural factors on organization, Perceptions, Personality and Attitudes, Values, Learning and Job satisfaction.

Interpersonal Behaviour: Transactional analysis, Group dynamics, Management of change, Conflict Management, Organizational Culture.

Recommended Books:

1. Samuel C. Certo, S.T. 'Modern Management: Concepts and Skills', 14th Edn., Pearson Education, 2015.
2. R.W. Griffin, 'Management', 4th Edn., Houghton Mifflin, 1993.
3. F. Luthans, 'Organizational Behavior International Student Edition', 4th Edn., McGraw Hill, Michigan, 1985.
4. Robbins, 'Management', 10th Edn., Pearson Education India.
5. T.A. Stephen Robbins, 'Organizational Behaviour', 7th Edn., Pearson, 2013.
6. R.E. James Arthur Finch Stoner, 'Management', 5th Edn., Prentice Hall, 1992.
7. H. Koontz, 'Essentials of Management', Tata McGraw Hill, 2012.

BASICS OF TOURISM

Subject Code: MHOM1-102

L T P C

Duration: 45 Hrs.

4 0 0 4

Course Objectives: This course shall introduce learner to tourism's growth and development. The course also highlights the role of tourism as an economic intervention and its significance in economy; Course discusses the global nature of tourism, tourism product and emerging trends in tourism industry. It is also important to appreciate the future of tourism.

UNIT-I

Tourism: Definitions, Historical development of tourism, Statistical overview of global and Indian tourism industry, Indian domestic tourism, Tourism elements, Characteristics of tourism, Typology of tourism, Classification of Tourists, Interdisciplinary approaches to tourism, Major motivations and deterrents to travel.

UNIT-II

Tourism Industry: Structure and components: Attractions, Accommodation, Activities, Transportation, F&B, Shopping, Entertainment, Infrastructure and Hospitality.

Emerging Areas of Tourism: Rural, Eco, Medical, MICE, Indigenous, Wellness, Film, Golf, Responsible tourism, Alternate tourism and Theme tourism.

UNIT-III

Tourist Transportation:

Air Transportation: Present policies and practices. Functioning of Indian carriers. Air Corporation Act, Air charters.

Surface Transport: Rent-a-car Scheme and coach-Bus Tour, Transport & Insurance documents, All-India Permits

Rail Transport: Major Railway Systems of World, (Euro Rail and AMTrak), General information about Indian Railways, Types of rail tours in India:, Palace-on-Wheels and Royal Orient, Deccan Odyssey, Toy Trains. Indrail Pass.

Water Transport: Historical past, cruise ships, ferries, hovercrafts, river and canal boats.

UNIT-IV

Tourism Impacts (Environmental, Socio-cultural and Economic), Tourism Area Life Cycle (TALC), Doxey's Index, Demonstration Effect, Push and Pull Theory.

Tourism System: Mathieson and Wall Model, Leiper's Model, Stanley Plog's Model of Destination Preferences, Demand and supply in tourism.

Recommended Books:

1. 'Ministry of Tourism (Govt. of India) Annual Report'. Ministry of Tourism, New Delhi, 2018.
2. A.J. Burkart, S.M., 'Tourism: Past, Present and Future', 2nd Edn., Butterworth-Heinemann.
3. C.Y. Gee, 'The Travel Industry', 3rd Illustrated Edn., An Nostrand Reinhold, 1997.
4. J. Christopher Holloway, C.H., 'The Business of Tourism', 8th Illustrated, Reprint Edn., Financial Times/Prentice Hall, 2009.
5. S. Medlik, 'Understanding Tourism', Taylor & Francis, 2009.
6. M.M. Coltman, 'Introduction to Travel and Tourism: An International Approach', Illustrated Edn., Wiley, 1989.
7. J.C. Stephen Page, 'Tourism: A Modern Synthesis', Illustrated Edn., Cengage Learning EMEA, 2006.
8. A.B. Sunetra Roday, 'Tourism Operations and Management', Illustrated Edn., Oxford University Press, 2009.

TOURISM GEOGRAPHY AND RESOURCES OF INDIA

Subject Code: MHOM1-103

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

Duration: 45 Hrs.

Course Objectives: Geography is the basic edifice of tourism. The knowledge of geography shall give an extra edge to the students in designing the itineraries for the travellers, suggesting them various destinations to the clients for their travel etc.

UNIT-I

Importance of Geography in Tourism: Latitude, longitude, international date time. Time zone. Time differences, GMT variations. Major landforms as tourist resources. Elements of weather and climate. Climatic regions of the world (in brief). Impact of weather and climate on tourists and destinations. Map Reading and Practical Exercise (Popular International tourism destinations).

UNIT-II

Aviation Geography: IATA Traffic Conference Areas. Important tourist circuits and popular Itineraries of Far East countries (Malaysia, Singapore, Thailand, Japan).

UNIT-III

Tourism Products: Definition, Concept and classification.

Cultural Heritage of India: Performing arts of India: classical dances, folk dances and folk culture; **Handicrafts and Textiles:** important handicraft objects and centres, Souvenir industry; Fairs and Festivals: Social, religious and commercial fairs of touristic significance. Indian cuisine (gastronomy).

Heritage: Meaning, types of Heritage Tourism, Heritage Management Organisations - UNESCO, ASI, ICOMOS, INTACH.

UNIT-IV

Popular Religious Centres of Hindu, Buddhist, Jain, Sikh, Muslim and Christian religions. World Heritage Sites in India, Selected case studies (Taj Mahal, Khajuraho, Konark, and Ajanta & Elora Caves).

Wildlife sanctuaries, national parks and biological reserves in India, Selected Case studies (Jim Corbett Tiger Reserve, Kanha, Kaziranga, Sasan Gir, Hemis, Ranthambhore and Keoladeo Ghana, Great Himalayan National Park, Sunder Bans).

Important Wetlands of India (Chandertal, Renuka, Pong Dam, Harike, Kanjli, Ropar, Chilika, Ashtamudi).

Recommended Books:

1. Brian G. Boniface, C.C. 'Worldwide Destinations: The Geography of Travel and Tourism', Illustrated Edn., Routledge, 2012.
2. C. Michael Hall, S.J. 'The Geography of Tourism and Recreation: Environment, Place and Space', 4th Edn., Routledge, 2014.
3. Pearce, D.G. 'Tourism Today: A Geographical Analysis (2nd Illustrated, Reprint Edn., Longman Scientific & Technical, 1995.
4. R.L. Singh, 'India: A Regional Geography', National Geographical Society of India, 1971.
5. D.G. Pearce, 'Tourism Today: A Geographical Analysis', 2nd Illustrated, Reprint Edn., Longman Scientific & Technical, 1995.
6. P.N. Seth, 'Successful Tourism: Fundamentals of Tourism', Vol. I, Sterling Publishers Pvt. Ltd., 2006.
7. M.B. Sarina Singh, 'Lonely Planet India. Lonely Planet', 2015.

**MRSPTU MASTERS IN HOSPITALITY AND TOURISM ADMINISTRATION
SYLLABUS 2018 BATCH ONWARDS**

INTRODUCTION TO HOSPITALITY MANAGEMENT

Subject Code: MHOM1-104

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

Duration: 45 Hrs.

Course Objectives: The objective of this course is to make student familiar with the basics of hospitality industry and make them aware with the global hospitality trends.

UNIT-I

Introduction to Hospitality Industry:

- a) Evolution and growth of the Hospitality Industry
- b) Classification of hotels
- c) Types of rooms
- d) Examples of hotels in each category

UNIT-II

Guest cycle, Formats and equipment used in front office, Categorization of guests, Associated functions in the guest cycle and the operating staff, Different types of tariff, Basis for pricing a room.

Front Office Operations:

Guest cycle, Formats and equipment used in front office, Categorization of guests, Associated functions in the guest cycle and the operating staff, Different types of tariff, Basis for pricing a room.

UNIT-III

Housekeeping: Role and importance of Housekeeping, Organizational structure of the department, sections of the Housekeeping department, types of rooms, cleaning of rooms, keys and key control, supplies and amenities provided in a guest room.

UNIT-IV

Food & Beverages: Role & Importance of F&B, Organization Structure, Types of F&B Outlets, Light & Heavy equipment, Type of Menu and Menu examples. Classification of Beverage.

Recommended Books:

1. S.N. Bagchi, 'Textbook of Food and Beverage Service', 3rd Edn., Aman Publications, 2009.
2. G. Raghubalan, S.R. 'Hotel Housekeeping: Operations and Management', 3rd Edn., Illustrated Edn., Oxford University Press, 2015.
3. Andrews, 'Textbook of Front Office Mgmt & Operations', Tata McGraw Hill Education, 2007.

MANAGERIAL ECONOMICS

Subject Code: MHOM1-105

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

Duration: 45 Hrs.

Course Objectives: This course is intended to make students understand various social, political, legal, economic and other factors that influence business in India and enable them appreciate associated opportunities, risks and challenges and their relevance for managerial decisions.

UNIT-I

Managerial Economics: Meaning, Nature, Scope & Relationship with Other Disciplines, Role of Managerial Economics in Decision Making, Opportunity Cost Principle, Production Possibility Curve, Incremental Concept.

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Marginal Analysis: Law of Diminishing Marginal Utility, Law of Equi-Marginal Utility.
Indifference Curve Analysis: Meaning Assumptions Properties, Consumer Equilibrium and its Application.

UNIT-II

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.

UNIT-III

Theory of Production: Production Function, Short Run and Long Run Production, Analysis, Isoquants, Optimal Combination of Inputs, Application in Managerial Decision Making. 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.

UNIT-IV

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.

Course Outcomes: After studying the subject the students will be able to understand and explain the concept of economics and its managerial perspective including the real insight of the consumer's economic behaviour leading them to estimate the demand for the new product as well as changes in the existing products.

Recommended Books:

1. Craig H. Peterson, H.C. (1994). Managerial Economics (3, illustrated ed.). Macmillan Publishing Company, 1994.
2. Luke M. Froeb, B.T. 'Managerial Economics', 5th Edn., Cengage Learning, 2017.
3. Geetika. (2011). Managerial Economics. Tata McGraw-Hill Education.
4. Dewett, K. K. (1950). Modern Economic Theory (revised ed.). Premier Publishing Company,.
5. Mithani, D. M. (2013). Managerial Economics: Theory and Applications (7 ed.). Himalaya Publishing House.
6. Dwivedi, D. (1980). Managerial Economics, 8th Edition (8 ed.). Vikas Publishing House,.

INTERPERSONAL AND LEADERSHIP SKILLS IN HOSPITALITY & TOURISM

Subject Code: MHOM1-106

L T P C

Duration: 40 Hrs.

4 0 0 4

Course Objectives: The aim of this course is to make students understand how to manage people, leadership strategies at work.

UNIT-I

People Management: Meaning and Concepts, Importance of People Management, Interactive Approach to Managing People; the Role of Human Resources, Individual and Interpersonal Behaviour.

UNIT-II

Deciding How to Decide: Performance at Work; Work Planning and Organization. Interactive Communication Skills; Responsible Management of People at Work. Grooming

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and Etiquette. Telephone Handling Skills

UNIT-III

Leadership: Types and Importance of Leadership, Role of Leadership in Creating a High Performance Work Culture, Empowerment and Delegation; Interactive Problem-Solving and Leadership.

UNIT-IV

Creativity and Innovation; Knowledge Management, Meaning and Concept, Leadership and Knowledge Management, the Human factor of Knowledge Management.

Recommended Books:

1. A.J. DuBrin, 'Principles of Leadership', 7th Illustrated Edn., South-Western Cengage Learning, 2012.
2. U.K. Haldar, 'Leadership and Team Building', Illustrated Edn., Oxford University Press, 2010.
3. Christopher F. Achua, R.N. 'Effective Leadership', 5th Illustrated Edn., South-Western, Cengage Learning, 2012.
4. R.L. Daft, 'Leadership', 5th Illustrated Edn., South-Western Cengage Learning, 2011.

BUSINESS COMMUNICATIONS

Subject Code: MHOM1-107

L T P C
4 0 0 4

Duration: 45 Hrs.

Course Objectives: The primary objective of business communication is to introduce the student to various forms of written and oral communication that are necessary in real-life business situations, perfecting verbal and non-verbal communication skills.

UNIT-I

Communication Fundamentals: Business Communication in today's world, The Communication Process & Communication Channels, Barriers to Communication, Verbal & non-verbal communication.

UNIT-II

Oral Communication: Elements of Good Oral Communication, Speaking and Listening Skills, Professional use of the telephone, Effective presentation skills.

Written Communication: Report writing and presentation, Business Letters – layout and types, Preparing resume Application letters, Memo, Proposals, Legal aspects.

UNIT-III

Customer Care: Effective customer care, managing customer complaints & negotiating with the customer, Handling Interpersonal Conflict, Counseling skills.

UNIT-IV

Personality Development: Basic traits of personality - dress, address, gestures and manners, Self-evaluation and development- identification of strengths and weaknesses, overcoming hesitation and fear of facing the public, Corrective and developmental exercises - confidence building, role plays.

Recommended Books:

1. L.B. Jon Burton, 'Interpersonal Skills for Travel and Tourism', Addison Wesley Longman, 1994.
2. Herta A. Murphy, H.W. 'Effective Business Communications', 7th Edn., McGraw Hill, 1997.

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3. Patricia Hayes Andrews, R.T. 'Organizational Communication: Empowerment in a Technological Society', Illustrated Edn., Allyn & Bacon, Incorporated, 1995.
4. S. Mohan, 'Buss Corres'Ce & Report Writing', 4th Edn., Reprint Edn., Tata McGraw Hill Education, 2010.
5. L.V. Wagen, 'Communication in Tourism & Hospitality: Meeting the World in the Workplace', Illustrated Edn., Hospitality Press, 1997.

TOURISM PRODUCTS OF PUNJAB

Subject Code: MHOM1-108

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

Duration: 28 Hrs.

Course Objectives: The objective of this course is to introduce the student to various tourism products of Punjab. The course will cover the past, present and future scenario of tourism in the state.

UNIT-I

History and Geography of Punjab: History-general Information, Geography- general Information.

Religious Tourism in Punjab - Main religious' places of Punjab.

UNIT-II

Cultural and Heritage Tourism in Punjab: Culture of Punjab- its handicrafts, cuisine, customs, costumes, fairs and festivals, dances, music.

Rural Tourism in Punjab:

UNIT-III

Role of PTDC and PHTPB: Role of PTDC in promoting Punjab tourism. Recent initiatives taken by Punjab Heritage Tourism Promotion Board.

Policies and Planning: Policies and planning in Punjab.

Tourist Transportation: Tourist transportation of Punjab (role of airways, roadways and railways in the promotion of tourism in Punjab).

UNIT-IV

Recent Development in Punjab: Recent development and trends in Punjab (development of hotel industry, food joints, malls and their relevance in promoting tourism in Punjab).

Tourist Destinations: Main tourist destinations of Punjab. Amritsar, Patiala, Kapurthala, Chandigarh.

Recommended Books:

1. D.S. Manku, 'Geography of Punjab', Kalyani Publications.
2. Vijay Singal, 'Book on Punjab', American Book Publisher.
3. 'Punjab Travel Guide'.
4. M.S. Mann, 'History of Punjab'.
5. R.L. Singh, 'India: A Regional Geography'. National Geographical Society of India, 1971.
6. H.S. Mavi, 'Geography of Punjab', National Book Trust, 1993.
7. R. Gandhi, 'Punjab: A History from Aurangzeb to Mountbatten', Aleph Book Company, 2013.
8. S.S. Johar, 'Holy Sikh Shrines', M.D. Publications Pvt. Ltd., 1998.
9. 'Brochures', PTDC, Punjab Heritage Promotion Board and Punjab Govt.
10. C.K. Wilbur, 'Indian Handcrafts', Rowman & Littlefield, 1990.

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11. 'Transport in Punjab, India', Published by Books LLC., 2010.

TRAVEL AGENCY AND TOUR OPERATIONS

Subject Code: MHOM1-210

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

Duration: 46 Hrs.

Course Objectives: Travel agency management is the basis for understanding the modus operandi of a travel and tour company. It shall substantiate the students with the basic practical inputs about the various procedures involved in handling the operations of a travel agency. Further the objectives of the course are to acquire an in-depth knowledge about the Tour Operation Management and to become familiar with the Tour Operation Techniques and strategies required for successful handling of Tour Operation Business.

UNIT-I

History and growth of travel agency business, emergence of Thomas Cook. Emergence of Travel Intermediaries, Indian travel agents and tour operators - an overview; Definition of travel agent and tour operator; differentiation, interrelationship of TA/TO and principles of present business trends and future prospects, problems and issues.

UNIT-II

Setting Up Travel Agency/Tour Operation Business: Market research, sources of funding, Comparative study of various types of organization proprietorship, partnership, private limited and limited, Government rules for getting approval, IATA rules, regulation for accreditation, Documentation, Sources of earning: commissions, service charges etc.

UNIT-III

Tour Operation: Definition- Concept-History and Growth of Tour Operation business. Types of Tour Operators. Organizational Structure, Forms of Organization, Departments and its functions. The Process of travel decision making, Mode and Destination selection. Reservation and Cancellation procedures for Tour related Services-Hotels, Airlines, Cruise liners, Car rentals and Rail travel. Commission Structures from Suppliers of Service.

UNIT-IV

Tour Operation Documentation: Voucher-Hotel and Airline Exchange Order, Pax Docket, Status Report, Daily Sales Record, AGT Statements-Credit Cards-Importance and Future. RBI Regulations for Tour Operators.

Managing Tour Operation. Field Operations- inbound and outbound. Managing Distribution, Role of Distribution in exchange process, Selling through distribution chains. Distribution System in Tourism Operation. Management of In-house operations.

Recommended Books:

1. M. Chand, 'Travel Agency Management: An Introductory Text', 2nd Edn., Anmol Publications Pvt. Ltd., 2009.
2. C.Y. Gee, 'Professional Travel Agency Management', Illustrated, Reprint Edn., Prentice Hall, 1990.
3. B. Fay, 'Essentials of Tour Management', Illustrated Edn., Prentice Hall, 1992.
4. J. Negi, 'Travel Agency and Tour Operation: Concepts and Principles', 2nd Reprint Edn., Kanishka Publishers, Distributors, 2006.

TOURISM POLICY, PLANNING & DEVELOPMENT

Subject Code: MHOM1-211

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

Duration: 45 Hrs.

Course Objectives: The purpose of this course is to impart knowledge about policies and development in the field of tourism.

UNIT-I

Concept, need, objective, institutional framework and the principal lines of public tourism policy; The role of govt. public and private sector in formulation of tourism policy. Roles of international, national, state and local tourism organizations in carrying out tourism policies.

UNIT-II

Goal of national administration and tourism policy. Policy making bodies and its process at national levels. Outline of L.K. Jha Committee (Ad-hoc Committee) - 1963, National Tourism Policy -1982, National Committee Report-1998, National Action Plan on Tourism - 1992. National Tourism Policy-2002. Opportunities for investments in hotel sector & Tourism related organizations. Incentives and concessions extended for tourism projects and resources of funding. Case study of TFCI.

UNIT-III

Background, Approach and Process, Techniques of Plan Formulation. Planning for Tourism Destinations-Objectives, methods, steps and factors influencing planning. Destination life cycle concept.

UNIT-IV

Tourism planning at international, national, regional, state and local, the traditional, approach and PASLOP method of tourism planning, Important feature of five-year tourism plans in India. Elements Agents, Processes and typologies of tourism development. Case study of selected state tourism policies (West Bengal, Goa, Kerala, Rajasthan).

Recommended Books:

1. M. Bezbaruah, 'Indian Tourism: Beyond the Millennium', Gyan Publishing House, 1999.
2. J. Burkart, S.M., 'Tourism: Past, Present and Future', 2nd Edn., Butterworth-Heinemann, 1992.
3. C.Y. Gee, 'The Travel Industry', 3rd Illustrated Edn., An Nostrand Reinhold, 1997.
4. P.E. Murphy, 'Tourism: A Community Approach (RLE Tourism)', Routledge, 2013.

ENTREPRENEURSHIP IN TOURISM

Subject Code: MHOM1-212

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

Duration: 45 Hrs.

Course Objectives: The purpose of this paper is to prepare a ground where the students view Entrepreneurship as a desirable and feasible career option. In particular, the paper seeks to build the necessary competencies and motivation for a career in Entrepreneurship.

UNIT-I

Foundations of Entrepreneurship: Concept, Need, Definition & Role of Entrepreneurship, Definition, Characteristics & Scope of Entrepreneur, Innovation, Invention, Creativity, Opportunities. Concepts of Entrepreneur, Manager, Entrepreneur / Corporate Entrepreneur– Comparative Study, Roles & Responsibilities, Role of entrepreneur in Indian economy, Entrepreneurship as a career, Sustaining Competitiveness -

Maintaining competitive advantage, Entrepreneurial Culture, Reasons for The Failure of Entrepreneurial Ventures, Various Case Studies, Successful, Failed and Turnaround Ventures.

UNIT-II

Women Entrepreneurs & Entrepreneurship Development: **Meaning, Role, Problems & Reasons for Less Women Entrepreneurs. Various Institutes & Govt. Schemes to Help & Uplift Women Entrepreneurs. Case Studies for Successful Women Entrepreneurs, Concept, Need & Role of Entrepreneurship Development, Role of the Following Agencies in the Entrepreneurship Development DIC, SISI, EDII & NIESBUD.**
Ownership structure and organizational framework of small scale enterprises in Tourism and Travel Business- Venture Creation and Management.

UNIT-III

Small & Medium Enterprises - Small & Medium Industry: Meaning and Importance - Definition of SME – Role & importance in India Economy, steps for Starting Small Industry: Decisions to Become Entrepreneur - Steps to be Taken - Search for a Business Idea, Source of Ideas, Idea Processing, Selection Idea, Input Requirements, Nature and Components of SME Environment, SME Funding, Sources of Finance for SME's.
Managing family enterprises in Tourism industry.

UNIT-IV

Project Management Technical, Financial, Marketing Personnel and Management Feasibility Reports Financial Schemes Offered by Various Financial Institutions like Commercial Banks, IDBI, ICICI, SIDBI, SFCs, Venture Capital Funding, and Angel Capitalist. Role of Central Government and State Government in Promoting Entrepreneurship with Various Incentives, Subsidies, Grants

Recommended Books:

1. V. Desai, 'Organisation and Management of Small-scale Industries'. Himalaya Publishing House.
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

MARKETING FOR HOSPITALITY AND TOURISM

Subject Code: MHOM1-213

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

Duration: 45 Hrs.

Course Objectives: This is the basic introductory course for learners of marketing for Hospitality & Tourism. This course helps learners to use marketing skills and techniques in all routine managerial activities in all aspects of businesses effectively and efficiently.

UNIT-I

Understanding Marketing and Marketing Process: Marketing Concepts, Nature and Scope of Marketing, Marketing Mix, Marketing Management Philosophies, Strategic Planning and Marketing Process. Marketing Environment, Uniqueness of Tourism Marketing Services Marketing: Concepts, Definition, Characteristics, Services Marketing Mix. Service Quality and Service Gap Analysis Model.

UNIT-II

Market Targeting: Market Segmentation and Tourism Market. Identifying Market Segments and Selecting Target Market. Identifying & Developing Market Activities of Tourism Market. Marketing mix for travel and tourism.

UNIT-III

Managing the Product / Service, Product Decisions-Product Line, Product Mix, Product Life Cycle, New Product Development, Branding and Packaging Decisions.

UNIT-IV

Pricing Tourism Products: Pricing Considerations and Approaches, Pricing Strategies and Methods. Marketing of Small Tourism Business. Distribution Channel in Travel and Tourism, Cooperation and conflict Management, Promotion Decision – Promotion Mix: Advertising, Sales Promotion, Personal Selling, and Publicity.

Recommended Books:

1. J.T. Philip Kotler, 'Marketing for Hospitality and Tourism', 2nd Illustrated Edn., Prentice Hall, **1999**.
2. L. Lumsdon, 'Tourism Marketing', Illustrated, Reprint Edn., International Thomson Business Press Holloway, M. f.-J. (2004), **1997**.
3. S.F. Witt, 'Tourism Marketing and Management Handbook', 2nd Edn., (L. M. Stephen F. Witt, Edn.) Prentice Hall, **1994**.
4. Victor T.C. Middleton, J.R. 'Marketing in Travel and Tourism', 3rd Edn. Routledge, **2012**.
5. P. Kotler, 'Marketing Management: Analysis, Planning, Implementation, and Control', 9th Illustrated Edn.), Prentice Hall, **1997**.
6. Philip T. Kotler, G.A. 'Principles of Marketing', 17th Edn., Pearson Education, **2017**.
7. William J. Stanton, M.J. 'Fundamentals of Marketing', Vol. 1, 9th Edn., McGraw Hill, **1991**.
8. Ramaswamy, 'Marketing Management', Tata McGraw Hill Education, **2013**.
9. Douglas J. Dalrymple, L.J. 'Marketing Management: Strategy and Cases', 5th Edn., Wiley, **1990**.

FINANCIAL MANAGEMENT & ACCOUNTING

Subject Code: MHOM1-214

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

Duration: 40 Hrs.

Course Objectives:

The course intends to give learners an understanding of the accounting procedures in an organization. It will help to students to understand and apply the concepts of accounting to solve business problems.

UNIT-I (10 Hrs.)

Accounting-Meaning, Objectives: Classification, Accounting Equation, Accounting concepts and conventions, Profit and Loss Account and Balance Sheet

UNIT-II (10 Hrs.)

Finance & Financial Management: Meaning, aims, Nature, Scope, Objectives: and functions of financial management. Sources of finance, Statement of Changes in Financial position – Funds flow Analysis. Cash Flow Analysis – Ratio analysis.

UNIT-III (10 Hrs.)

Working Capital Management: Significance, Classification, Theory and Planning of Working Capital, estimating need for working capital, Techniques of Forecasting Working capital requirements.

UNIT-IV (10 Hrs.)

Cost Accounting, Cost Sheet/Tender/Marginal Costing & Break even Analysis, Budgetary Control.

Recommended Books:

1. I. Pandey, 'Financial Management', 11th Edn., Vikas Publishing House, 2015.
2. M.Y. Khan, 'Financial Management: Text, Problems and Cases', Tata McGraw Hill Education, 2004.
3. A. Upchurch, 'Management Accounting Principles and Practice', Pearson Education Ltd., 1998.
4. R. Mason, 'Bookkeeping and Accounting', Hodder Education, 2008.
5. T.S. Grewal, 'Introduction to Accountancy', S. Chand, 1978.
6. M.Y. Khan, P.K. 'Cost Accounting', 2nd Edn., McGraw Hill Education, 2000.

HUMAN RESOURCE MANAGEMENT

Subject Code: MHOM1-215

L T P C
4 0 0 4

Duration: 40 Hrs.

Course Objectives: The students of human resources management must aware of basic aspects of human resource management to understand the functioning of human resource management in an organizational setting.

UNIT-I

Human Resource Management: Definition, Objectives, Functions, Scope, Importance HRM in India, Evolution of HRM, Quality of a good Human Resource Managers, Human Resource Planning, HR Accounting & Audit, Job Analysis, Job description and Job Specification. Recruitment and Selection- Sources of Recruitment, Selection Process- Test -Types, Interview - Types, Career Planning v/s Man Power Planning and succession Planning, Career Planning Process, Career Development, Placement and Induction.

UNIT-II

Training: Methods of Training, Executive Development, Potential appraisal and Performance Appraisal, Performance Appraisal-Methods of Performance Appraisal, Transfer, Promotion, Wage & Salary Administration, Wage Boards and Pay Commission, Wage Incentive, Fringe Benefits, Employees Welfare, Safety and Health Measures, Redressal of Grievances.

UNIT-III

Industrial Relations: Meaning & Characteristics, Parties to Industrial relations, Nature of Trade Unions, Problems of Trade Unions, Causes for Industrial Disputes, Settlement of Industrial Disputes. Employee Empowerment and Participative Management.

UNIT-IV

Collective Bargaining: Features, Pre-requisite of Collective Bargaining, Agreement at different levels, Employee Discipline, Workers Participation in Management- Objectives for Successful Participation. Flexi-time and Flexi-work. Tenets of TQM, Features of quality, Quality circles and Quality control, Quality of Work Life, Work Life Balance.

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Recommended Books:

1. K. Aswathappa, 'Human Resource and Personnel Management', 4th Edn., Tata McGraw Hill Education, **2005**.
2. J.M. Ivancevich, 'Human Resource Management', 11th Edn., McGraw Hill, **2010**.
3. Bernard, 'Human Resource Management', 4th Edn., Tata McGraw Hill.
4. Luis R. Gomez-Mejia, D.B. 'Managing Human Resources', 8th Edn., Pearson Education, **2014**.
5. D. Gary, 'Human Resource Management', 12th Edn., Pearson Education India, **2011**.
6. Robert L. Mathis, J.H. 'Human Resource Management', 11th Edn., Cengage South-Western, **2005**.
7. Scott A. Snell, S.M. 'Managing Human Resources', 17th Edn., Cengage Learning, **2015**.
8. B. Pattanayak, 'Human Resource Management', 4th Edn., PHI Learning Pvt. Ltd., **2014**.
9. P. Jyothi, D.N. 'Human Resource Management', Illustrated Edn., Oxford University Press, **2005**.
10. V. Rao, 'Human Resources Management: Text and Cases', 2nd Reprint Edn., Excel Books India, **2007**.

BUSINESS RESEARCH METHODS

Subject Code: MHOM1-216

L T P C
4 0 0 4

Duration: 45 Hrs.

Course Objectives: The objective of this course is to make the student acquainted with the research methodology which will help in developing business strategies.

UNIT-I

Meaning of Research: Objectives, types of research and approach; meaning of method and methodology, scientific research process; Identification and defining of research problem, research design and types.

Research Design: Meaning, need and important features, types of research design, selection and formulation of research problem.

UNIT-II

Hypothesis formulation and its importance in research; types of hypothesis testing and major techniques (Chi-Square, ANOVA, t-test etc.); Measurement and scaling techniques and their importance.

Types and sources of data. Collection techniques: questionnaire, schedules, participant observation, interviews, focused-group, nominal group (NGT). Difference between case study and survey methods; Questionnaire design considerations; Sampling-definition, types and their importance, type of sampling designs; sampling size and its determination, sampling in qualitative research.

UNIT-III

Major Data Analysis Techniques: multivariate and context analysis (principles); market segmentation techniques (a priori and factor cluster); cost-benefit analysis.

UNIT-IV

Interpretation Techniques: Report writing; Presentation; Computer applications in research-SPSS, EXCEL.

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Recommended Books:

1. J.S. Chandan, 'Statistics for Business and Economics', Vikas Publishing House Pvt. Ltd., New Delhi.
2. D. Chawla and N. Sondhi, 'Statistics for Business and Economics', Vikas Publishing.
3. Ajai S. Gaur, S.S. 'Statistical Methods for Practice and Research: A Guide to Data', **2009.**
4. O.R. Krishnaswamy, 'Methodology Of Research In Social Sciences', Revised Edn., Himalaya Publishing House, 2010.
5. K. Punch, 'Survey Research: The Basics', Illustrated, Reprint Edn., SAGE, 2003.
6. N. Walliman, 'Social Research Methods: The Essentials', 2nd Edn., SAGE, 2015.

FOREIGN LANGUAGE (FRENCH)

Subject Code: MHUM1-101

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

Duration: 45 Hrs.

Course Objectives:

The students will learn the basics of French language.

UNIT-I

Conjugation of verbs from the text to be put in present tense only.

UNIT-II

A series of exercises covering the grammar.

UNIT-III

Translation of sentences from the text from French to English and English to French.

UNIT-IV

Demanding of a Service: A simple dialogue to be formed between two persons for any of the following situations: reserving of train tickets, room booking, giving directions to reach a place, taking a phone call, ordering food, fixing a date.

Recommended Books:

1. Monnerie-Goarin, A. 'Bienvenue En France 1 Eleve', Illustrated Edn., Cornelsen Verlag GmbH + C, 1991.
2. Gaston Mauger, R.G. 'Cours de langue et de civilisation françaises, á l'usage des étrangers', Vol. 1, Illustrated Edn., Hachette, **1953.**

M.Sc. (COMPUTER SCIENCE) 1ST SEM.

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
MCAP3- 101	Information Management	4	1	0	40	60	100	5
MCAP3- 102	Object Oriented Programming Using C++	4	1	0	40	60	100	5
MCAP3- 103	Computer Organization and Assembly Language	4	1	0	40	60	100	5
MCAP3- 104	Operating System	4	1	0	40	60	100	5
MCAP3- 105	Professional Communication	3	1	0	40	60	100	4
MCAP3- 106	Software Lab. – I (Based on MCAP3-102)	0	0	4	60	40	100	2
MCAP3- 107	Software Lab. – II (Based on MCAP3- 104)	0	0	4	60	40	100	2
Total		15	5	8	320	380	700	28

M.Sc. (COMPUTER SCIENCE) 2ND SEM.

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
MCAP3- 208	Data Communication and Networks	4	1	0	40	60	100	5
MCAP3- 209	Relational Database Management System	4	1	0	40	60	100	5
MCAP3- 210	Data Structures and Algorithms	4	1	0	40	60	100	5
MCAP3- 211	Web Technologies	4	1	0	40	60	100	5
MCAP3- 212	Software Lab – III (Based on MCAP3-209)	0	0	4	60	40	100	2
MCAP3- 213	Software Lab – IV (Based MCAP3-210)	0	0	4	60	40	100	2
MCAP3- 214	Software Lab – V (Based on MCAP3-211)	0	0	4	60	40	100	2
Total		16	4	12	340	360	700	26

M.Sc. (COMPUTER SCIENCE) 3RD SEM.

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
MCAP3- 315	Computer Graphics	4	1	0	40	60	100	5
MCAP3- 316	Software Engineering	4	1	0	40	60	100	5
MCAP3- 317	OOPs Using JAVA Programming	4	1	0	40	60	100	5
MCAP3- 318	Data Analytics	4	1	0	40	60	100	5
MCAP3- 319	Software Lab – VI (Based on MCAP3-315)	0	0	4	60	40	100	2
MCAP3- 320	Software Lab – VII (Based on MCAP3-317)	0	0	4	60	40	100	2
MCAP3- 321	Minor Project	0	0	8	60	40	100	4
Total		16	4	16	340	360	700	28

M.Sc. (COMPUTER SCIENCE) 4TH SEM.

Course		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
MCAP3-422	Programming with Python	4	1	0	40	60	100	5
MCAP3-423	Information Security	4	1	0	40	60	100	5
MCAP3-424	Theory of Computation	4	1	0	40	60	100	5
MCAP3-425	Data Warehousing & Mining	4	1	0	40	60	100	5
MCAP3-426	Software Lab – VIII (Based on MCAP3-422)	0	0	4	60	40	100	2
MCAP3-427	Major Project	0	0	8	120	80	200	4
Total		16	4	12	340	360	700	26

Total Credits: 28 + 26 + 28+ 26 = 108

INFORMATION MANAGEMENT

Subject Code: MCAP3-101

L T P C
4 1 0 5

Duration: 55 Hrs.

Unit-I (12 Hrs.)

Introduction to Information Technology: Definition, Applications in various sectors, Different types of software, Generations of Computers, Input and output Devices, Various storage devices like HDD, Optical Disks, Flash Drives. Different Types of data file formats: Types and Applications.

Unit-II (15 Hrs.)

IT Infrastructure in India: Telecommunication, Internet research and Broadband Data Collection and Data Management, Data Models, Information vs. Knowledge, Various techniques to derive information, Information Management.

Unit-III (15 Hrs.)

Management Information System: Definition, Strategic Management of Information, Decision Making, Development Process of MIS, Strategic Design of MIS, Business Process Reengineering.

Unit-IV (13 Hrs.)

Understanding Knowledge Management: Designing a Knowledge Management System, Nature and Scope of Business Intelligence, Information Security- Meaning and Importance, Organizational Security Policy and Planning, Access Control and Operations Security. Office Automation (Word processing, Spreadsheet, Presentation, E-Mail Clients), Content Management System and Architecture.

Recommended Books:

1. Turban, Efraim, Rex Kelly Rainer and Richard E. Potter, 'Introduction to Information Technology', John Wiley & Sons, New York, NY, 2001.
2. Ponniah, Paulraj, 'Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals', John Wiley & Sons, 2004.
3. Schou, Corey and Daniel Paul Shoemaker, 'Information Assurance for the Enterprise: A Roadmap to Information Security', McGraw Hill, Inc., 2006.
4. Jawadkar, Waman S. 'Management Information Systems: Text and Cases: A Global Digital Enterprise Perspective', Tata McGraw Hill Education, 2013.

OBJECT ORIENTED PROGRAMMING USING C++

Subject Code: MCAP3-102

L T P C
4 1 0 5

Duration: 55 Hrs.

Unit-I (13 Hrs.)

Evolution of OOP, OOP Paradigm, advantages of OOP, Comparison between functional programming and OOP Approach, Characteristics of object oriented language- objects, classes, inheritance, reusability, user defined data types, polymorphism, overloading. Introduction to C++, Identifier and keywords, constants, C++ operators, type conversion, Variable declaration, statements, expressions, features of iostream.h and iomanip.h input and output, conditional expression loop statements, breaking control statements.

Unit-II (15 Hrs.)

Defining function, types of functions, storage class specifiers, recursion, preprocessor, header files and standard functions, Arrays, pointer arithmetic's, structures, pointers and structures, unions, bit fields typed, enumerations, Passing array as an argument to function.

Unit-III (15 Hrs.)

Classes, member functions, objects, arrays of class objects, pointers and classes, nested classes, constructors, destructors, inline member functions, static class member, friend functions, dynamic memory allocation. Inheritance, single inheritance, types of base classes, types of derivations, multiple inheritance, container classes, member access control.

Unit-IV (12 Hrs.)

Function overloading, operator overloading, polymorphism, early binding, polymorphism with pointers, virtual functions, virtual destructors, late binding, pure virtual functions, opening and closing of files, stream state member functions, binary file operations, structures and file operations, classes and file operations, random access file processing. Exception Handling.

Recommended Books:

1. Lafore, Robert. 'Object-Oriented Programming in Turbo C++'. Galgotia Publications, 2001.
2. Stroustrup, Bjarne. 'The design and evolution of C++', Pearson Education India, 1994.
3. Balagurusamy, Entrepreneurial. 'Object Oriented Programming with C++', 6th Edn., Tata McGraw Hill Education, 2001.
4. S. Hallada and M. Wiebel, 'Object Oriented Software Engineering', BPB Publications, 1995.

COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE

Subject Code: MCAP3-103

L T P C
4 1 0 5

Duration: 55 Hrs.

Objectives: The objective of the course is to provide students with a solid foundation in computer design. Examine the operation of the major building blocks of a computer system. To introduce students to the design and organization of modern digital computers & basic assembly language.

Unit-I (13 Hrs.)

Computer Organization: Basic Computer Organization, Bus & Memory Transfer, Stored Program Organization, Computer Registers, Computer Instructions, Timing and Control, Hardwired based design of Control Unit, Instruction Cycle, Formats of Various types of Instructions- Memory Reference Instructions, Register Reference Instructions & I/O Instructions, General Register Organization-Control word, Design of Adder & Logic Unit, Stack Organization-Register Stack, Memory Stack, Reverse Polish Notation Addressing Modes, RISC vs CISC Architectures, Interrupts & types.

Unit-II (15 Hrs.)

Pipeline & Vector Processing: Parallel Processing, Pipelining-Arithmetic & Instruction Pipeline, Vector Processing-Vector operations, Memory Interleaving, Array Processors. Input – Output Organization: Input-Output Interface- I/O vs Memory Bus, Isolated vs Memory mapped I/O, Synchronous Data Transfer, Asynchronous Data Transfer-Strobe Control, Handshaking, Asynchronous Communication Interface, Modes of Transfer- Programmed I/O, Interrupt Initiated I/O, Interrupt Cycle, Priority Interrupt Controller, and DMA Controller & DMA Transfer.

Unit-III (14 Hrs.)

Memory Organization: Main Memory-Memory Address Map, Memory connection to CPU, Associative Memory-Hardware organization, Match Logic, Cache Memory-Levels of Cache, Associative Mapping, Direct Mapping, Set-Associative Mapping, writing into Cache, Cache coherence, Virtual Memory-Address space & Memory space, Address mapping using pages,

Associative memory page table, Page replacement, Memory Management Hardware – Segmented page mapping, Multiport memory, Memory protection.

Unit-IV (13 Hrs.)

Multiprocessors: Characteristics of Multiprocessors, Interconnection Structures-Time Shared Common Bus, Crossbar switch, Multistage Switching Network, Hypercube interconnection, Interprocessor communication & synchronization.

Assembly Language Programming: Example of a typical 8-bit processor (8085 microprocessor)-Registers, addressing modes, Instruction Set-Data Transfer Instructions, Arithmetic Instructions, Logical Instructions, Program Control Instructions, Machine Control Instructions, Use of an Assembly Language for specific programmes: Simple numeric manipulations, sorting of a list and use of I/O instructions.

Recommended Books:

1. Car Hamacher, Zvonks Vranesic, Safwat Zaky ‘Computer Organization’, 5th Edn., McGraw Hill.
2. M.M. Mano, ‘Computer System Architecture’, Prentice Hall of India, 1986.
3. John Paul Hayes, ‘Computer Architecture and Organization’, McGraw Hill International Edn.
4. A.S. Tanenbaum, ‘Structured Computer Organization’, Prentice Hall of India.

OPERATING SYSTEM

Subject Code: MCAP3-104

L T P C
4 1 0 5

Duration: 55 Hrs.

Unit-I (13 Hrs.)

Basics of Operating Systems: Definition, Types of Operating Systems: Mainframe, Desktop, Multiprocessor, Distributed, Clustered, Real time, Embedded and Time sharing. Simple, Layered, Monolithic and Microkernel Operating Systems. Virtual systems.

Operating System Components: Process Management, Memory Management component, I/O Management, File Management, Protection System and Network management.

Operating System Services: Process Execution, I/O operations, File manipulations, Communications, Error detection and recovery, Resource allocation, Accounting, System, Protection, System Calls and System Call Execution; API.

Unit-II (15 Hrs.)

Process: Definition, Process Relationships, Process states, Process State transitions, Process Control Block, Context switching. Threads - Concept, Types and advantages of Multithreads.

Process Scheduling: Definition, 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 and RR.

Multiprocessor schedulers. Performance evaluation of schedulers.

Inter-process Communication and Synchronization: Definition, Shared Memory System, Message passing, Critical section, Mutual Exclusion, Semaphores.

Deadlocks: Definition, Deadlock characteristics, Deadlock Prevention, Deadlock Avoidance, Deadlock detection and Recovery.

Unit-III (14 Hrs.)

Basic Memory Management: Definition, Logical and Physical address map, Memory allocation, Contiguous, Fixed and variable partition. Internal and External fragmentation and Compaction; Paging - Principle of operation, Page allocation, Hardware support, Protection and sharing; Segmentation, Segmentation with Paging.

Virtual Memory Management: Basics of Virtual Memory, Hardware and control structures, Locality of reference, Page fault, Working Set, Dirty page/Dirty bit; Demand paging, Page

replacement policies - Optimal (OPT), First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

Unit-IV (13 Hrs.)

Device Management: Hardware I/O organization, I/O control, Port and memory mapped I/O, DMA. Buffering and Caching. Device Drivers.

Disk Management: Disk Structure, Disk Formatting, Disk Scheduling and its algorithms, RAID.

Security: Authentication; Types of Threats, Detection, Prevention and correction of Threats.

File Management: File concept, File attributes - Name, Identifier, Type, Location, Size, Time, Date, user identification, File Operations, Directory Structure - Single level, two level, Tree Structure. Disk space allocation methods - Contiguous, Linked, Indexed. Access Methods - Sequential, Indexed, Random access, File system structure, Byte sequence, Record sequence and Tree-based. Disk formatting.

Security and Protection: Security threats, Security Policies and Mechanisms, Authentications.

Recommended Books:

1. William Stallings, 'Operating System Internals and Design Principle', 6th Edn., Pearson Education, India, 2009.
2. Peterbars Galvin, 'Operating System Principle', 7th Edn., Wiley India, 2009.
3. J. Harris, 'Operating System SCHAUM'S OUTLINE', Tata McGraw Hill, Special Indian Edn., **2008**.
4. Pramod Chandra, 'An Introduction to Operating System', 3rd Edn., PHI, 2010.

PROFESSIONAL COMMUNICATION

Subject Code: MCAP3-105

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

Duration: 45 Hrs.

Unit-I (10 Hrs.)

Basics of Technical Communication: Functions of Communication-Internal & External Functions, Models-Shannon & Weaver's model of communication, Flow, Networks and importance, Barriers to Communication, Essential of effective communication (7 C's and other principles), Non-verbal Communication.

Unit-II (13 Hrs.)

Basic Technical Writing: Paragraph writing (descriptive, Imaginative etc.), precise writing, reading and comprehension, Letters – Format & various types.

Unit-II (12 Hrs.)

Advanced Technical Writing: Memos, Reports, E-Mails & Net etiquettes, Circulars, Press Release, Newsletters, Notices. Resume Writing, Technical Proposals, Research Papers, Dissertation and Thesis, Technical Reports, Instruction Manuals and Technical Descriptions, Creating Indexes, List of References and Bibliography.

Unit-IV (10 Hrs.)

Verbal Communication: Presentation Techniques, Interviews, Group Discussions, Extempore, Meetings and Conferences.

Technical Communication: MS-Word, Adobe Frame maker and ROBO Help.

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 and

Engineering (with audio CD)'.

SOFTWARE LAB.-I (BASED ON MCAP3-102)

Subject Code: MCAP3-106

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

Note: Program should be fully documented with simple I/O data. Flow charts should be developed wherever necessary.

Write program in 'C++' language:

Using input and output statements using control statements.

Using functions.

Using array

Using Classes and implementation of Constructor and Destructor. Using files.

Using OOP's Concepts (Inheritance, Polymorphism, Encapsulation, Friend and Static Functions)

SOFTWARE LAB.-II (BASED ON MCAP3-104)

Subject Code: MCAP3-107

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

This laboratory course will mainly comprise of exercises of the Course MCAP-104.

DATA COMMUNICATION AND NETWORKS

Subject Code: MCAP3-208

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

Duration: 55 Hrs.

Objectives: As part of this course, students will be introduced to Computer Networks and Data Communication paradigms, about Network models and standards, Network protocols and their use, wireless technologies.

UNIT-I (13 Hrs.)

Introduction to Data Communication: Components of Data Communication, Data Representation, Transmission Impairments, Switching, Modulation, Multiplexing.

Review of Network Hardware: LAN, MAN, WAN, Wireless networks, Internetworks.

Review of Network Software: Layer, Protocols, Interfaces and Services.

Review of Reference Models: OSI, TCP/IP and their comparison.

Physical Layer

Transmission Media: Twisted pair, Coaxial cable, Fiber optics, Wireless transmission (Radio, Microwave, Infrared). Introduction to ATM, ISDN, Cellular Radio and Communication Satellites.

UNIT-II (15 Hrs.)

Data Link Layer

Services provided by DLL: FRAMING, ERROR CONTROL, FLOW CONTROL, MEDIUM ACCESS

Medium Access Sub Layer

Channel Allocation, MAC protocols – ALOHA, CSMA protocols, Collision free protocols, Limited Contention Protocols, Wireless LAN protocols, IEEE 802.3, 802.4, 802.5 standards and their comparison.

UNIT-III (15 Hrs.)

Network Layer

Design Issues, Routing Algorithms (Shortest Path, Flooding, Distance Vector, Hierarchical, Broadcast, Multicast). Congestion Control Algorithms (Leaky bucket, Token bucket, Load shedding), Internetworking, IP Protocol, ARP, RARP.

Network Trouble Shooting

Using Ping, Traceroute, IPconfig, Netstat, nslookup.

UNIT-IV (12 Hrs.)

Transport Layer

Addressing, Establishing and Releasing Connection, Flow Control, Buffering, Internet Transport Protocol (TCP and UDP).

Application Layer

Domain name system, E-mail, File transfer protocol, HTTP, HTTPS, World Wide Web. Suggested.

Recommended Books:

1. Tanenbaum, Andrew S., 'Computer Networks', 4th Edn., PHI, 2009.
2. B.A. Forouzan, 'Data Communications and Networking', 4th Edn., Tata McGraw Hill, 2009.
3. Douglas E. Comer, 'Internetworking with TCP/IP (Vol.1, 4thEdition)', CPE 2004.
4. Stallings, William, 'Data and Computer Communications', 8th Edn., PHI, 2008.
5. Nance, Bary, 'Introduction to Networking', 4th Edn., PHI, 1997.

RELATIONAL DATABASE MANAGEMENT SYSTEMS

Subject Code: MCAP3-209

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

Duration: 55 Hrs.

Unit-I (14 Hrs.)

Review of DBMS:

Basic DBMS terminology; Architecture of a DBMS: Data Independence - Physical and Logical Independence, Degree of Data Abstraction, Initial Study of the Database, Database Design, Implementation and Loading, Testing and Evaluation, Operation, Maintenance and Evaluation.

Conceptual Model:

Entity Relationship Model, Importance of ERD, Symbols (Entity: Types of Entities, weak Entity, Composite Entity, Strong Entity, Attribute: Types of Attribute, Relationship: Type of relationship, Connectivity, Cardinality).

Unit-II (12 Hrs.)

Database Models and Normalization:

Comparison of Network, Hierarchical and Relational Models, Object Oriented Database, Object Relational Database, Comparison of OOD & ORD; Normalization and its various forms, De- Normalization, Functional Dependencies, Multi-valued Dependencies, Database Integrity: Domain, Entity, Referential Integrity Constraints.

Transaction Management and Concurrency Control:

Client/ Server Architecture and implementation issues, Transaction: Properties, Transaction Management with SQL, Concurrency; Concurrency Control: Locking Methods: (Lock Granularity, Lock Types, Two Phase Locking, Deadlocks), Time Stamping Method, Optimistic Method, Database Recovery Management.

Unit-III (15 Hrs.)

Distributed Databases:

Centralized Verses Decentralized Design; Distributed Database Management Systems (DDBMS): Advantage and Disadvantages; Characteristics, Distributed Database Structure, Components, Distributed Database Design, Homogeneous and Heterogeneous DBMS.

Levels of Data and Process Distribution:

SPSD (Single-Site Processing, Single-Site Data), MPSD (Multiple-Site Processing, Single Site Data), MPMD (Multiple-Site Processing, Multiple-Site Data), Distributed Database Transaction Features, Transaction Transparency, Client/ Server Vs DDBMS.

Unit-IV (14 Hrs.)

Business Intelligence and Decision Support System:

The need for Data Analysis, Business Intelligence, Operational Data vs. Decision Support Data, DSS Database properties and importance, DSS Database Requirements.

OLAP and Database Administration:

Introduction to Online Analytical Processing (OLAP), OLAP Architecture Relational, Star Schemas, Database Security, Database administration tools, developing a Data Administration Strategy.

Recommended Books:

1. Peter Rob Carlos Coronel, 'Data Base Systems', 8th Edn., Cengage Learning.
2. Henry F. Korth, Abraham, 'Database System Concepts', 4th Edn., McGraw Hill,
3. C.J. Date, 'An Introduction to Database Systems', 8th Edn., Pearson Education.
4. Ullman, 'Principles of Database Systems', 3rd Edn., Galgotia Publication.
5. Bipin C. Desai, 'An Introduction to Database Systems', Galgotia Publication.

DATA STRUCTURES

Subject Code: MCAP3-210

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

Duration: 55 Hrs.

Unit-I (13 Hrs.)

Introduction to Data Structure: Concept of data, problem analysis, data structures and data structure operations, notations, mathematical notation and functions, algorithmic complexity, Big-O Notation and time space trade off.

Overview of Arrays, Recursion, Pointers, Pointer Arithmetic, Array of pointers, Arrays in terms of pointers, Static and Dynamic Memory Management, Garbage Collection.

Understanding and Implementation of various Data Structures with applications

Stack: Operations like push, pop and various applications like conversion from infix to postfix and prefix expressions, evaluation of postfix expression using stacks.

Queues: Operations like enqueue, dequeue on simple, circular and priority queues. Linked Lists: operations like creations, insertion, deletion, retrieval and traversal on single, circular and doubly linked list.

Unit-II (15 Hrs.)

Trees Definitions and Concepts: Root, Node, Leaf Node, Level, Degree, Height and Tree representation using Linked List and Array

Types of Trees: Binary trees, Binary search tree, Height balanced (AVL) tree, B- trees, B+ Tree.

Tree Operations: Creation, insertion, deletion and traversals (Preorder, In-order, Post-ordered) and searching on various types of trees.

Heap: Definition, Structure, Algorithms and applications.

Unit-III (15 Hrs.)

Graph definitions and Concepts: Edge, Vertices and Graph representation using Adjacency matrix, Adjacency lists.

Types of Graphs: Weighted, Unweighted, Directed, Undirected Graphs.

Graph Operations: Creation, insertion, deletion, traversals and searching (depth-first, breadth-first) of various types of graphs and Dijkstra's algorithm for shortest distance calculation.

Unit-IV (12 Hrs.)

Searching: Concept and efficiency of linear and binary search algorithms.

Sorting: Concepts, Order, Stability, Efficiency of various algorithms (Selection Sort, Bubble Sort, Insertion Sort, Merge Sort, Quick Sort, Heap Sort, Radix Sort).

Hashing: Definition, Implementation and applications.

Note: Programs are to be implemented in C++.

Recommended Books:

1. Gilberg and Forouzan, 'Data Structures - A Pseudo Code Approach with C++', Cengage.
2. Hubbard John R., 'Schaum's Outline of Data Structures with C++', Tata McGraw Hill.
3. Langsam, Augenstein, Tanenbaum, 'Data Structures Using C and C++', Pearson Education.

WEB TECHNOLOGIES

Subject Code: MCAP3-211

L T P C
4 1 0 5

Duration: 55 Hrs.

Unit-I (15 Hrs.)

Internet and World Wide Web: Introduction, Internet Addressing, ISP, types of Internet Connections, Introduction to WWW, WEB Browsers, WEB Servers, URLs, HTTP, WEB Applications, Tools for web site creation.

HTML5: Introduction to HTML5, Lists, adding graphics to HTML5 page, creating tables, linking documents, forms, frames, Cascading Style sheets.

Unit-II (13 Hrs.)

Java Script: Introduction, programming constructs: variables, operators and expressions, conditional checking, functions and dialog boxes, JavaScript DOM, creating forms, introduction to Cookies, JQuery.

Unit-III (15 Hrs.)

AJAX: Introduction, HTTP Request, XML Http Request, AJAX Server Script.

Unit-IV (12 Hrs.)

PHP: Introduction, syntax, statements, operators, PHP and MySQL, PHP and AJAX.

Recommended Books:

1. Deitel, Deitel, Nieto, Lin and Sadhu, 'XML How to Program', Pearson Education.
2. Ivan Bayross, 'Web Enabled Commercial Application Development using HTML, DHTML, JavaScript, Perl CGI', BPB.
3. Steven M. Schafer, 'HTML, CSS, JavaScript, Perl, Python and PHP', Wiley India.
4. Paul S. Wang, G. Keller, S. Katila, 'An Introduction to Web Design + Programming', Cengage Learning.
5. Jeffery C. Jackson, 'Web Technologies: A Computer Science Perspective', Pearson Education.
6. Robin Nixon, 'Learning PHP, MySQL and JavaScript', Shroff/O'Reilly.

SOFTWARE LAB. –III (BASED ON MCAP3-209)

Subject Code: MCAP3-212

L T P C

0 0 4 2

1. Comparative study of various Database Management Systems.
2. Data Definition Language (DDL), Data Manipulation Language (DML) and Data Control Language (DCL).
3. How to apply constraints at various levels?
4. View data in the required form using Operators, Functions and Joins.
5. Creating different types of Views for tailored presentation of data.
6. How to apply Conditional Controls in PL/SQL.
7. Error Handling using Internal Exceptions and External Exceptions.
8. Using various types of Cursors.
9. How to run Stored Procedures and Functions.
10. Creating Packages and applying Triggers.
11. Creating Arrays and Nested Tables.

SOFTWARE LAB. – IV (BASED ON MCAP3-210)

Subject Code: MCAP3-213

L T P C

0 0 4 2

1. Selecting suitable Data Structures for specific tasks.
2. Understanding various traversing techniques on various data structures.
3. Inserting and deleting elements in required data structures.
4. Searching data stored within various data structure using various search techniques.
5. Understanding memory-space trade off.
6. Sorting various data structures using different techniques.

SOFTWARE LAB. –V (BASED ON MCAP3-211)

Subject Code: MCAP3-214

L T P C

0 0 4 2

1. Creation of Web pages using HTML5.
2. Creation of Web pages using JavaScript.
3. Creation of Web pages using AJAX.
4. Creating web pages using PHP.

**MRSPTU M.TECH. ELECTRICAL ENGINEERING (POWER SYSTEM)
SYLLABUS 2018 BATCH ONWARDS**

1 st Semester		Contact Hrs.			Marks			Credits
Code	Course	L	T	P	Int.	Ext.	Total	
MELEE1-101	Power System Analysis	3	0	0	40	60	100	3
MELEE1-102	Power System Dynamics-I	3	0	0	40	60	100	3
MRMIP-101	Research Methodology and IPR	2	0	0	40	60	100	2
MELEE1-103	Power System (Power System Steady State Analysis) Lab-I.	0	0	4	60	40	100	2
MELEE1-104	Power System (Renewable Energy) Lab-II.	0	0	4	60	40	100	2
Departmental Elective-I		3	0	0	40	60	100	3
MELEE1-156	Renewable Energy System and Distributed Generation							
MELEE1-157	Smart Grids							
MELEE1-158	High Power Converters							
MELEE1-159	Wind and Solar Systems							
Departmental Elective-II		3	0	0	40	60	100	3
MELEE1-160	Electrical Power Distribution System							
MELEE1-161	Optimization Techniques for Power Engineering							
MELEE1-162	Pulse Width Modulation for PE Converters							
MELEE1-163	Electric and Hybrid Vehicles							
Audit Course (Choose any one)		2	0	0	100	0	100	0
MHUMA0-101	English For Research Paper Writing							
MCIVE0-101	Disaster Management							
MHUMA0-102	Sanskrit for Technical Knowledge							
MHUMA0-103	Value Education							
MHUMA0-104	Constitution of India							
MHUMA0-105	Pedagogy Studies							
MHUMA0-106	Stress Management by Yoga							
MHUMA0-107	Personality Development through Life Enlightenment Skills							
Total		16	0	8	420	380	800	18

**MRSPTU M.TECH. ELECTRICAL ENGINEERING (POWER SYSTEM)
SYLLABUS 2018 BATCH ONWARDS**

2 nd Semester		Contact Hrs.			Marks			Credits
Code	Course	L	T	P	Int.	Ext.	Total	
MELEE1-205	Digital Protection of Power System	3	0	0	40	60	100	3
MELEE1-206	Power System Dynamics-II	3	0	0	40	60	100	3
MELEE1-207	Power System Lab.-III (Power System Protection Lab.)	0	0	4	60	40	100	2
Lab.-IV (Choose any one)		0	0	4	60	40	100	2
MELEE1-208	Artificial Intelligence Lab.							
MELEE1-209	Smart Grid Lab.							
MELEE1-210	Mini Project	0	0	4	60	40	100	2
Departmental Elective-III		3	0	0	40	60	100	3
MELEE1-264	Restructured Power Systems							
MELEE1-265	Advanced Digital Signal Processing							
MELEE1-266	Dynamics of Electrical Machines							
MELEE1-267	Electrical Machine Design							
Departmental Elective-IV		3	0	0	40	60	100	3
MELEE1-268	Advanced Micro-Controller Based Systems							
MELEE1-269	SCADA System and Applications							
MELEE1-270	Power Quality							
MELEE1-271	Artificial Intelligence Techniques							
Audit Course (Choose any one)		2	0	0	100	0	100	0
MHUMA0-101	English For Research Paper Writing							
MCIVE0-101	Disaster Management							
MHUMA0-102	Sanskrit for Technical Knowledge							
MHUMA0-103	Value Education							
MHUMA0-104	Constitution of India							
MHUMA0-105	Pedagogy Studies							
MHUMA0-106	Stress Management by Yoga							
MHUMA0-107	Personality Development through Life Enlightenment Skills							
Total		14	0	12	440	360	800	18

Note: Choose any one Audit Course in the table for 2nd semester except the one chosen in 1st semester.

**MRSPTU M.TECH. ELECTRICAL ENGINEERING (POWER SYSTEM)
SYLLABUS 2018 BATCH ONWARDS**

3 rd Semester		Contact Hrs.			Marks			Credits
Code	Course	L	T	P	Int.	Ext.	Total	
MELEE1-311	Major Project (Phase-I) Dissertation	0	0	20	60	40	100	10
Departmental Elective-V		3	0	0	40	60	100	3
MELEE1-372	Power System Transients							
MELEE1-373	FACTS and Custom Power Devices							
MELEE1-374	Industrial Load Modeling and Control							
MELEE1-375	Dynamics Of Linear Systems							
Open Elective		3	0	0	40	60	100	3
MELEE1-391	Business Analytics							
MELEE1-392	Industrial Safety							
MELEE1-393	Operations Research							
MELEE1-394	Cost Management of Engineering Projects							
MELEE1-395	Composite Materials							
MELEE1-396	Waste to Energy							
Total		6	0	20	80	160	300	16

4 th Semester		Contact Hrs.			Marks			Credits
Code	Course	L	T	P	Int.	Ext.	Total	
MELEE1-412	Major Project (Phase-II) Dissertation	0	0	32	60	40	100	16
Total		0	0	32	60	40	100	16

Programme Outcomes of Power Systems Stream:

PO1: Ability to apply the enhanced knowledge in advanced technologies for modeling, analyzing and solving contemporary issues in power sector with a global perspective.

PO2: Ability to critically analyze and carry out detailed investigation on multifaceted complex Problems in area of Power Systems and envisage advanced research in thrust areas.

PO3: Ability to identify, analyze and solve real-life engineering problems in the area of Power Systems and provide strategic solutions satisfying the safety, cultural, societal and environmental aspects/ needs.

PO4: Ability for continued pursuance of research and to design, develop and propose theoretical and practical methodologies towards research and development support for the Power System infrastructure.

PO5: Ability to develop and utilize modern tools for modeling, analyzing and solving various Engineering problems related to Power Systems.

PO6: Willingness and ability to work in a team of engineers/ researchers with mutual understandings to take unsophisticated challenges, in the field of Power Systems, lead and motivate the group to inculcate multi-disciplinary and collaborative approach.**PO7** Willingness and ability to take up administrative challenges including the management of various projects of interdisciplinary nature and carry out the same in an efficient manner giving due consideration to societal, environmental, economic and financial factors.

PO8: Ability to express ideas clearly and communicate orally as well as in writing with others in an effective manner, adhering to various national and international standards and practices for the documentation and presentation of the contents.

MRSPTU

ENGLISH FOR RESEARCH PAPER WRITING

Subject Code: MHUMA-101

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

Duration: 30 Hrs.

Course Objectives:

Students will be able to:

1. Understand that how to improve your writing skills and level of readability
2. Learn about what to write in each section
3. Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission.

UNIT-I

Planning and Preparation, Word Order, breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction

UNIT-II

Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature, skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions.

UNIT-III

Useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

Recommended Books:

1. R. Goldbort, 'Writing for Science', Yale University Press (available on Google Books) Model Curriculum of Engineering & Technology PG Courses, Vol.-I, **2006**.
2. R. Day, 'How to Write and Publish a Scientific Paper', Cambridge University Press, **2006**.
3. N. Highman, 'Handbook of Writing for the Mathematical Sciences', SIAM. Highman's Book, **1998**.
4. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg, London, **2011**.

DISASTER MANAGEMENT

Subject Code: MCIVE0-101

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

Duration: 30 Hrs.

Course Objectives:

Students will be able to:

1. Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
2. Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
3. Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
4. Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in

UNIT-I

Introduction Disaster: Definition, Factors and Significance; Difference Between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.

Repercussions of Disasters and Hazards: Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks of Disease and Epidemics, War and Conflicts.

UNIT-II

Disaster Prone Areas in India Study of Seismic Zones; Areas Prone to Floods and Droughts, Landslides and Avalanches; Areas Prone to Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post-Disaster Diseases and Epidemics

UNIT-III

Disaster Preparedness and Management Preparedness: Monitoring of Phenomena Triggering a Disaster or Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological and Other Agencies, Media Reports: Governmental and Community Preparedness.

UNIT-IV

Risk Assessment Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation in Risk Assessment. Strategies for Survival.

Disaster Mitigation Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends in Mitigation. Structural Mitigation and Non-Structural Mitigation, Programs of Disaster Mitigation in India.

Recommended Books:

1. R. Nishith, A.K. Singh, 'Disaster Management in India: Perspectives, Issues and Strategies', New Royal Book Company, Model Curriculum of Engineering & Technology PG Courses, Vol.-I.
2. Sahni, Pardeep et. al.(Eds.), 'Disaster Mitigation Experiences and Reflections', Prentice Hall of India, New Delhi.
3. S.L. Goel, 'Disaster Administration and Management, Text and Case Studies', Deep & Deep Publication Pvt. Ltd., New Delhi.

SANSKRIT FOR TECHNICAL KNOWLEDGE

Subject Code: MHUMA0-102

L T P C

Duration: 30 Hrs.

2 0 0 0

Course Objectives:

1. To get a working knowledge in illustrious Sanskrit, the scientific language in the world
2. Learning of Sanskrit to improve brain functioning
3. Learning of Sanskrit to develop the logic in mathematics, science & other subjects
4. Enhancing the memory power
5. The engineering scholars equipped with Sanskrit will be able to explore the
6. Huge knowledge from ancient literature

Alphabets in Sanskrit, Past/Present/Future Tense

Simple Sentences

Order

Introduction of roots

Technical information about Sanskrit Literature

Technical concepts of Engineering-Electrical, Mechanical
Architecture, Mathematics

Recommended Books:

1. Vishwas, 'Abhyaspustakam', Sanskrita-Bharti Publication, New Delhi.
2. 'Teach Yourself Sanskrit', Prathama Deeksha-VempatiKutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi, Publication.
3. Suresh Soni, 'India's Glorious Scientific Tradition', Ocean Books Pvt. Ltd., New Delhi.

Course Outcomes:

Students will be able to

1. Understanding basic Sanskrit language
2. Ancient Sanskrit literature about science & technology can be understood
3. Being a logical language will help to develop logic in students.

VALUE EDUCATION

Subject Code: MHUMA0-103

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

Duration: 30 Hrs.

Course Objectives:

Students will be able to

1. Understand value of education and self- development
2. Imbibe good values in students
3. Let the should know about the importance of character

UNIT-I

Content Hours Values and self-development –Social values and individual attitudes. Work ethics, Indian vision of humanism. Moral and non- moral valuation. Standards and principles. Value judgements.

UNIT-II

Importance of cultivation of values. Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness. Honesty, Humanity. Power of faith, National Unity. Patriotism, Love for nature, Discipline.

UNIT-III

Personality and Behavior Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline. Punctuality, Love and Kindness. Avoid fault Thinking. Free from anger, Dignity of labor. Universal brotherhood and religious tolerance. True friendship. Happiness Vs suffering, love for truth. Aware of self-destructive habits. Association and Cooperation. Doing best for saving nature.

UNIT-IV

Character and Competence –Holy books vs Blind faith, Self-management and Good health. Science of reincarnation, Equality, Nonviolence, Humility, Role of Women. All religions and same message, mind your Mind, Self-control, Honesty, Studying effectively.

Recommended Books:

1. S.K. Chakroborty, 'Values and Ethics for Organizations Theory and Practice', Oxford University Press, New Delhi.

Course Outcomes: Students will be able to

1. Knowledge of self-development.
2. Learn the importance of Human values.
3. Developing the overall personality.

CONSTITUTION OF INDIA

Subject Code: MHUMA0-104

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

Duration: 30 Hrs.

Course Objectives:

Students will be able to:

1. Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
2. To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
3. To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

UNIT-1

History of Making of the Indian Constitution: History, Drafting Committee, (Composition & Working). Philosophy of the Indian Constitution: Preamble Salient Features

UNIT-II

Contours of Constitutional Rights & Duties: Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy, Fundamental Duties.

UNIT III

Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions

UNIT IV

Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation.

Pachayati Raj: Introduction, PRI: Zila Pachayat. Elected officials and their roles, CEO Zila Pachayat: Position and role. Block level: Organizational Hierarchy (Different departments),

Village Level: Role of Elected and Appointed officials, importance of grass root democracy

Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

Recommended Books:

1. 'The Constitution of India', (Bare Act), Government Publication, 1950.
2. S.N. Busi, B.R. Ambedkar, 'Framing of Indian Constitution', 1st Edn., **2015.**
3. M.P. Jain, 'Indian Constitution Law', 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, 'Introduction to the Constitution of India', Lexis Nexis, 2015.

Course Outcomes:

Students will be able to:

1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. 4. Discuss the passage of the Hindu Code Bill of 1956.

PEDAGOGY STUDIES

Subject Code: MHUMA0-105

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

Duration: 30 Hrs.

Course Objectives:

Students will be able to:

1. Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.
2. Identify critical evidence gaps to guide the development.

UNIT-I

Introduction and Methodology: Aims and rationale, Policy background, Conceptual framework and terminology, Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions. Overview of methodology and Searching. Thematic overview: Pedagogical practices are being used by teachers in formal and informal, classrooms in developing countries. Curriculum, Teacher education.

UNIT-II

Evidence on the effectiveness of pedagogical practices, Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.

UNIT-III

Professional Development: alignment with classroom practices and follow-up, support Peer support, Support from the head teacher and the community. Curriculum and assessment, Barriers to learning: limited resources and large class sizes.

UNIT IV

Research Gaps and Future Directions: Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.

Recommended Books:

1. J. Ackers, F. Hardman, 'Classroom Interaction in Kenyan Primary Schools, Compare', 31 (2): 245-261, **2001**.
2. M. Agrawal, 'Curricular Reform in Schools: The Importance of Evaluation, Journal of Curriculum Studies', 36 (3): 361-379, **2004**.
3. K. Akyeampong, 'Teacher Training in Ghana - Does it Count?', Multi-site Teacher Education Research Project (MUSTER) Country Report 1. London: DFID, **2003**.
4. K. Akyeampong, K. Lussier, J. Pryor, J. Westbrook, 'Improving Teaching and Learning of basic Maths and Reading in Africa: Does Teacher Preparation Count?', International Journal Educational Development, 33 (3): 272-282, **2013**.
5. R.J. Alexander, 'Culture and Pedagogy: International Comparisons in Primary Education, Oxford and Boston', Blackwell, **2001**.
6. M. Chavan, 'Read India: A Mass Scale, Rapid, 'Learning to Read' Campaign, **2003**.
7. www.pratham.org/images/resource%20working%20paper%202.pdf.

Course Outcomes: Students will be able to understand:

1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

STRESS MANAGEMENT BY YOGA

Subject Code: MHUMA0-106

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

Duration: 30 Hrs.

Course Objectives:

1. To achieve overall health of body and mind
2. To overcome stress

UNIT-I

Definitions of Eight parts of Yog. (Ashtanga)

UNIT-II

Yam and Niyam. Do`s and Don`ts in life:

- a) Ahinsa, satya, astheya, bramhacharya and aparigraha
- b) Shaucha, santosh, tapa, swadhyay, ishwar pranidhan

UNIT-III

Asan and Pranayam:

- a) Various yog poses and their benefits for mind & body
- b) Regularization of breathing techniques and its Effects-Types of pranayam

Recommended Books:

1. 'Yogic Asanas for Group Tarining', Part-I, Janardan Swami Yogabhyasi Mandal, Nagpur.
2. 'Rajayoga or Conquering the Internal Nature', Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata.

Course Outcomes:

Students will be able to:

1. Develop healthy mind in a healthy body thus improving social health also
2. Improve efficiency.

PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

Subject Code: MHUMA0-107

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

Duration: 30 Hrs.

Course Objectives:

1. To learn to achieve the highest goal happily
2. To become a person with stable mind, pleasing personality and determination
3. To awaken wisdom in students

Course Outcomes:

Students will be able to

1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity
3. Study of Neetishatakam will help in developing versatile personality of students.

UNIT-I

Neetisatakam-Holistic development of personality Verses- 19, 20, 21, 22 (wisdom), Verses- 29, 31, 32 (pride & heroism) Verses- 26,28,63,65 (virtue), Verses- 52, 53, 59 (dont`s), Verses- 71, 73, 75, 78 (do`s)

UNIT-II

Approach to day to day work and duties.2 Shrimad Bhagwad Geeta: Chapter 2-Verses 41, 47, 48, Chapter 3-Verses 13, 21, 27, 35, Chapter 6-Verses 5, 13, 17, 23, 35, Chapter 18-Verses 45, 46, 48

UNIT-III

Statements of basic knowledge.3 Shrimad Bhagwad Geeta: Chapter 2-Verses 56, 62, 68, Chapter 12 -Verses 13, 14, 15, 16,17, 18, Personality of Role model. Shrimad Bhagwad Geeta: Chapter 2-Verses 17, Chapter 3-Verses 36, 37, 42, Chapter 4-Verses 18, 38, 39, Chapter18 – Verses 37, 38, 63

Recommended Books:

1. ‘Srimad Bhagavad Gita’, Swami Swarupananda Advaita Ashram (Publication Department), Kolkata.
2. ‘Bhartrihari’s Three Satakam (Niti-sringar-vairagya)’, P. Gopinath, Rashtriya Sanskrit Sansthanam, New Delhi.

DIGITAL PROTECTION OF POWER SYSTEM

Subject Code: MELEE1-205

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

Duration: 40 Hrs.

UNIT-1 (6 Hrs.)

Evolution of digital relays from electromechanical relays, Performance and operational characteristics of digital protection, Recent Advances in Digital Protection of Power Systems.

UNIT-II (10 Hrs.)

Mathematical background to protection algorithms, Interpolation formulae, Forward, backward and central difference interpolation, Curve fitting and smoothing, Finite difference techniques, Numerical differentiation, Differential equation based algorithms, Sample and first derivative (Mann and Morrison) algorithm, least squares method and its algorithms.

UNIT-III (10 Hrs.)

Fourier analysis, Fourier series and Fourier transform, Fourier Algorithm: Full cycle window algorithm, fractional cycle window algorithm, Walsh function analysis and its algorithm, Sinusoidal wave based algorithms, Traveling Wave based Techniques.

UNIT-IV (14 Hrs.)

Basic elements of digital protection, Signal conditioning, transducers, surge protection, analog filtering, analog multiplexers, Conversion subsystem: the sampling theorem, signal aliasing, Error, sample and hold circuits, multiplexers, analog to digital conversion, Digital filtering concepts
Digital relay as a unit consisting of hardware and software, Digital differential protection of Transformers, Digital Differential Protection of Lines.

Recommended Books:

1. A.G. Phadke and J.S. Thorp, ‘Computer Relaying for Power Systems’, Wiley/Research Studies Press, 2009.
2. A.T. Johns and S.K. Salman, ‘Digital Protection of Power Systems’, IEEE Press, 1999.
3. Gerhard Zeigler, ‘Numerical Distance Protection’, Siemens Publicis Corporate Publishing, 2006.
4. S.R. Bhide, ‘Digital Power System Protection’, PHI Learning Pvt. Ltd., 2014.
5. T.S. Madhava Rao, ‘Power System Protection: Static Relays: with Microprocessor Applications’, **2017.**

Course Objectives: To make the students familiar to:

1. Study of numerical relays
2. Developing mathematical approach towards protection
3. Study of algorithms for numerical protection

Course Outcomes: Students will be able to:

1. Learn the importance of Digital Relays.
2. Apply Mathematical approach towards protection.

3. Learn to develop various Protection algorithms.

POWER SYSTEM DYNAMICS-II

Subject Code: MELEE1-206

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

Duration: 40 Hrs.

Unit - I (8 Hrs.)

Basic Concepts of Dynamic Systems and Stability Definition, Small Signal Stability (Low Frequency Oscillations) of Unregulated and Regulated System

Unit-II (12 Hrs.)

Large Signal Rotor Angle Stability, Dynamic Equivalents and Coherency, Direct Method of Stability Assessment, Stability Enhancing Techniques, Asynchronous Operation and Resynchronization, Multi-Machine Stability.

Unit-III (10 Hrs.)

Effect of Damper winding, Flux Linkage Variation and Automatic Voltage Regulator, Dynamic Analysis of Voltage Stability, Voltage Collapse.

Unit-IV (10 Hrs.)

Frequency Stability, Automatic Generation Control, Primary and Secondary Control, Sub-Synchronous Resonance and Counter Measures

Recommended Books:

1. P. Kundur, 'Power System Stability and Control', McGraw Hill Inc, 1994.
2. J. Machowski, Bialek, Bumby, 'Power System Dynamics and Stability', John Wiley & Sons, 1997.
3. L. Leonard Grigsby (Ed.), 'Power System Stability and Control', 2nd Edn., CRC Press, 2007.
4. V. Ajjarapu, 'Computational Techniques for voltage stability assessment & control', Springer, 2006.

Course Objectives: To introduce the students to:

1. Study of power system dynamics
2. Interpretation of power system dynamic phenomena
3. Study of various forms of stability

Course Outcomes: Students will be able to:

1. Gain valuable insights into the phenomena of power system including obscure ones.
2. Understand the power system stability problem.
3. Analyse the stability problems and implement modern control strategies.
4. Simulate small signal and large signal stability problems.

POWER SYSTEM LAB. - III (POWER SYSTEM PROTECTION LAB.)

Subject Code: MELEE1-207

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

List of Experiments

1. Introduction to Power System Protection.
2. Impact of Induction Motor Starting on Power System.
3. Modelling of Differential Relay using MATLAB.
4. Radial Feeder Protection.
5. Parallel Feeder Protection.
6. Principle of Reverse Power Protection.
7. Differential Protection of Transformer.
8. To study time vs. voltage characteristics of over voltage induction relay.

9. To study the characteristics of CT saturation.

POWER SYSTEM LAB. - IV (ARTIFICIAL INTELLIGENCE LAB)

Subject Code: MELEE1-208

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

List of Experiments

1. Write A Program for Best Fit Search.
2. Write A Program to Generate the output for A* Algorithm.
3. Write a Program To Show the Tic Tac Toe Game for 0 and X.
4. Write A Program For Expert System By Using Forward Chaining.
5. Comparing the Search Methods.
6. Implement the Greedy Search Algorithm.
7. Implement the min-max Algorithm.
8. Adding a Heuristic.

POWER SYSTEM LAB. - IV (SMART GRID LAB.)

Subject Code: MELEE1-209

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

List of Experiments

1. To study the components of smart grid.
2. To analyse the geographic information system for smart grid.
3. Formation of micro grid, protection and control of grid.
4. Understand power quality issues in grid connected renewable energy sources.
5. Performance analysis of smart meters.

MINI PROJECT

Subject Code: MELEE1-210

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

The object of Mini 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:

1. Survey and study of published literature on the assigned topic.
2. Define the objective, formulate the problem and prepare an action plan for conducting the investigation.
3. 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.
4. Analyse the results and prepare a written report on the study conducted for presentation to the Department.
5. Final seminar, as oral presentation before a departmental committee.

RESTRUCTURED POWER SYSTEMS

Subject Code: MELEE1-264

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

Duration: 40 Hrs.

Units-I (8 Hrs.)

Fundamentals of restructured system, Market architecture, Load elasticity, Social welfare maximization.

Unit-II (12 Hrs.)

Mathematical Modeling of optimal power flow problem and its solution in restructured electricity markets, Locational marginal price (LMP) Energy, loss and congestion components of LMP.

Unit-III (8 Hrs.)

Congestion management and its methods, Strategic bidding, Risk assessment, Hedging, Transmission pricing and its methods, Tracing of power.

Unit-IV (12 Hrs.)

Ancillary services, Standard market design, distributed generation in restructured markets, Working of restructured power systems, IT applications in restructured markets, Recent developments of restructuring in India, International scenario of restructured power systems.

Recommended Books:

1. Lorrin Philipson, H. Lee Willis, 'Understanding Electric Utilities and De-regulation', Marcel Dekker, 1998.
2. Steven Stoft, 'Power System Economics: Designing Markets for Electricity', John Wiley and Sons, 2002.
3. Kankar Bhattacharya, Jaap E. Daadler, Math H.J. Boolen, 'Operation of Restructured Power Systems', Kluwer Academic Pub., 2001.
4. Mohammad Shahidehpour, Muwaffaq Alomoush, 'Restructured Electrical Power Systems: Operation, Trading and Volatility', Marcel Dekker.
5. Loi Lee Lei, 'Power system Restructuring and Deregulation', John Wiley & Sons, Ltd., 2002.

Course Objectives: To make the students to:

1. Understand about the restructuring of the electricity market
2. Understand about the need for deregulation of the electricity market
3. Understand about the money, power & information flow in a deregulated power system

Course Outcomes:

Students will be able to:

1. Describe various types of regulations in power systems.
2. Identify the need of regulation and deregulation.
3. Define and describe the Technical and Non-technical issues in Deregulated Power Industry.
4. Identify and give examples of existing electricity markets.
5. Classify different market mechanisms and summarize the role of various entities in the market.

ADVANCED DIGITAL SIGNAL PROCESSING

Subject Code: MELEE1-265

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

Duration: 40 Hrs.

Unit-I (10 Hrs.)

Discrete time signals, Linear shift invariant systems-, Stability and causality, Sampling of continuous time signals, Reconstruction, Zero and First order hold circuit, Discrete time

**MRSPTU M.TECH. ELECTRICAL ENGINEERING (POWER SYSTEM)
SYLLABUS 2018 BATCH ONWARDS**

Fourier transform- Discrete Fourier series- Discrete Fourier transform, Z Transform- Properties, Inverse Z transform and its applications.

Unit-II (8 Hrs.)

Linear convolution using Discrete Fourier Transform (DFT), Computation of DFT Design of IIR (Infinite Impulse Response) digital filters from analog filters, Impulse invariance method, Bilinear transformation method.

Unit-III (12 Hrs.)

Finite Impulse Response (FIR) filter design using window functions, Comparison of FIR and IIR digital filters, Basic IIR and FIR filter realization structures, Signal flow graph representations Quantization process and errors, Coefficient quantization effects in IIR and FIR filters.

Optimum linear filters, Optimum signal estimation, Mean square error estimation, Optimum FIR and IIR Filters.

Unit-IV (10 Hrs.)

A/D conversion noise- Arithmetic round-off errors, Dynamic range scaling, Overflow oscillations and zero Input limit cycles in IIR filters, Linear signal models, All pole, all zero and Pole-zero models, Power spectrum estimation- Spectral analysis of deterministic signals, Estimation of power spectrum of stationary random signals.

Recommended Books:

1. Sanjit K. Mitra, 'Digital Signal Processing: A Computer-based Approach', Tata McGraw Hill Edn., 1998.
2. Dimitris G. Manolakis, Vinay K. Ingle and Stephen M. Kogon, 'Statistical and Adaptive Signal Processing', McGraw Hill International Edn., **2000.**
3. John G. Proakis, Dimitris G. Manolakis, 'Digital Signal Processing: Principles, Algorithms, and Applications', 4th Edn., Prentice Hall, 2006.
4. M.H. Hayes, 'Statistical Signal Processing and Modelling', John Wiley and Sons, 1996.

Course Objectives: To acquaint the Students with:

1. The difference between discrete-time and continuous-time signals
2. The application of DFT to IIR filter design and window functions to FIR design
3. The optimal design of FIR and IIR filters
4. The linear signal models and power spectrum of stationary random signals.

Course Outcomes: Students will be able to:

1. Knowledge about the time domain and frequency domain representations as well analysis of discrete time signals and systems.
2. Study the design techniques for IIR and FIR filters and their realization structures. Design of optimum FIR and IIR filters.
3. Acquire knowledge about the finite word length effects in implementation of digital filters.
4. Knowledge about the various linear signal models and estimation of power spectrum of stationary random signals.

DYNAMICS OF ELECTRICAL MACHINES

Subject Code: MELEE1-266

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

Duration: 40 Hrs.

Unit-I (6 Hrs.)

Stability, Primitive four winding commutator machine and its complete voltage equation

Unit-II (12 Hrs.)

Torque Equation, Analysis of simple DC machines using the primitive machine equations, three phase Induction Motor transformed Equations, Different reference frames for

Induction Motor Analysis, Transfer function formulation.

Unit-III (8 Hrs.)

Three Phase Salient Pole Synchronous Machine, Parks' transformation, Steady state analysis.

Unit-IV (14 Hrs.)

Large signal transients, Small oscillation equations in state variable form, Dynamical analysis of interconnected machines.

Large signal transient analysis using transformed equations, DC generator/DC motor System, Alternator /Synchronous Motor System.

Recommended Books:

1. D.P. Sengupta & J.B. Lynn, 'Electrical Machine Dynamics', The Macmillan Press Ltd., 1980.
2. R. Krishnan, 'Electric Motor Drives, Modelling, Analysis, and Control', Pearson Education, 2001.
3. P.C. Kraus, 'Analysis of Electrical Machines', McGraw Hill Book Company, 1987.
4. I. Boldia & S.A. Nasar, 'Electrical Machine Dynamics', The Macmillan Press Ltd., 1992.
5. C.V. Jones, 'The Unified Theory of Electrical Machines', Butterworth, London, 1967.
6. P.S. Bimbhra, 'Generalized Theory of Electrical Machines', Khanna Publishers, 2002.

Course Objectives: To make the Students to:

1. Learn about the performance characteristics of machines.
2. To understand the dynamics of the machines.
3. To understand how to determine stability of machine.

Course Outcomes: Students will be able to:

1. Formulate the electrodynamic equations of all electric machines and analyze the performance characteristics.
2. Knowledge of transformations for the dynamic analysis of machines.
3. Knowledge of determination of stability of the machines under small signal and transient conditions.
4. Study about synchronous machines.

ELECTRICAL MACHINE DESIGN

Subject Code: MELEE1-267

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

Duration: 40 Hrs.

Unit-I (10 Hrs.)

Principles of Design of Machines: Specific loadings, choice of magnetic and electric loadings and materials, Real and apparent flux densities, temperature rise calculation, Separation of main dimension for induction machines and synchronous machines, Heating and cooling of machines, Types of ventilation, Continuous and intermittent rating

Unit-II (12 Hrs.)

Design of Transformers: General considerations, output equation, emf per turn, choice of flux density and current density, main dimensions, leakage reactance and conductor size, design of tank and cooling,

General considerations, output equation, emf per turn, choice of flux density and current density, main dimensions, leakage reactance and conductor size, design of tank and cooling tubes, Calculation of losses, efficiency and regulation, Forces winding during short circuit

Unit-III (10 Hrs.)

Design of Three Phase Induction Motors: Design of stator and rotor winding, Number of slots in stator and rotor, Slot leakage flux, Leakage reactance, Equivalent resistance of squirrel cage rotor, Magnetizing current, Efficiency from design data.

Unit-IV (8 Hrs.)

Design of Alternators: Types of alternators, comparison, specific loadings, output coefficient, design of main dimensions, Introduction to computer aided electrical machine design of energy efficient machines.

Recommended Books:

1. A.E. Clayton, 'The Performance and Design of D.C. Machines', Sir I. Pitman & Sons, Ltd.
2. M.G. Say, 'The Performance and Design of A.C. Machines', Pitman.
3. A.K. Sawhney, 'A Course in Electrical Machine Design', Dhanpat Rai & Sons, 5th Edn.,
4. R.K. Aggarwal, 'Principles of Electrical Machine Design', S.K. Kataria & Sons, **2009.**

Course Objectives: To apprise the students with:

1. The modeling and analysis of AC machines.
2. The electromagnetic energy conversion process.
3. The design and rating of machines.

Course Outcomes:

Students will be able to:

1. To give a systematic approach for modeling and analysis of all rotating machines under both transient and steady state conditions with the dimensions and material used.
2. Ability to model and design transformers, three-phase induction motors and alternator.

ADVANCED MICRO-CONTROLLER BASED SYSTEMS

Subject Code: MELEE1-268

L T P C

Duration: 40 Hrs.

3 0 0 3

Unit-I (8 Hrs.)

Basic Computer Organization, Accumulator based Processes-Architecture, Memory Organization-I/O Organization.

Unit-II (12 Hrs.)

Micro-Controllers-Intel 8051 & Intel 8052, Registers, Memories, I/O Ports, Serial Communication, Timers, Interrupts, Programming

Intel 8051 – Assembly language programming, Addressing-Operations, Stack & Subroutines, Interrupts-DMA.

Unit-III (10 Hrs.)

ARDUINO UNO ATMEGA 328 Microcontroller, Architecture, Programming, Interfacing Memory/ I/O Devices, Serial I/O and data communication.

Unit-IV (10 Hrs.)

Microcontroller development for motor control applications, Stepper motor control using micro controllers.

Introduction to Digital Signal Processor (DSP) and its Architecture, Introduction to field Programmable gate arrays and implementation.

Recommended Books:

1. John. F. Wakerly, 'Microcomputer Architecture and Programming', John Wiley and Sons, 1981.
2. Ramesh S. Gaonker, 'Microprocessor Architecture, Programming and Applications with the 8051', Penram International Publishing (India), 1994.
3. Raj Kamal, 'The Concepts and Features of Microcontrollers', Wheeler Publishing, 2005.
4. Creig Steiner, 'The 8051/8052 Microcontrollers, Architecture, Assembly language and Hardware Interfacing', Universal Publishers, Boca Raton, Florida, 2005.
5. Kenneth J. Ayala, 'The 8051 microcontroller', Cengage Learning, 2004.
6. Kilts Steve, 'Advanced FPGA Design: Architecture, Implementation, and Optimization',

A John Wiley & Sons Inc., 1st Edn., 2007.

Course Objectives: To familiarize the students with:

1. The architecture and programming of advance microcontrollers.
2. The applications of these controllers.
3. The introductory concepts of field programmable gate arrays (FPGA).

Course Outcomes: Students will be able to:

1. To learn how to program a processor in assembly language and develop an advanced processor based system.
2. To learn configuring and using different peripherals in a digital system.
3. To compile and debug a Program.
4. To generate an executable file and use it.

SCADA SYSTEM AND APPLICATIONS

Subject Code: MELEE1-269

L T P C

Duration: 40 Hrs.

3 0 0 3

Unit-I (10 Hrs.)

Introduction to SCADA, Data acquisition systems, Evolution of SCADA, Communication technologies, Monitoring and supervisory functions, SCADA applications in Utility Automation.

Unit-II (10 Hrs.)

Industries SCADA System Components, Remote Terminal Unit (RTU), Intelligent Electronic Devices (IED), Programmable Logic Controller (PLC), Communication Network, SCADA Server, SCADA/HMI Systems.

Unit-III (12 Hrs.)

SCADA Architecture, Various SCADA architectures, advantages and disadvantages of each system, Single unified standard architecture -IEC 61850.

SCADA Communication, various industrial communication technologies, wired and wireless methods and fiber optics, Open standard communication protocols.

Unit-IV (8 Hrs.)

SCADA Applications: Utility applications, Transmission and distribution sector operations, monitoring, analysis and improvement, 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.**

Course Objectives: To make the students to get insight into the:

1. Basic architecture and components of SCADA.
2. Functions and communication in SCADA.
3. Applications of SCADA.

Course Outcomes: Students will be able to:

1. Describe the basic tasks of supervisory control and data acquisition systems (SCADA) as

- well as their typical applications.
2. Acquire knowledge about SCADA architecture, various advantages and disadvantages of each system.
 3. Knowledge about single unified standard architecture IEC 61850.
 4. To learn about SCADA system components: remote terminal units, PLCs, intelligent electronic devices, HMI systems, SCADA server.
 5. Learn and understand about SCADA applications in transmission and distribution sector, industries etc.

POWER QUALITY

Subject Code: MELEE1-270

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

Duration: 40 Hrs.

Unit-I (8 Hrs.)

Introduction to power quality, voltage quality, overview of power quality phenomena, classification of power quality issues, power quality measures and standards, Total harmonic distortion (THD), Total demand distortion (TDD), Telephone influence factor (TIF), Distortion index (DIN), occurrence of power quality problems, various solutions of these problems.

Unit-II (8 Hrs.)

Harmonics, individual and total harmonic distortion, RMS value of a harmonic waveform, harmonic resonance, Triplex harmonics, important harmonic introducing devices, SMPS, three phase power converters, arcing devices, saturable devices, harmonic distortion of fluorescent lamps, effect of power system harmonics on power system equipment and loads.

Unit-III (8 Hrs.)

Modeling of networks and components under non-sinusoidal conditions transmission and distribution systems, Shunt capacitors, transformers, electric machines, grounding systems, loads that cause power quality problems, Power quality problems created by drives and its impact on drive.

Unit-IV (8 Hrs.)

Power factor improvement, passive and active compensation, Passive and active filtering, Control methods for single phase APFC (active power factor correction) and three phase APFC, Power factor correction (PFC) based on bilateral single phase and three phase converter.

Unit-V (8 Hrs.)

Hybrid Filtering techniques and various types, NEC grounding requirements, reasons for grounding, typical grounding and wiring problems, solutions to grounding and wiring problems

Recommended Books:

1. Angelo Baggingi, 'Handbook of Power Quality', Wiley, 2008.
2. G.T. Heydt, 'Electric Power Quality', McGraw Hill Professional, 2007.
3. Math H. Bollen, 'Understanding Power Quality Problems', IEEE Press, 2000.
4. J. Arrillaga, 'Power System Quality Assessment', John Wiley, 2000.

Course Objectives: To make the students aware about:

1. The different power quality issues to be addressed.
2. The recommended practices by various standard bodies like IEEE, IEC, etc. on voltage, frequency and harmonics.

Course Outcomes: Students will:

1. Acquire knowledge about the harmonics, harmonic introducing devices and effect of harmonics on system equipment and loads.

2. Develop analytical skills needed for modeling and analysis of harmonics in networks and components.
3. To introduce the students to active power factor correction based on static VAR compensators and their control techniques.
4. To introduce the students to series and shunt active power filtering techniques for harmonics.

ARTIFICIAL INTELLIGENCE TECHNIQUES

Subject Code: MELEE1-271

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

Duration: 40 Hrs.

Unit-I (10 Hrs.)

Biological foundations to intelligent systems, Artificial neural networks (ANN), Single layer and multilayer feed forward NN, Least-mean-square (LMS) and back propagation algorithm, Feedback networks and Radial basis function networks.

Unit-III (8 Hrs.)

Genetic algorithm (GA) and its operators; reproduction, cross over, mutation, Introduction to evolutionary programming.

Unit-II (12 Hrs.)

Fuzzy logic, Knowledge representation and inference mechanism, De-fuzzification methods, Introduction to type 2 fuzzy systems.

Fuzzy neural networks, System identification using fuzzy and neural network, some algorithms to learn the parameters of the network like GA.

Unit-IV (10 hrs)

Applications of above mentioned techniques i.e. Artificial neural networks, Fuzzy Neural networks, Genetic algorithms to practical problems.

Recommended Books:

1. J.M. Zurada, 'An Introduction to ANN', Jaico Publishing House, West, 1992.
2. Simon Haykins, 'Neural Networks', Pearson Prentice Hall, 2005.
3. Timothy J. Ross, 'Fuzzy Logic with Engineering Applications', McGraw Hill.
4. Driankov, Dimitra, 'An Introduction to Fuzzy Control', Narosa Publication.
5. Davis E. Goldberg, 'Genetic Algorithms in Search, Optimization, and Machine Learning', Adison Willey Publishing Company, 1989.
6. Siva Nandam, 'Introduction to Fuzzy Logic using MATLAB', Springer Science & Business Media, 2006.
7. N.P. Padhy, 'Artificial Intelligence and Intelligent Systems', Oxford University Press, 2005.

Course Objectives: To make the students to:

1. Understand ANN, fuzzy logic and fuzzy neural networks.
2. Understand Genetic Algorithm and Evolutionary programming.
3. Learn to apply these techniques to practical problems.

Course Outcomes: Students will be able to:

1. Learn the concepts of biological foundations of artificial neural networks.
2. Learn Feedback networks and radial basis function networks and fuzzy logics.
3. Identifications of fuzzy and neural networks.
4. Acquire the knowledge of GA and EP.

MAJOR PROJECT (PHASE – I) DISSERTATION

Subject Code: MELEE1-311

**L T P C
0 0 20 10**

Course Objectives: To learn, practice, and critique effective scientific writing and to formulate the research objectives clearly.

Course Outcomes:

1. Design a meaningful research project that demonstrates spatial thinking and uses the knowledge and skills.
2. Define and analyse a problem in latest research areas.
3. Formulate and write a research proposal.
4. Synopsis and its Presentation.

POWER SYSTEM TRANSIENTS

Subject Code: MELEE1-372

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

Duration: 40 Hrs.

Unit - I (8 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.

Unit - II (8 Hrs.)

Principle of digital computation, Matrix method of solution, Modal analysis, Z transform- Computation using EMTP (electromagnetic transients program), Lightning, switching and temporary over voltages, Lightning, Physical phenomena of lightning.

Unit - III (10 Hrs.)

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, Lightning arresters, Substation earthing.

Unit - IV (8 Hrs.)

Switching of HVDC line, travelling waves on transmission line, Circuits with distributed parameters wave equation, Reflection, Refraction, Behaviour of Travelling waves at the line terminations, Lattice Diagrams – attenuation and distortion, Multi-conductor system and Velocity wave.

Unit - V (6 Hrs.)

Insulation Co-ordination: 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.

Course Objectives: To make the students aware about:

1. The occurrence of transients in a power system.
2. The change in parameters like voltage and frequency during transients.
3. The lightning phenomenon and its effect on power system.

Course Outcomes: Students will be able to:

1. Knowledge of various transients that could occur in power system and their mathematical formulation.
2. Ability to design various protective devices in power system for protecting equipment and personnel.
3. Coordinating the insulation of various equipment in power system.
4. Modelling the power system for transient analysis.

FACTS AND CUSTOM POWER DEVICES

Subject Code: MELEE1-373

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

Duration: 40 Hrs.

UNIT-I (10 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 (8 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 (8 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.

UNIT-IV (8 Hrs.)

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-V (6 Hrs.)

Introduction to interline power flow controller, 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.

Recommended Books:

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. Angelo Baghini, 'Handbook of Power Quality', Wiley, **2008**.

Course Objectives: To make the students:

1. To learn the active and reactive power flow control in power system.
2. To understand the need for static compensators.
3. To develop the different control strategies used for compensation.

Course Outcomes: Students will be able to:

1. Acquire knowledge about the fundamental principles of passive and active and reactive power compensation schemes at transmission and distribution level in power systems.
2. Learn various Static VAR Compensation Schemes like Thyristor/GTO controlled reactive power systems; PWM inverter based reactive power systems and their controls.
3. To develop analytical modelling skills needed for modelling and analysis of such Static VAR Systems.

INDUSTRIAL LOAD MODELING AND CONTROL

Subject Code: MELEE1-374

L T P C

Duration: 40 Hrs.

3 0 0 3

Unit -I (8 Hrs.)

Electric Energy Scenario, Demand side management, Industrial load management, Load curves, Load Shaping Objectives, Methodologies, Barriers, Classification of industrial loads, Continuous and Batch processes, Load modeling.

Unit - II (8 Hrs.)

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 - III (6 Hrs.)

Reactive power management in industries, Controls, Power quality impacts, Application of filters, Energy saving in industries.

Unit - IV (8 Hrs.)

Cooling and heating loads, load profiling, Modeling cool storage, Types, Control strategies, Optimal operation, Problem formulation, Case studies.

Unit -V (10 Hrs.)

Captive power units, Operating and control strategies, Power Pooling, Operation models, Energy banking, Industrial cogeneration.

Selection of Schemes, Optimal operating strategies, Peak load saving, Constraints problem formulation, Case study, Integrated load management for industries.

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, 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.

Course Objectives: To acquaint the students with:

1. The energy demand scenario.

2. The modelling of load and to study load demand industrially.
3. To know electricity pricing models.
4. Study reactive power management in industries.

Course Outcomes: Students will be able to:

1. Knowledge about load control techniques in industries and its application.
2. Learn different types of industrial processes and optimize the process using tools like LINDO and LINGO.
3. Apply load management to reduce demand of electricity during peak time.
4. Apply different energy saving opportunities in industries.

DYNAMICS OF LINEAR SYSTEMS

Subject Code: MELEE1-375

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

Duration: 40 Hrs.

Unit - I (12 Hrs.)

State variable representations of systems, transfer function and transfer function matrix, solutions of state equations.

Observability and controllability, minimal realization of MIMO systems, analysis of linear time varying systems, the concepts of stability.

Unit II (10 Hrs.)

Lyapunov stability analysis, Lyapunov function and its properties, controllability by state variable feedback, Krasovskii method for stability.

Ackerman's Formula, Stabilization by output feedback, Asymptotic observers for state measurement, Observer design.

Unit III (8 Hrs.)

State space representation of discrete systems, Solution of state equations, controllability and Observability stability analysis using Lyapunov method.

Unit IV (10 Hrs.)

State feedback of linear discrete time systems, MATLAB Exercises for above mentioned topics.

Recommended Books:

1. Thomas Kailath, 'Linear Systems', Prentice Hall Inc., Englewood Cliffs, N.J., 1980.
2. K. Ogata, 'State Space Analysis of Control Systems', Prentice Hall Inc., Englewood Cliffs, N.J., 1965.
3. K. Ogata, 'Modern Control Engineering', 2nd Edn., Prentice Hall Inc., Englewood Cliffs, N.J., 1990.
4. M. Gopal, 'Digital Control and State Variable Methods', Tata McGraw Hill Publishing Company Ltd., New Delhi, 1997.
5. C.T. Chen, 'Linear System Theory and Design', Holt Rinehart and Winston, New York, 1984.
6. R.C. Dorf and R.T. Bishop, 'Modern Control Systems', Addison Wesley Longman Inc., 1999.

Course Objectives: To make the students:

1. To understand the linear and discrete systems and their functions.
2. To understand the stability analysis of linear systems and implement the same in MATLAB.

Course Outcomes: Students will be able to:

1. To learn linear system modelling, analysis and design so as to obtain the ability to apply the same to engineering problems in a global perspective.
2. Knowledge on carrying out detailed stability analysis of both linear and nonlinear systems.

3. Design observers and controllers for linear systems.
4. Acquire knowledge of discrete time linear systems modelling, analysis and design.
5. Develop and utilize modern software tools for analysis and design of linear continuous and discrete time systems.

BUSINESS ANALYTICS

Subject Code: MELEE1-391

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

Duration: 40 Hrs.

Unit-1 (8 Hrs.)

Business analytics, its Overview, Scope, Process, Relationship of Business Analytics Process and organization, Competitive advantages of Business Analytics.

Statistical Tools: Statistical Notation, Descriptive Statistical methods, Review of probability distribution and data modeling, sampling and estimation methods an overview.

Unit-2 (8 Hrs.)

Trendiness and Regression Analysis: Modeling relationships and trends in data, Simple linear regression.

Important resources, Business analytics Personnel, Data and models for Business analytics, problem solving, Visualizing and exploring Data, Business analytics technology.

Unit-3 (8 Hrs.)

Organization Structures of Business analytics, Team management, Management Issues, Designing Information policy, Outsourcing, ensuring data Quality, measuring contribution of business analytics, Managing changes.

Descriptive Analytics, predictive analytics and its modeling, Predictive analytics analysis, Data Mining and its methodologies, Prescriptive analytics and its step in the business analytics process, Prescriptive modeling, Nonlinear optimization.

Unit-4 (8 Hrs.)

Forecasting Techniques: Qualitative and judgmental forecasting, Statistical forecasting models: for stationary time series, for time series with a linear trend, time series with seasonality.

Regression forecasting with casual variables, selecting appropriate forecasting models, Monte Carlo simulation and risk analysis: Monte Carle simulation using analytic solver platform, New-product development model, Newsvendor model, Overbooking model, Cash budget model.

Unit-5 (8 Hrs.)

Decision Analysis: Formulating Decision Problems, Decision Strategies with the without Outcome Probabilities, Decision Trees, The Value of Information, Utility and Decision Making.

Recent Trends in: Embedded and collaborative business intelligence, Visual data recovery, Data Storytelling and Data journalism.

Recommended Books:

1. Marc J. Schniederjans, Dara G. Schniederjans, Christopher M. Starkey, 'Business Analytics Principles, Concepts and Applications', Pearson F.T. Press.
2. James Evans, 'Business Analytics', Persons Education.

Course Objectives:

1. Understand the role of business analytics within an organization.
2. Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.
3. To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making.

4. To become familiar with processes needed to develop, report, and analyze business data.
5. Use decision-making tools/Operations research techniques.
6. Manage business process using analytical and management tools.
7. Analyze and solve problems from different industries such as manufacturing, service, retail, software, banking and finance, sports, pharmaceutical, aerospace etc.

Course Outcomes:

1. Students will demonstrate knowledge of data analytics.
2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.
3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.

Students will demonstrate the ability to translate data into clear, actionable insights.

INDUSTRIAL SAFETY

Subject Code: MELEE1-392

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

Duration: 40 Hrs.

Unit-I (8 Hrs.)

Industrial Safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and firefighting, equipment and methods.

Unit-II (6 Hrs.)

Fundamentals of Maintenance Engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.

Unit-III (8 Hrs.)

Wear and Corrosion and their Prevention: Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working and applications, i) Screw down grease cup, ii) Pressure grease gun, iii) Splash lubrication, iv) Gravity lubrication, v) Wick feed lubrication vi) Side feed lubrication, vii) Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.

Unit-IV (8 Hrs.)

Fault Tracing: Fault tracing-concept and importance, decision tree concept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipment's like, i) Any one machine tool, ii) Pump iii) Air compressor, iv) Internal combustion engine, v) Boiler, vi) Electrical motors, Types of faults in machine tools and their general causes.

Unit-V (10 Hrs.)

Periodic and Preventive Maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets,

Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance

Recommended Books:

1. Higgins & Morrow, 'Maintenance Engineering Handbook', Da Information Services.
2. H.P. Garg, 'Maintenance Engineering', S. Chand and Company.
3. Audels, 'Pump-hydraulic Compressors', McGraw Hill Publication.
4. Winterkorn, Hans, 'Foundation Engineering Handbook', Chapman & Hall London.

OPERATIONS RESEARCH

Subject Code: MELEE1-393

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

Duration: 40 Hrs.

UNIT – I (8 Hrs.)

Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models.

UNIT – II (8 Hrs.)

Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming.

UNIT – III (8 Hrs.)

Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem - CPM/PERT.

UNIT – IV (8 Hrs.)

Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models - Geometric Programming.

UNIT – V (8 Hrs.)

Competitive Models, Single and Multi-Channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation

Recommended Books:

1. H.A. Taha, 'Operations Research, An Introduction', PHI, 2008.
2. H.M. Wagner, 'Principles of Operations Research', PHI, Delhi, 1982.
3. J.C. Pant, 'Introduction to Optimisation: Operations Research', Jain Brothers, Delhi, 2008.
4. Hitler Libermann, 'Operations Research: McGraw Hill Pub.', 2009.
5. Pannerselvam, 'Operations Research', Prentice Hall of India, 2010.
6. Harvey M. Wagner, 'Principles of Operations Research', Prentice Hall of India, 2010.

Course Outcomes: At the end of the course, the students should be able to:

1. Students should able to apply the dynamic programming to solve problems of discrete and continuous variables.
2. Students should able to apply the concept of non-linear programming.
3. Students should able to carry out sensitivity analysis.

NOTE: Student should able to model the real world problem and simulate it.

COST MANAGEMENT & ENGINEERING PROJECTS

Subject Code: MELEE1-394

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

Duration: 40 Hrs.

UNIT-I (8 Hrs.)

Introduction and Overview of the Strategic cost management process, Cost Concepts in Decision-Making; Relevant Cost, Differential Cost, Incremental Cost and Opportunity Cost. Objectives of a Cost Management, Inventory Management, Creation of a Database for operational control; Provision of data for Decision-Making.

UNIT-II (12 Hrs.)

Project: Meaning, Different types, why to manage, cost over runs centres, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and non-technical activities. Detailed engineering activities. Pre project execution, main clearances and documents.

Project Team: Role of each member. Importance Project site: Data required with significance. Project contracts. Types and contents. Project execution, Project cost control. Bar charts and Network diagram. Project commissioning: mechanical and process.

UNIT-III (10 Hrs.)

Cost Behavior and Profit Planning Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis, Standard Costing and Variance Analysis, Pricing Strategies: Target Costing, Life Cycle Costing.

Budgetary Control: Flexible Budgets, Performance Budgets, Zero-Based Budgets, Pricing Decisions: Transfer Pricing.

UNIT IV (10 Hrs.)

Costing of service sector, Just-in-Time Approach, Material requirement planning, Enterprise Resource Planning, Total Quality Management Principles, Theory of Constraints, Activity-Based Cost Management, Benchmarking, Balanced Score Card and Value-Chain Analysis.

Quantitative Techniques for Cost Management: Linear Programming formulation and graphical, PERT/CPM, Transportation problems, Assignment problems, Simulation, Learning Curve Theory.

Recommended Books:

1. Charles T. Horngren, 'Cost Accounting: A Managerial Emphasis', Prentice Hall of India, New Delhi, 2012.
2. Charles T. Horngren and George Foster, 'Advanced Management Accounting'.
3. Robert S. Kaplan, Anthony A. Alkinson, 'Management & Cost Accounting'.
4. Ashish K. Bhattacharya, 'Principles & Practices of Cost Accounting', A.H. Wheeler Publisher.
5. N.D. Vohra, 'Quantitative Techniques in Management', Tata McGraw Hill Book Co. Ltd.

COMPOSITE MATERIALS

Subject Code: MELEE1-395

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

Duration: 40 Hrs.

UNIT-I (8 Hrs.)

Introduction: Definition – Classification and characteristics of Composite materials. Advantages and application of composites. Functional requirements of reinforcement and matrix. Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite performance.

UNIT – II (8 Hrs.)

Reinforcements: Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures. Isostrain and Isostress conditions.

UNIT – III (10 Hrs.)

Manufacturing of Metal Matrix Composites: Casting – Solid State diffusion technique, Cladding – Hot isostatic pressing. Properties and applications. Manufacturing of Ceramic Matrix Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.

UNIT-IV (6 Hrs.)

Manufacturing of Polymer Matrix Composites: Preparation of Moulding compounds and prepregs – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection moulding. Properties and applications.

UNIT – V (8 Hrs.)

Strength: Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure. Laminate first ply failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using caplet plots; stress concentrations.

Recommended Books:

1. R.W. Cahn, 'Material Science and Technology – Composites', Vol-13, VCH, West Germany.
2. W.D. Callister, Jr., Adapted by R. Balasubramaniam, 'Materials Science and Engineering, An introduction', John Wiley & Sons, NY, Indian Edn., 2007.
3. Lubin ed, 'Hand Book of Composite Materials'.
4. K.K. Chawla, 'Composite Materials'.
5. Deborah D.L. Chung, 'Composite Materials Science and Applications'.
6. Danial Gay, Suong V. Hoa, and Stephen W. Tasi., 'Composite Materials Design and Applications'.

WASTE TO ENERGY

Subject Code: MELEE1-396

L T P C

Duration: 40 Hrs.

3 0 0 3

UNIT – I (6 Hrs.)

Introduction to Energy from Waste: Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digestors.

UNIT – II (8 Hrs.)

Biomass Pyrolysis: Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods - Yields and application – Manufacture of pyrolytic oils and gases, yields and applications.

UNIT – III (8 Hrs.)

Biomass Gasification: Gasifiers – Fixed bed system – Downdraft and updraft gasifiers – Fluidized bed gasifiers – Design, construction and operation – Gasifier burner arrangement for thermal heating – Gasifier engine arrangement and electrical power – Equilibrium and kinetic consideration in gasifier operation.

UNIT - IV (8 Hrs.)

Biomass Combustion: Biomass stoves – Improved chullahs, types, some exotic designs, fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors.

UNIT - V (10 Hrs.)

Biogas: Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their classification.

Biomass Conversion Processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion - Types of biogas Plants – Applications - Alcohol production from biomass - Bio diesel production - Urban waste to energy conversion - Biomass energy programme in India.

Recommended Books:

1. Desai, Ashok V., 'Non-Conventional Energy', Wiley Eastern Ltd., 1990.
2. K.C. Khandelwal and S.S. Mahdi, 'Biogas Technology - A Practical Hand Book',

**MRSPTU M.TECH. ELECTRICAL ENGINEERING (POWER SYSTEM)
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- Vol. I & II, Tata McGraw Hill Publishing Co. Ltd., 1983.
3. D.S. Challal, 'Food, Feed and Fuel from Biomass', IBH Publishing Co. Pvt. Ltd., 1991.
 4. C.Y. WereKo-Brobby and E.B. Hagan, John, 'Biomass Conversion and Technology'.

MAJOR PROJECT (PHASE – II) DISSERTATION

Subject Code: MELEE1-412

L T P C

0 0 32 16

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 Electrical Engineering including interdisciplinary fields in the final semester of M. Tech Course.

The Dissertation will carry 24 credits and will be evaluated as under:

Dissertation 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	12
4	Discussion (Contribution of Candidate)	18	12
Total		60	40

MRSPTU PRE-Ph. D. (PHYSICS) COURSE SYLLABUS

Pre-Ph.D. (Physics)		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
MREM0-101	Research Methodology	4	0	0	40	60	100	4
PPHY-101	Research and Computational Techniques Lab.	0	0	4	60	40	100	2
PPHY-102	Seminar	0	0	2	40	60	100	1
Departmental Electives (Choose any two subjects)		2x4	0	0	2x40	2x60	2x100	2x4
PPHY-103	Mathematical Tools							
PPHY-104	Radiation Protection and Dosimetry							
PPHY-105	Experimental Techniques in Nuclear and Particle Physics							
PPHY-106	Material Characterization Techniques							
PPHY-107	Vacuum Science and Thin Films							
PPHY-108	Environmental Physics							
PPHY-109	Modelling and Simulation Techniques							
Total		12	0	6	220	280	500	15

MRSPTU

RESEARCH METHODOLOGY

Subject Code: MREM0-101

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

Duration: 45 Hrs.

UNIT-I (11 Hrs.)

Introduction to Research: Meaning, Definition, Objective and Process.

Research Design: Meaning, Types - Historical, Descriptive, Exploratory and Experimental.

Research Problem: Necessity of Defined Problem, Problem Formulation, Understanding of Problem, Review of Literature.

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 (10 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.

UNIT-III (13 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.

Testing of Hypothesis: T-test, Z- test, Chi Square, F-test, ANOVA.

UNIT – IV (11 Hrs.)

Multivariate Analysis: Factor Analysis, Discriminant Analysis, Cluster Analysis, Conjoint Analysis, Multi-Dimensional Scaling.

Report Writing: Essentials of Report Writing, Report Format.

Statistical Software: Application of Statistical Softwares like SPSS, MS Excel, Mini Tab or MATLAB Software in Data Analysis.

**Each Student has to Prepare Mini Research Project on Topic/ Area of their Choice and Make Presentation. The Report Should Consists of Applications of Tests and Techniques Mentioned in The Above UNITS*

Recommended Books:

1. R.I. Levin and D.S. Rubin, ‘Statistics for Management’, 7th Edn. Pearson Education New Delhi.
2. N.K. Malhotra, ‘Marketing Research – An Applied Orientation’, 4th Edn., Pearson Education New Delhi.
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’, 2nd Edn., New Age International Publishers.

RESEARCH & COMPUTATIONAL TECHNIQUES LAB.

Subject Code: PPHY-101 **L T P C** **Duration: 48 Hrs.**
0 0 4 2

Computational Techniques:

Introduction to Numerical Methods, Programming Languages Fortran 95 or C++, Use of the programming language to design the programs assigned by the supervisor with the consent of the Head of the Department.

Introduction to Latex and Origin and their applications.

Experimental Tools:

As per the requirement of the research topic.

SEMINAR

Subject Code: PPHY-102 **L T P C** **Duration: 24 Hrs.**
0 0 2 1

The Pre-PhD course work candidate will do literature review of minimum 10 research paper of reputed journals related to the research field and will finally present the seminar.

The Pre PhD course work candidate will submit 3-4 topics out of which one topic will be approved by a committee at the departmental level. The student has to do literature review of minimum 10 research paper of that topic of reputed journals and will finally present the seminar.

Evaluation: Satisfactory/Unsatisfactory by a committee of three faculty member including head of the department.

MATHEMATICAL TOOLS

Subject Code: PPHY-103 **L T P C** **Duration: 45 Hrs.**
4 0 0 4

UNIT- 1

Numerical Techniques: (12 Hrs.)

Introduction to numerical techniques, Solution of equations graphically, Newton’s Raphson’s method or Successive substitution method, Rules of false position, Iteration method or indirect method, Solution of linear systems, Jacobi’s method, Gauss-Seidal method, Taylor series method, Euler’s method, Runge Kuta Method.

UNIT- 2

Group Theory: (12 Hrs.)

Definition of a group, Composition table, Conjugate elements and classes of groups, direct product, Isomorphism, homeomorphism, permutation group, Definitions of the three dimensional rotation group and SU (2), O (3).

UNIT- 3

Sampling and Probability Distribution: (12 Hrs.)

Random Variables: Definition, Probability Distribution-Binomial, Poisson and Normal distributions. Sampling Distributions: Population and samples, Concept of sampling Distributions-Student's t test, F-test and Chi-square test, Curve Fitting, Least square fitting.

UNIT- 4

Tensors: (12 Hrs.)

Review of tensor, Equality of Tensors - Symmetric and Skew – symmetric tensors - Outer multiplication, Contraction and Inner Multiplication - Quotient Law of Tensors - Reciprocal Tensor of Tensor - Relative Tensor - Cross Product of Vectors, Riemannian Space - Christoffel Symbols and their properties.

Recommended Books:

1. S.C. Gupta & V.K. Kapoor, 'Mathematical Statistics', S. Chand.
2. Josaph A. Gallian, 'Contemporary Abstract Algebra', Narosa.
3. A.R. Vasishtha, 'Modern Algebra', Krishna Prakashan.
4. Erwin Kreyszig, 'Advanced Mathematical Physics'.
5. J.L. Synge and A. Schild, 'Tensor Calculus', Toronto, 1949.
6. H.K. Dass, 'Advanced Engineering Mathematics', S. Chand.

RADIATION PROTECTION & DOSIMETERY

Subject Code: PPHY-104

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

Duration: 45 Hrs.

UNIT-I

Radiations and Dosimeter: (12 Hrs.)

Basic Concepts of Radiation and Dosimetric Units: Radiation & need for its measurements, physical features of radiations, conventional sources of radiation, tissue equivalent materials, radiation dose, Definition of dose quantities :- Fluence, kerma, exposure, absorbed dose, Dose equivalent, Quality factor Q, effective dose equivalent, determination of dose equivalent, Radiation quality.

UNIT- II

Radiation Physics Applications: (11 Hrs.)

Archaeological applications: Carbon dating; limitations and accuracy. Industrial Applications: Smoke detection, blockage/leakage detection of buried pipelines, thickness gauge, non-destructive testing. Agricultural Applications: benefits of radiation processing of food items, sterilization. Medical Applications: sterilization of medical equipment's, diagnosis and radiotherapy: in-vivo and in-vitro. Space Exploration: nuclear batteries/RTG. Practical applications and some simple numerical problems.

UNIT – III

Measurement of Radiation Dose: (11 Hrs.)

Measurement of Radiation Dose: Thermo-luminescent dosimetry (TLD):- Theoretical aspects of thermos-luminescence, Characteristics of TL dosimeters, commercial TLD dosimeters, - LiF, Li₂B₄O₇, CaSO₄, MgB₄O₇., TLD instrumentations, Applications of TLD. An introduction to Photoluminescence (PL), Solid state Nuclear Track dosimetry, Internal dosimetry, External dosimetry.

UNIT-- IV

Radiation Effects & Protection: (11 Hrs.)

Effects of radiations exposure, Biological effects of radiation, acute and delayed effects, stochastic and non-stochastic effects, Dose response characteristics, Relative Biological Effectiveness (RBE). History of radiation protection standards, current limits of radiation exposure, protective barriers for radiation sources, protection for sealed sources, radiation surveys, personal monitoring. Permissible dose to occupational and non-occupational workers, safe handling of radioactive materials. ALARA, ALI and MIRD concepts, Radiation waste and its disposal.

Recommended Books:

1. G.F. Knoll, 'Radiation Detection and Measurement', 3rd Edn., John Wiley & Sons Inc., 2000.
2. E.B. Podgorsak, 'Radiation Physics for Medical Physicists', Springer, 2006.
3. R.M. Singru, 'Introduction to Experimental Nuclear Physics', Wiley Eastern Pvt. Ltd., 1974.
4. S.N. Ahmed, 'Physics and Engineering of Radiation Detection', Academic Press, 2007.

EXPERIMENTAL TECHNIQUES IN NUCLEAR AND PARTICLE PHYSICS

Subject Code: PPHY-105

L T P C

Duration: 45 Hrs.

4 0 0 4

UNIT-I

Detection of Radiations: (11 Hrs.)

Interaction of gamma-rays, electrons, heavy charged particles, neutrons, neutrinos and other particles with matter. General properties of Radiation detectors, energy resolution, detection efficiency and dead time. Gas-filled detectors, Proportional counters, space charge effects, energy resolution, time characteristics of signal pulse, position-sensitive proportional counters, Multiwire proportional chambers, Drift chamber, Organic and inorganic scintillators and their characteristics.

UNIT-II

Electronics Associated with Detectors: (14 Hrs.)

Electronics for pulse signal processing, CR-(RC)ⁿ and delay-line pulse shaping, pole-zero cancellation, baseline shift and restoration, preamplifiers (voltage and charge-sensitive configurations), overload recovery and pileup, Linear amplifiers, single-channel analyzer, analog-to-digital converters, multichannel analyzer. Basic considerations in time measurements, Walk and jitter, Time pickoff methods, time-to amplitude converters, Systems for fast timing, fast-slow coincidence, and particle identification, NIM and CAMAC instrumentation standards and data acquisition system.

UNIT-III

Experimental Methods in Nuclear Physics: (10 Hrs.)

Detector systems for heavy-ion reactions: Large gamma and charge particle detector arrays, multiplicity filters, electron spectrometer, heavy-ion reaction analyzers, nuclear lifetime measurements (DSAM and RDM techniques), production of radioactive ion beams.

UNIT-IV

Experimental Methods in Particle Physics: (10 Hrs.)

Detector systems for high energy experiments: Collider physics (brief account), Particle Accelerators (brief account), Secondary beams, Beam transport, Modern Hybrid experiments-

LHS, CMS and ALICE.

Recommended Books:

1. Richard Fernow, 'Introduction to Experimental Particle Physics', Cambridge University Press, 2001.
2. Glenn F. Knoll, 'Radiation Detection and Measurement', Wiley, 2010.
3. W.R. Leo, 'Techniques in Nuclear and Particle Experiments', Springer, 1994.
4. Konrad Kleinknecht, 'Detectors for Particle Radiation', Cambridge University Press, 1999.

MATERIAL CHARACTERIZATION TECHNIQUES

Subject Code: PPHY-106

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Magnetic Measurements: (8 Hrs.)

Magnetometry: Vibrating Sample Magnetometry, Thermomagnetic Analysis, Superconducting quantum interference device (SQUID), Spintronic measurements.

UNIT-II

X-Ray Techniques: (13 Hrs.)

XAFS and XANES Spectroscopy, X-Ray Magnetic Circular Dichroism, Single crystal and powder x-ray diffraction, X-Ray Diffraction Techniques for Liquid Surfaces and Monomolecular Layers, Small-angle X-ray scattering (SAXS). Inelastic x-ray scattering, Synchrotron radiation sources: advantages and special features of synchrotron radiation.

UNIT-III

Neutron Scattering Techniques: (12 Hrs.)

Neutron Powder Diffraction, Single-Crystal Neutron Diffraction, Magnetic Neutron Scattering, Small-angle neutron scattering (SANS), Phonon and dynamics studies by inelastic and quasielastic neutron scattering. Neutron reflectometry for thin films.

UNIT-IV

Microscopy: (12 Hrs.)

Optical, polarizing and confocal microscopy, Scanning Electron Microscopy (SEM) and Transmission electron microscopy (TEM). Elemental analysis by Energy dispersive and wavelength dispersive X-ray analysis. Sample preparation for TEM by ion milling and shadow techniques. AFM and STM: Basic principles and different modes of operation. Magnetic Force Microscopy (MFM).

Recommended Books:

1. John Clarke and Alex I. Braginski, 'The SQUID Handbook: Fundamentals and Technology of SQUID and SQUID Systems', Wiley-VCH, 2004.
2. 'Solid State Magnetism', John Crangle, Edward Arnold – UK, 1991.
3. J. Daillant and A. Gilaud, 'X-ray and Neutron Reflectivity', Springer, 2009.
4. T.L. Alford, L.C. Feldman and J.W. Mayer, 'Fundamentals of Nanoscale Film Analysis', Springer, 2007.
5. R. F. Egerton, 'Physical Principles of Electron Microscopy: An Introduction to TEM, SEM and AEM', Springer, 2005.
6. S. Zhang, L. Li and A. Kumar, 'Materials Characterization Techniques', CRC Press, 2009.

VACUUM SCIENCE AND THIN FILMS

Subject Code: PPHY-107

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

Duration: 45 Hrs.

UNIT-I

Behaviour of Gases: (10 Hrs.)

Mean free path, particle flux, monolayer formation, Gas laws. Elementary Gas Transport Phenomenon: Viscosity, diffusion, and thermal transpiration. Gas Flow: gas throughput, conductance, mass flow, viscous and molecular flow regimes, transition regime.

UNIT-II

Measurement of Pressure: (10 Hrs.)

Thermal conductivity Gauge, Penning gauge, Ionization Gauge, Bayard-Alpert Gauge, Residual Gas Analyzer. Production of Vacuum: Mechanical pumps (Rotary, Root and Turbomolecular pumps), Diffusion pump, Getter and Ion pumps, Cryopumps.

UNIT-III

Physical Vapor Deposition (12 Hrs.)

Hertz Knudsen equation; mass evaporation rate; Directional distribution of evaporating species Evaporation of elements, compounds, alloys, e-beam, pulsed laser and ion beam evaporation, Glow Discharge and Plasma, Sputtering - mechanisms and yield, DC and RF sputtering, Bias sputtering, magnetically enhanced sputtering systems, reactive sputtering, Hybrid and Modified PVD-Ion plating, reactive evaporation, ion beam assisted deposition.

UNIT-IV

Chemical Vapor Deposition (13 Hrs.)

Reaction chemistry and thermodynamics of CVD; Thermal CVD, laser & plasma enhanced CVD, Chemical Techniques - Spray Pyrolysis, Electrodeposition, SolGel and LB Techniques, Nucleation & Growth: capillarity theory, atomistic and kinetic models of nucleation, basic modes of thin film growth, stages of film growth & mechanisms, Epitaxy - homo, hetero and coherent epilayers, lattice misfit and imperfections, epitaxy of compound semiconductors.

Recommended Books:

1. Marsbed H. Hablanian, 'High Vacuum Technology – A Practical Guide', Marcel Dekker, Inc., New York, 1990.
2. John F. O'Hanlon, 'A User's Guide to Vacuum Technology', John Wiley & Sons, New York, 1989.
3. A. Roth, 'Vacuum Technology', Pergamon Press Ltd., Oxford.
4. A Chambers, R.K. Fitch & B.S. Halliday, 'Basic Vacuum Technology', Int. of Phys. Publishing, Bristol & Philedelphia, 1998.
5. L.I. Maissel and R. Glang, 'Hand Book of Thin Film Technology', McGraw Hill Inc., 1970.
6. K.L. Chopra, 'Thin Film Phenomena', McGraw Hill Inc., 1969.
7. Milton Ohring, 'The Materials Science of Thin Films', Academic Press, 1992.

ENVIRONMENTAL PHYSICS

Subject Code: PPHY-108

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Introduction Environmental Physics: (11 Hrs.)

Concept and scope of environmental Physics with respect to human environment, Heat balance (steady and transient), Basics of transport of heat, mass, momentum and radiant energy, Natural and anthropogenic sources of pollution. Primary and Secondary Pollutants. Transport and diffusion of pollutants.

UNIT-II

Atmosphere and Meteorological Impacts: (11 Hrs.)

Structure and composition of atmosphere: Large scale vertical structure of the atmosphere, composition of the atmosphere, Different layers of atmosphere, their characteristics and temperature relationships; Atmospheric stability, inversions and mixing heights, wind roses Residence time, Photochemical pollution, Atmospheric aerosol, Meteorology: Weather and Climate, Atmospheric general circulation, Air mass and weather fronts, Weather elements, Precipitation and types of storms.

UNIT- III

Sampling and Monitoring Environmental Matrices (12 Hrs.)

Air/water/soil pollution Sampling and Monitoring: Scope, Purpose and Objectives of Air/water/soil Quality Monitoring Programme; Preliminary information required for planning quality survey; Guidelines for planning a survey; Design of quality surveillance network; Period, frequency and duration of sampling; Averaging times; Sample size determination; Principles and instruments for measurement of pollutants. Computer applications in environmental modelling. Computer-based modelling: Linear, regression, validation and forecasting.

UNIT-IV

Instrumentation and Analytical Methods (11 Hrs.)

Instrumentation and analytical methods involved in the following techniques and their applications in environment: Fluorescence Spectroscopy, Visible, Atomic and Infrared spectrometry, Flame photometry, Atomic Absorption Spectroscopy (AAS), X-ray diffraction (XRD), X-ray fluorescence (XRF), Mass Spectroscopy, Neutron Activation Analysis (NAA), Inductive Coupled Plasma (ICP-MS), Particle Induced X-ray Fluorescence (PIXE).

Recommended Books:

1. W.P. Cunningham and M.A. Cunningham, 'Principles of Environment Science Enquiry and Applications'. 2nd Edn., Tata McGraw Hill, New Delhi, 2004.
2. M. Dzelalija, 'Environmental Physics', University of Split, 2004.
3. S.K. Bhargava, 'Practical Methods for Water and Air Pollution Monitoring', New Age International Pub., New Delhi, 2008.
4. J. Monteith and M. Unsworth, 'Principles of Atmospheric Physics.', 3rd Edn., Academic Press, Inc., USA, 2007.

MODELING & SIMULATION TECHNIQUES

Subject Code: PPHY-109

L T P C
4 0 0 4

Duration: 45 Hrs.

UNIT-I

Introduction to Modelling & Simulations: (11 Hrs.)

Introduction: modelling and simulations, Different types of simulation, Concept of a system, Continuous and Discrete systems, System modelling, Types of models, Progress of a simulation study, Monte Carlo method, comparison of Simulation and analytic methods, Numerical computational techniques for discrete and continuous models.

Simulation Languages and Applications of Simulation: (12 Hrs.)

Simulation language features, Hardware requirements, Use of simulation, Simulation as a designed tool, Estimation of Simulation time. Methodology for manufacturing simulations, Forcing completion of design with simulation, the simulation decision, Optimizing and developing solutions, Genetic Algorithms, Ethics in simulation.

Simulation Development and Implementation: (11 Hrs.)

Quality Assurance Phase, Selection of a language or tool, Model construction and verification, Experimental Design, Production runs, Output analysis and Reporting, Post Processing Output, Operations, Maintenance and Archival Phase.

Simulation Models: (11 Hrs.)

Discrete Event simulation, Continuous simulation, Computer model of Queuing, inventory and scheduling systems, Parallel Simulations, Simulation and data dependency, Performing verification and validation.

Recommended Books:

1. John A. Sokolowski and Catherine M. Banks, 'Principles of Modelling and Simulation - A Multidisciplinary Approach', Wiley.
2. Louis G. Birta Gilbert Arbez, 'Modelling and Simulation - Exploring Dynamical System Behaviour', Springer.
3. Bernard P. Zeigler, Tag Gon Kim, 'Theory of Modelling and Simulation - Integrated Discrete events and Continuous Complex Dynamic Systems', Herbert praehofer.

COURSE DESCRIPTION

A course developing university-wide skills of reading, writing and analysis addresses the needs of students in English and other disciplines where both writing and reading have an important role in learning. The course fosters personal writing skills and also introduces writing as a subject of study in itself.

OVERVIEW

FUNCTIONAL ENGLISH aims to help improve your ability to read, write and think, no matter what is your major or degree. The course targets and strengthens literary skills that are important for academic success, equipping you with the ability to read, write, listen and speak more effectively and to navigate the university environment with greater confidence. The course also focuses on transferable literary skills that assist you in workplace, digital and professional communications.

STUDY AND EVALUATION SCHEME FOR CERTIFICATE PROGRAMME IN FUNCTIONAL ENGLISH

FIRST SEMESTER

CODE	UNITS	STUDY SCHEME		CREDITS	MARKS IN EVALUATION SCHEME								Total Marks
		Total Hours			INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
		Th	Pr		Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
CHUM1-101	Reading	96	-	4	40	-	40	25	1	-	-	25	50
CHUM1-102	Writing	96	-	4	25	-	25	25	1	-	-	25	50
CHUM1-103	Grammar	24	-	1	30	-	30	30	1	-	-		60
CHUM1-104P	Listening	-	96	4	25	-	25	25	1	-	-	25	50
CHUM1-105P	Speaking	-	120	5	-	50	50	-	-	100	1	100	150
CHUM1-106P	Real Encounters	-	24	1	-	25	25	50	-	-	2	50	75
Total		216	336	33	120	180	225	155	-	235	-	360	700

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, environment and energy conservation, sports, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities etc

Total weeks per Semester = 16 Total working days per week Total hours per day = 7
= 5 Total hours in a Semester = 16 x 5 x 7 = 560

One credit is defined as one hour of lecture per week or two hours of practicals per week for one semester. Fractions in credits have been rounded to nearest integer.

GUIDELINES FOR ASSESSMENT OF STUDENT CENTRED ACTIVITIES (SCA)

The maximum marks for SCA should be 25. The marks may be distributed as follows:

- i) 5 marks for general behaviour and discipline
(by Principal or HOD in consultation with the instructor(s)/trainers)
 - ii) 5 marks for attendance as per following
(by the instructors/ trainers of the department)
 - a) Up to 75% Nil
 - b) 75% to 80% 02 marks
 - c) 80% to 85% 03 marks
 - d) Above 85% 05 marks
 - iii) 15 marks maximum for sports/ NCC/ NSS/ Cultural/ Co-curricular activities as per following:
(by In-charge of Sports/ Cultural/ NCC/ NSS/ Co-curricular activities)
 - 15 marks - for National level participation or inter-university competition
 - 10 marks - participation any two of the activities.
 - 05 marks - participation at the internal sports of the institute/college/university
- Note: There should be no marks for attendance in the internal sessional of different subjects.

UNIT-1.1
SUBJECT CODE: CHUM1-101
READING

Learning Outcomes:

After undergoing this unit, the students will be able to:

Fully understand a complex argument which they encounter in a text; critically assess an article; comprehend the relations between arguments presented within a text or in several texts; write a piece of their own which integrates information from several sources; construct a convincing argument of their own.

1. What is reading?
2. How to understand complex ideas.
3. Time management while reading.
4. Reading practice.

UNIT-1.2
SUBJECT CODE: CHUM1-102
WRITING

Learning Outcomes:

After undergoing this unit, the students will be able to:

1. Will have a wide range of vocabulary to put his/her ideas confidently.
2. Will know how to use variety of patterns in writing.

Theory

1. What is writing?
2. Simple, complex and compound sentences.
3. Essay writing.
4. Letter writing.
5. Writing practice

UNIT-1.3
SUBJECT CODE: CHUM1-103
GRAMMAR

Learning Outcomes:

After undergoing this unit, the students will be able to:

1. Will have a wide range of vocabulary to put his/her ideas confidently.
2. Will know how to use variety of patterns in writing.

Theory:

The Grammar syllabus will include the following :

1. Tenses
2. Modals
3. Use of passive voice
4. Subject – verb concord
5. Reporting
 - (i) Commands and requests

- (ii) Statements
- (iii) Questions
- 6. Clauses:
 - (i) Noun clauses
 - (ii) Adverb clauses
 - (iii) Relative clauses
- 7. Determiners
- 8. Prepositions

UNIT-1.4
SUBJECT CODE: CHUM1-104P
LISTENING

Learning Outcomes:

After undergoing this unit, the students will be able to:

1. Comprehend spoken English, of Indian as well as international speakers.
2. Accent of the students will be improved.

Practical

1. IELTS listening.
2. English speeches.
3. English stories.
4. English short movies.
5. BBC Documentaries.
6. TED talks.

UNIT-1.5
SUBJECT CODE: FE-105P
SPEAKING

Learning Outcomes:

After undergoing this unit, the students will be able to:

1. Will start speaking fluently.
2. Accent of the students will be improved.

Practical

1. Introduction to the sounds of English-Vowels, Diphthongs and Consonants.
2. Situational Dialogues / Role Play.
3. Oral Presentations- Prepared and Extempore.
4. 'Just a minute' Sessions (JAM).
5. Describing Objects/ Situations/ People.
6. Information Transfer.
7. Debates.
8. Group Discussion.
9. Telephonic Skills.
10. Giving Directions.
11. Interview Skills.
12. Listening Exercise.

UNIT-1.6
SUBJECT CODE: CHUM1-106P
REAL ENCOUNTERS

Learning Outcomes:

After undergoing this unit, the students will be able to:

1. Face real life situations to improve confidence to speak and comprehend English.

Practical

1. Going to a Bank.
2. Giving orders at CCD, Hotels and Restaurant etc.
3. Taking Interviews.
4. Talking to any receptionist.

Means of Assessment

1. Assignments and quiz/class tests
2. Mid-term and end-term written tests
3. Laboratory and practical work
4. Viva-voce

a)	Punctuality and regularity	20%
b)	Industrial training report	50%
c)	Presentation and viva-voce	30%

**MRSPTU PG CERTIFICATE COURSE (6 MONTHS) IN HOSPITAL
ADMINISTRATION 2018 BATCH ONWARDS**

1st Semester		Contact Hrs.			Marks			Credits
Code	Name	L	T	P	Int.	Ext.	Total	
CPHA1-101	Principles of Management and Organizational Behaviour	3	1	0	40	60	100	4
CPHA1-102	Healthcare Management	3	1	0	40	60	100	4
CPHA1-103	Health Information System, Marketing & Hospitality Management	3	1	0	40	60	100	4
CPHA1-104	Hospital Training & Report	0	0	16	100	0	100	8
Total		9	3	16	220	180	400	20

MRSPTU

PRINCIPLES OF MANAGEMENT AND ORGANIZATIONAL BEHAVIOUR

Subject Code: CPHA1-101

L T P C
3 1 0 4

Contact Hrs.: 45

Unit – I

Communication:

Basic concepts and principles of good communication. Types and process of communication. Barriers of communication and how to overcome these. Communication with media/press. Special character of health communication. Counseling in health care and its different methods. IEC activities in Health sector. Management and coordination of IEC activities.

Unit – II

Principles of Management: History and progress of management science. Traditional management vis-à-vis modern health care management. Evaluation of management concepts. Management components i.e. Planning, Organizing, Staffing, Motivating, Leading, Co-ordination and Controlling. Modern management concept and its implication in health sector.

Principles of Hospital Management: Concept of hospital care industry. Functioning of corporate multi-specialty hospital. Administrative activities for effective hospital functioning. Effective inter and intra departmental coordination. Quality of effective managers.

Unit - III

Location & Layout of a Hospital: Factors affecting location choice. A Model Design Schematic Layout of an ICU: Quantity and quality and temperature. Noise and waste control in Hospital. Selection of hospital equipment and furniture.

Hospital Organization: Hospital Management as a Service Organizations: Administrative Organization. Managing the Pediatric Ward. Obstetric Unit. Mortuary. Radiology Department. Pathology Department. Operation Theatre, etc.

Unit – IV

Organizational Behavior:

Concept of organizational behavior. Major component of organization. Behaviour of people of their work place and its relation in team building for achieving organizational goal. Motivation and Leadership.

Formal and Informal Organization: Span of Management & Organization Levels, Formal & Informal Groups, types of Groups, Informal Roles of Employees: interpersonal conflict, group conflict, role conflict, goal conflict, strategies for Conflict Resolution.

Unit – V

Management of Human Resource: The role of the chief executive, administration, human resource managers. Personnel recruitment and retention, Compensation and benefits. Work force shortages, training and development. Work force reduction.

Management of Material and Inventory Control: Introduction, Economy of material management, Basic Principles of material management, Element (cycle) of material management. Introduction of inventory control, some of the methods and principles of inventory control - lead time, buffer stock, reorder level, economic ordering quantity EOQ.

HEALTHCARE MANAGEMENT

Subject Code: CPHA1-102

L T P C
3 1 0 4

Contact Hrs.: 45

Unit – I

Concept of Health and Disease: Disease and well-being. Concept of health, Preventive aspect of diseases. Changing pattern of diseases. Concept of health indicators. Role of hospital to offer various level of care.

Overview of Hospital: Concept of modern hospital and privatization in health sector. Public sector hospital and level of care offered and facilities.

Effect of globalization on health care. Concept of corporate hospital in developing countries. Infrastructure and lay out of an ideal corporate hospital. Functioning of modern hospital and changing needs of patients. Hospitality in hospital care.

Unit – II

Health Care of the Community: Health care delivery system in India at Primary/ Secondary/ Tertiary care. Indigenous system of medicine in India. Community participation in Health Care delivery system. Health system in developed country.

Epidemiology: Principles of epidemiology. Natural history of disease. Method of epidemiological studies. Epidemiology of communicable, non-communicable diseases and disease transmission. Immunization, disease monitoring and surveillance. Investigation of an epidemic and role of hospital in its control.

Unit - III

Hospital and Health Services Development: Introduction, history of hospital in India, functions of hospital, classification of hospitals, different hospital service units, hospital and communities.

Emergency Services and Disaster Management: Emergency Services Scope, Principle of planning of emergency services.

Staffing of emergency department, Medico legal aspect of emergency department, Problem areas in emergency department, Emergency department.

Disaster management in hospital, types of hazards/disasters, disaster plan, managerial issues in Disaster management. Control of hospital acquired infection.

Unit - IV

Hospital Services and their Management: Out Patient Department (OPD), Intensive Care Unit (ICU), ward management and operation theatre. Blood bank, pharmacy, central sterile supply department, linen and laundry services, diagnostic services (clinical lab services), radiology and imaging services.

Unit - V

Health Insurance: Health insurance in private health sector. Health insurance in developing and developed countries. Concept of combined life insurance and health insurance. Hospitals/TPA/Insurance company/Relationship and problems.

**HEALTH INFORMATION SYSTEM, MARKETING & HOSPITALITY
MANAGEMENT**

Subject Code: CPHA1-103

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

Contact Hrs.: 45

Unit - I

Computer Information System:

Basics about computer Hardware & Software. Computer programme and operating system. Data Based Concept (Entity Relationship, ER diagram). Microsoft Office, SQL, Visual Basics. Enterprise resource planning (ERP) system and its modules. Application of Computer in hospitals.

Unit - II

Health Information System:

Health information system. Hospital information system. Hospital Management information system (HMIS). HMIS as a tool to managerial control. Introduction to commonly used hospital software

Unit - III

Marketing Management:

Basic concept of marketing management. Consumer behavior. Marketing research information. Pricing of various services. Marketing strategy, evaluation and control. Promotion of business in hospital. Service marketing - patient care and communication. Digital maintenance of medical records.

Unit - IV

Marketing & Insurance:

Advertisement and Branding. Market promotional activities. Corporate marketing. Marketing for TPA and cash patients. Marketing and medical ethics. Social aspect of marketing. Health insurance in private health sector. Concept of combined life insurance and health insurance. Hospitals/TPA/Insurance company/Relationship and problems.

Unit - V

Hospitality Management: Aims and objective of hospitality management. Methods of hospitality management in a hospital setup. Treating patient like a guest. Role of hospitality management in a hospital setup. Effective conversation, attractive look, multi lingual, smart rest, etiquette and manners.

HOSPITAL TRAINING & REPORT

Subject Code: CPHA1-104

**L T P C
0 0 16 8**

To enable the students to acquire practicing in hand on skills, maximum emphasis will be laid on clinical practice. The students will undergo Clinical / Field training in MRSPTU Campus health center, Government medical colleges, civil hospitals, private hospitals and health centers. Students will submit and present a training report after completion of hospital training.

MRSPTU

4. STUDY AND EVALUATION SCHEME FOR CERTIFICATE PROGRAMME IN HARDWARE & NETWORKING

FIRST SEMESTER

CODE	UNITS	STUDY SCHEME Total Hours		CREDITS	MARKS IN EVALUATION SCHEME								Total Marks
		Th	Pr		INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
					Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
CECE2-101	Basic Sciences	32	-	2	25	-	25	25	1	-	-	25	50
CECE2-102	Basic Electrical & Electronics	32	-	2	25	-	25	25	2	-	-	25	50
CECE2-102P	Basic Electrical & Electronics Lab.	-	128	4	-	100	100	-	-	100	3	100	200
CECE2-103	Computer Hardware - I	32	-	2	25	-	25	25	2	-	-	25	50
CECE2-103P	Computer Hardware – I Lab.	-	128	4	-	100	100	-	-	100	3	100	200
CECE2-104	Computer Software	48	-	3	50	-	50	50	2	-	-	50	100
CECE2-104P	Computer Software Lab.	-	160	5	-	125	125	-	-	125	3	125	250
CECE2-105P	#Student Centred Activities (SCA)	-	48	2	-	25	25	-	-	-	-	-	25
CECE2-106P	+4 Weeks Industrial Training (during vacation)	-	-	4	-	-	-	-	-	100	3	100	100
Total		144	464	28	125	350	475	125	-	425	-	550	1025

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, environment and energy conservation, sports, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities etc.

+ **Industrial Training**
After examination of 1st Semester, the students will go for training during vacation in a relevant industry/field organization for a minimum period of 4 weeks and will prepare a diary. The students will prepare a report at the end of training and will present it in a seminar. This evaluation will be done by concerned instructor in the presence of one industrial representative from the related programme/trade.

Total weeks per Semester = 16 Total working days per week = 5 Total hours per day = 7

Total hours in a Semester = 16 x 5 x 7 = 560

One credit is defined as one hour of lecture per week or two hours of practicals per week for one semester. Fractions in credits have been rounded to nearest integer.

SECOND SEMESTER

CODE	UNITS	STUDY SCHEME Total Hours		CREDITS	MARKS IN EVALUATION SCHEME								Total Marks
		Th	Pr		INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
					Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
CECE2-207	Communication Skills	32	-	1	25	-	25	25	2	-	-	25	50
CECE2-207P	Communication Skills Lab.	-	32	1	-	25	25	-	-	25	3	25	50
CECE2-208	Computer Networking	64	-	4	75	-	75	75	1	-	-	75	150
CECE2-208P	Computer Networking Lab.	-	256	8	-	150	150	-	-	150	3	150	300
CECE2-209	Computer Hardware - II	64	-	4	75	-	75	75	1	-	-	75	150
CECE2-209P	Computer Hardware – II Lab.	-	128	4	-	100	100	-	-	100	3	100	200
CECE2-210P	Project Work	-	64	2	-	50	50	-	-	75	2	75	125
CECE2-211P	#Student Centred Activities (SCA)	-	48	2	-	25	25	-	-	-	-	-	25
CECE2-212P	+4 Weeks Industrial Training	-	-	4	-	-	-	-	-	100	3	100	100
Total		160	528	30	175	350	525	175	-	450	-	625	1150

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, environment and energy conservation, sports, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities etc.

+ **Industrial Training**

After examination of 2nd Semester, the students will go for training during vacation in a relevant industry/field organization for a minimum period of 4 weeks and will prepare a diary. The students will prepare a report at the end of training and will present it in a seminar. This evaluation will be done by concerned instructor in the presence of one industrial representative from the related programme/trade.

GUIDELINES FOR ASSESSMENT OF STUDENT CENTRED ACTIVITIES (SCA)

The maximum marks for SCA should be 25. The marks may be distributed as follows:

- i) 5 marks for general behaviour and discipline
(by Principal or HOD in consultation with the instructor(s)/trainers)
- ii) 5 marks for attendance as per following
(by the instructors/ trainers of the department)
 - a) Up to 75% Nil
 - b) 75% to 80% 02 marks
 - c) 80% to 85% 03 marks
 - d) Above 85% 05 marks
- iii) 15 marks maximum for sports/ NCC/ NSS/ Cultural/ Co-curricular activities as per following:
(by In-charge of Sports/ Cultural/ NCC/ NSS/ Co-curricular activities)
15 marks - for National level participation or inter-university competition
10 marks - participation any two of the activities
05 marks - participation at the internal sports of the institute/college/university
Note: There should be no marks for attendance in the internal sessional of different subjects.

UNIT-1.1
SUBJECT CODE: CECE2-101
BASIC SCIENCES

Learning Outcomes:

After undergoing this unit, the students will be able to:

- Apply the basic principles of Mathematics in solving the basic problems of the trade.
- Apply the basic principles of physics in solving the basic problems of the trade.

Practical	Theory (32Hours)
	<p>Mathematics</p> <ul style="list-style-type: none"> • Basic algebra – algebra formula. Simultaneous equation – quadratic equations. • Simultaneous linear equation in two variables. • Arithmetic and geometric progression, sum of n-terms, simple calculations. • Mensuration – Find the area of regular objects like triangle, rectangle, square, and circle; volumes of cube, cuboid, sphere cylinder. • Trigonometry – concept of angle, measurement of angle in degrees, grades and radians and their conversions, T-Ratios of Allied angles. • Co-ordinate Geometry – Cartesian and polar coordinates, conversion from Cartesian to polar coordinates. • Concept of differentiation and integration. <p style="text-align: center;">(16 Hours)</p>
	<p>Physics</p> <ul style="list-style-type: none"> • FPS, CGS, SI units, dimensions and conversions. • Force, speed, velocity and acceleration – Definition, units and simple problems. • Stress and strain, modulus of elasticity. • Heat and temperature, its units and specific heat of solids, liquids and gases. • Electricity and its uses, basic electricity terms and their units, D.C. and A.C., positive and negative terminals, use of switches and fuses, conductors and insulators. • Work, power and energy – Definition, units and simple problems. • Concept of force, Inertia, Newton’s First law of motion; momentum and newton’s

	second law of motion; Impulse; Newton's third law of motion. <ul style="list-style-type: none">• Friction and Lubrication.• Law of conservation of energy. (16 Hours)
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Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Model/prototype making

UNIT-1.2
SUBJECT CODE: CECE2-102
BASIC ELECTRICAL & ELECTRONICS

Learning Outcomes:

After undergoing this unit, the students will be able to:

- Understand basic knowledge of basic electricity.
- Understand basic knowledge analog electronics.
- Understand basic knowledge digital electronics.
- Understand various processors and generations of computers.

Practical (128 Hours)	Theory (32 Hours)
<ul style="list-style-type: none"> • Use of AC and DC signals • To verify KVL and KCL • VI Characteristics of Diode • Design of small circuits comprising of resistors, capacitors, switches, battery etc. <p style="text-align: center;">(24 Hours)</p>	<p>Basic Electricity</p> <ul style="list-style-type: none"> • Electricity: types of signal, AC, DC • Circuits • Resistances • Series vs parallel • Basic components • Resistors, capacitors, Diodes, transistors, LED's, switches, Batteries, Bread boards, Wire • Simple Circuits (using Resistances, Battery, switch, LED etc.) • Circuits using (using Resistances, Capacitor, Transistor, Battery, switch, LED etc.) • Circuits using IC's. <p style="text-align: center;">(08 Hours)</p>
<ul style="list-style-type: none"> • Soldering of resistors on PCB. • De-soldering practice. • Verification of ohm's law. • Use of Multimeter. • Use of CRO and function generator. • Identify types of transistors based on physical appearance. • Quick test given transistors using multimeter. Identify open, shorted junctions. <p style="text-align: center;">(64 Hours)</p>	<p>Analog Electronics</p> <ul style="list-style-type: none"> • Soldering: Soldering tools, Components of solder, how to solder and desolder etc • Ohm's Law and concept of basic analog circuit, concept of Power. • Diode: Semiconductor basics, PN junction theory, PN junction Diode, Diode as half wave & full wave rectifiers, Zener diode and its applications. • Transformer and DC power Supply • Transistor • Use of Multimeter • Use of CRO and function generator • IC 741 <p style="text-align: center;">(08 Hours)</p>
<ul style="list-style-type: none"> • IC pin identification and testing • Identify the specifications of given digital IC's referring to data books. • To study and verify various logic gates. • Use and testing of various flip-flops, Registers and counters. <p style="text-align: center;">(24 Hours)</p>	<p>Digital Electronics</p> <ul style="list-style-type: none"> • Binary, Hexa, Octal number system • Logic families • Classification of Integrated Circuits • Digital Logic States • TTL Input & Output Voltage Levels • TTL and CMOS Logic Levels

	<ul style="list-style-type: none"> • Ideal TTL Digital Logic Gate Voltage Levels • Basic Logic Gates and universal gates • The “74” Sub-families of Integrated Circuits • D and RS flip flop • Shift Registers • Counters • IC 555 <p>(08 Hours)</p>
<ul style="list-style-type: none"> ❖ Basic Maintenance issues related with CPU. <p>(16 Hours)</p>	<p>Processors</p> <ul style="list-style-type: none"> • Processors and CPU: Introduction • Types of Processor • Generations in Computer <p>(08 Hours)</p>

Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Laboratory and practical work
- Viva-voce

UNIT-1.3
SUBJECT CODE: CECE2-103
COMPUTER HARDWARE - I

Learning Outcomes:

After undergoing this unit, the students will be able to:

- Understand the various types of computer generations
- Study, Identification & testing of Parts & cards, RAM
- Assemble a PC, CMOS Setup and FDD & CDROM
- Install & Configure HDD, Key Board & Mouse

Practical (128 Hours)	Theory (32 Hours)
<ul style="list-style-type: none"> • Implement PC repair safety basics. • How to protect a PC from lightning strikes and power outages. (18 Hours) 	<p>Computer Generation</p> <ul style="list-style-type: none"> • Types of generation • Advantages & Disadvantages • Examples (02 Hours)
<ul style="list-style-type: none"> • Identification & testing of Parts & cards • Identification of different Processor Sockets • Identification of I/O Slots, BIOS, I/O Ports & IDE Channels • Identification of Display Cards and I/O cards (20 Hours) 	<p>Study & Identification & Testing of Parts & cards</p> <p>(A) Processors</p> <ul style="list-style-type: none"> • Definitions of processor, Bus speed, • Brief Study & Identifications of Processors <p>(B) Mother Board</p> <ul style="list-style-type: none"> • Study & Identification of I/O Slots, Ports • Study & Identification of BIOS • Study & Identification of IDE Channels <p>(C) Study of various sections of Motherboard</p> <ul style="list-style-type: none"> • Display, I/O, IDE, INTERNAL MODEM, Sound, Multimedia (06 Hours)
<ul style="list-style-type: none"> • Identification and testing of different slots of RAM (14 Hours) 	<p>Study & Identification & Testing of RAM</p> <ul style="list-style-type: none"> • Different types of RAM • SDRAM, RDRAM • Study & Identification of different slots of RAM (04 Hours)
<ul style="list-style-type: none"> • Mounting of the Motherboard • Connecting the different Ports & Connectors of IDE and SATA. • Inserting the different I/O cards on the Motherboard • Connecting the SMPS to the Motherboard (20 Hours) 	<p>Assembling of a PC</p> <ul style="list-style-type: none"> • Safety Precautions while Mounting of the Motherboard, Processors etc. • Issues related to compatibilities of different parts of the PC • Specification of different parts of PC (04 Hours)
<ul style="list-style-type: none"> • Configuring of different devices through CMOS • Changing of BIOS setup. (18 Hours) 	<p>CMOS Setup</p> <ul style="list-style-type: none"> • Study of Different types of BIOS • Flash BIOS • Study of Functioning of BIOS • Configuring of different devices through CMOS (04 Hours)

<ul style="list-style-type: none"> • Identification of the different parts of CDROM • CDROM Installation (14 Hours) 	<p>CDROM</p> <ul style="list-style-type: none"> • Identification of the different parts of CDROM • CDROM Installation (04 Hours)
<ul style="list-style-type: none"> • Parts Identification of HDD • Master-Slave Configuration of HDD • Partitioning of HDD • Data Recover Utility of HDD (12 Hours) 	<p>Installation & Configuration of HDD</p> <ul style="list-style-type: none"> • Logical Section of HDD • Physical Sections of HDD • Parts Identification of HDD • Master-Slave Configuration of HDD • Partitioning of HDD • Data Recover Utility of HDD (04 Hours)
<ul style="list-style-type: none"> • Testing of Different types of Keyboard • Testing of different types of Mouses (12 Hours) 	<p>Key Board & Mouse</p> <ul style="list-style-type: none"> • Study & Identification of Different types of Keyboard • Study of Different types of Mouses (04 Hours)

Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Laboratory and practical work
- Viva-voce

UNIT-1.4
SUBJECT CODE: CECE2-104
COMPUTER SOFTWARE

Learning Outcomes:

After undergoing this unit, the students will be able to:

- Install: DOS and Windows 7,8,10 (32 bit, 64 bit)
- Use of MS Word, MS Excel and MS Power Point
- Install & Configure: Internet, Multimedia, Operating System and Application Software on PC

Practical (160 Hours)	Theory (48 Hours)
<ul style="list-style-type: none"> • Installation of DOS • Booting, making boot disk. • Formatting (16 Hours) 	<p>DOS</p> <ul style="list-style-type: none"> • Installation • Internal Commands • External Commands • Bootable CD or Removal Disc • Formatting (04 Hours)
<ul style="list-style-type: none"> • Practice on Windows 7,8,10 (32 bit, 64 bit) • Installation of different operating systems. (16 Hours) 	<p>Windows 7,8,10 (32 bit, 64 bit)</p> <ul style="list-style-type: none"> • Desk Top Management • Windows explorer • Control Panel • Task / Menu bar • Add/remove programs • Wall Papers and Screen Saver settings • Add new hardware • System configuration (08 Hours)
<ul style="list-style-type: none"> • To perform various operation/tasks using MS word (16 Hours) 	<p>MS Word</p> <ul style="list-style-type: none"> • Text entering, editing, formatting using word tools. • Creating hyperlink. (04 Hours)
<ul style="list-style-type: none"> • To perform various operation/tasks using MS Excel (16 Hours) 	<p>MS Excel</p> <ul style="list-style-type: none"> • Creating work sheet, editing, formatting using excel tools & formulas. (04 Hours)
<ul style="list-style-type: none"> • To perform various operation/tasks using MS Power Point (16 Hours) 	<p>MS Power Point</p> <ul style="list-style-type: none"> • Creating Presentation, editing, formatting using power point tools. • Inserting Audio and Video (04 Hours)
<ul style="list-style-type: none"> • Installation, Configuration on Internet • Crimping the RJ-45 Connector • MODEM • Net connectors • Derivers • Configuring the net • Properties (32 Hours) 	<p>Installation, Configuration on Internet</p> <ul style="list-style-type: none"> • Naming & Internet addressing, subnetting, DNS layers • installation and connecting of Computer with Modem and Tel. lines • Internet browsing • E-Mail sending and Receiving • Computer Sharing (08 Hours)

<ul style="list-style-type: none"> • Installation and Configuration of Sound card, Audio and Video CDs along with utilities like WinAmp, Sonic, <i>etc.</i> (16 Hours) 	<p>Installation, Configuration of Multimedia</p> <ul style="list-style-type: none"> • Installation and Configuration of Sound card • Configuring the computer for Audio and Video CDs • Installation of various Audio and Video Utilities like WinAmp, Sonic, <i>etc.</i> (06 Hours)
<ul style="list-style-type: none"> • Installation configuration and activation of windows 7,8 , 10 (16 Hours) 	<p>Installation of Operating System</p> <ul style="list-style-type: none"> • Installation configuration and activation of windows 7, 8, 10. (04 Hours)
<ul style="list-style-type: none"> • Installation of Application Software (16 Hours) 	<p>Installation of Application Software</p> <ul style="list-style-type: none"> • Installation of MS- Office • Removal of virus, thread & Malware • Disc Management • Disc Defragmentation (06 Hours)

Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Laboratory and practical work
- Viva-voce

SUBJECT CODE: CECE2-106P
INDUSTRIAL TRAINING – I (4 Weeks)

The purpose of industrial training is to:

- Develop understanding regarding the size and scale of operations and nature of industrial/field work in which students are going to play their role after completing the courses of study.
- Develop confidence amongst the students through firsthand experience to enable them to use and apply institute based knowledge and skills to perform field activities.
- Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

It is needless to emphasize further the importance of Industrial Training of students during their one-year certificate programme. It is industrial training, which provides an opportunity to students to experience the environment and culture of world of work. It prepares students for their future role as skilled person in the world of work and enables them to integrate theory with practice.

An external assessment of 100 marks have been provided in the study and evaluation scheme of 1st Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations.

The instructor along with one industrial representative from the concerned trade will conduct performance assessment of students. The components of evaluation will include the following:

- | | | |
|----|----------------------------|-----|
| a) | Punctuality and regularity | 20% |
| b) | Industrial training report | 50% |
| c) | Presentation and viva-voce | 30% |

UNIT-2.1
SUBJECT CODE: CECE2-207
COMMUNICATION SKILLS

Learning Outcomes:

After undergoing this unit, the students will be able to:

- Speak confidently.
- Overcome communication barriers.
- Write legibly and effectively.
- Listen in proper prospective.
- Read various genres adopting different reading techniques.
- Respond to telephone calls effectively.

Practical (32 Hours)	Theory (32 Hours)
	<p>Basics of Communication</p> <ul style="list-style-type: none"> • Process of communication • Types of communication – formal and informal, oral and written, verbal and non-verbal. • Objectives of communication • Essentials of communication • Barriers to communication <p style="text-align: center;">(08 Hours)</p>
<ul style="list-style-type: none"> • Looking up words in a dictionary (meaning and pronunciation) <p style="text-align: center;">(04 Hours)</p>	<p>Functional Grammar and Vocabulary</p> <ul style="list-style-type: none"> • Parts of speech • Tenses • Correction of incorrect sentences <p style="text-align: center;">(06 Hours)</p>
<ul style="list-style-type: none"> • Self and peer introduction • Greetings for different occasions <p style="text-align: center;">(04 Hours)</p>	<p>Listening</p> <ul style="list-style-type: none"> • Meaning and process of listening • Important of listening • Methods to improve listening skills speaking • Importance • Methods to improve speaking • Manners and etiquettes <p style="text-align: center;">(06 Hours)</p>
<ul style="list-style-type: none"> • Newspaper reading <p style="text-align: center;">(06 Hours)</p>	<p>Reading</p> <ul style="list-style-type: none"> • Meaning • Techniques of reading: skimming, scanning, intensive and extensive reading <p style="text-align: center;">(06 Hours)</p>
<ul style="list-style-type: none"> • Vocabulary enrichment and grammar exercise • Exercise on sentence framing accurately <p style="text-align: center;">(06 Hours)</p>	<p>Functional Vocabulary</p> <ul style="list-style-type: none"> • One-word substitution • Commonly used words which are often misspelt • Punctuation • Idioms and phrases <p style="text-align: center;">(06 Hours)</p>
<ul style="list-style-type: none"> • Reading aloud articles and essays on current and social issues • Comprehension of short paragraph 	

<ul style="list-style-type: none"> • Write a short technical report • Letter writing <p>(06 Hours)</p>	
<ul style="list-style-type: none"> • Participate in oral discussion • Respond to telephonic calls effectively • Mock interview <p>(06 Hours)</p>	

Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Laboratory and practical work
- Viva-voce

UNIT-2.2
SUBJECT CODE: CECE2-208
COMPUTER NETWORKING

Learning Outcomes:

After undergoing this unit, the students will be able to:

- Understand the Networking Fundamentals and Network Components
- Utilize the Window Server 2008
- Understand the installation of Linux

Practical (256 Hours)	Theory (64 Hours)
<ul style="list-style-type: none"> • Practical demonstration - Client, Server, Topology, Technology • Hierarchical Central Computer, Peer to Peer Network, Client Server Network • Network Topologies (64 Hours) 	<p>Networking Fundamentals</p> <ul style="list-style-type: none"> • Terminologies Client, Server, Topology, Technology etc. • Types of Network • Hierarchical Central Computer, Peer to Peer Network, Client Server Network • Types of Network Topologies • Types of Network Technologies • Types of Data passing Schemes (16 Hours)
<ul style="list-style-type: none"> • Coaxial, UTP, STP, FOC • Types of Connectors • RJ-45, Terminator, T-Connector, BNC • Use of HUB, Switch, Router • Crimping Tool kit, punching tool kit, cable tester (64 Hours) 	<p>Network Components</p> <ul style="list-style-type: none"> • Types of Cablings • Coaxial, UTP, STP, FOC • Types of Connectors • RJ-45, Terminator, T-Connector, BNC • Define HUB, Switch, Router (16 Hours)
<ul style="list-style-type: none"> • Active directory installation & configuration • Connectivity between server & client • User creation & Administration • Network printing (64 Hours) 	<p>Window Server 2008</p> <ul style="list-style-type: none"> • Active directory installation & configuration • Configure the server • DHCP server • DNS server • FTP server • SQL server • Connectivity between server & client • User creation & Administration • Directory Rights • Log in script • Network printing (16 Hours)
<ul style="list-style-type: none"> • Installation of Linux with windows User Creation & Administration in Linux • Configuration of TCP/IP in Linux • Connectivity of Linux with Windows • Connecting to the Internet in Linux (64 Hours) 	<p>Linux</p> <ul style="list-style-type: none"> • Installation of Red Hat Linux 7.0 • Installation of Linux with windows • User Creation & Administration in Linux • Accessing CDROM & HDD in Linux • Configuration of TCP/IP in Linux • Connectivity of Linux with Windows • Installation & Configuration of NFS Server

	<ul style="list-style-type: none">• Installation of software packages in Linux• Installation & Configuration of DHCP Server• Connecting to the Internet in Linux• Linux Security• Installation of DOS Emulator & Windows Emulator in Linux <p>(16 Hours)</p>
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Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Laboratory and practical work
- Viva-voce

UNIT-2.3
SUBJECT CODE: CECE2-209
COMPUTER HARDWARE - II

Learning Outcomes:

After undergoing this unit, the students will be able to:

- Understand working and installation of Printers - DM & Inkjet, Laser jet
- Troubleshoot of Monitors – Mono & Colour
- Understand the working and troubleshooting of SMPS
- PC Trouble Shooting & Maintenance

Practical (128 Hours)	Theory (64 Hours)
<ul style="list-style-type: none"> • Installation of Dot-Matrix Printer in Windows-9X • Identification of Different parts of Dot-Matrix Printer • Identification of Different of Ink-jet Printer • Laser Printer (32 Hours) 	<p>Printers - DM & Inkjet, Laser jet</p> <ul style="list-style-type: none"> • Types of Printers • Impact & Non-Impact Printers • Working of Dot-Matrix Printer • Installation of Laser Printer • Identification of Different parts of Dot-Matrix Printer • Working of Ink-jet printer • Identification of Different of Ink-jet Printer (16 Hours)
<ul style="list-style-type: none"> • Voltage Measurement of Monitor • Troubleshooting of Monitor • LCD & LED (32 Hours) 	<p>Monitors</p> <ul style="list-style-type: none"> • LCD & LED Monitors • Resolution • Troubleshooting of Monitors (16 Hours)
<ul style="list-style-type: none"> • Parts Identification of SMPS • Voltage Measurements of SMPS • Troubleshooting of SMPS (16 Hours) 	<p>SMPS</p> <ul style="list-style-type: none"> • Study of Linear Power Supply • Study of Switch Mode Power Supply • Parts Identification of SMPS • Tracing of SMPS • Voltage Measurements of SMPS • Troubleshooting of SMPS (16 Hours)
<ul style="list-style-type: none"> • Problems in PC due to the Display Cards • Creating Data backup disc & system recovery disc. • Removing unused program • Running the disc cleanup program • Disc Defragmentation Program • Checking the hard disc drive & understanding hard disc drive space • Hardware installation, power, keyboard, mouse, internet access & performance (48 Hours) 	<p>PC Trouble Shooting & Maintenance</p> <ul style="list-style-type: none"> • Different Error signals generated by BIOS • Problems in PC due to the Display Cards • Problems in PC due to the cables & connectors • Data backup & system recovery. • Removing unused program • The disc clean up • Disc Defragmentation • Checking the hard disc drive & understanding hard disc drive space • Troubleshooting PC problems (Audio, video, CD & DVD drive, Display, HDD) • Hardware installation, power, keyboard,

	mouse, internet access & performance • Repairing software problems • Restarting PC, updating drivers, system restore, application & driver Recovery (16 Hours)
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Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Laboratory and practical work
- Viva-voce

SUBJECT CODE: CECE2-212P
INDUSTRIAL TRAINING – I (4 Weeks)

The purpose of industrial training is to:

- Develop understanding regarding the size and scale of operations and nature of industrial/field work in which students are going to play their role after completing the courses of study.
- Develop confidence amongst the students through firsthand experience to enable them to use and apply institute based knowledge and skills to perform field activities.
- Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

It is needless to emphasize further the importance of Industrial Training of students during their one-year certificate programme. It is industrial training, which provides an opportunity to students to experience the environment and culture of world of work. It prepares students for their future role as skilled person in the world of work and enables them to integrate theory with practice.

An external assessment of 100 marks have been provided in the study and evaluation scheme of 1st Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations.

The instructor along with one industrial representative from the concerned trade will conduct performance assessment of students. The components of evaluation will include the following:

- | | | |
|----|----------------------------|-----|
| d) | Punctuality and regularity | 20% |
| e) | Industrial training report | 50% |
| f) | Presentation and viva-voce | 30% |

STUDY & EVALUATION SCHEME FOR CERTIFICATE PROGRAMME IN MEDICAL LAB. TECHNOLOGY

FIRST SEMESTER

Code	Units	Study Scheme Total Hrs.		Credits	Marks Evaluation Scheme								Total Marks
		Th	Pr		Internal Assessment			External Assessment					
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
CMLT1-101	Communication Skills	8	-	1	25	-	25	25	1	-	-	25	50
CMLT1-101P	Communication Skills Lab.	-	24	1	-	25	25	-	-	50	3	50	75
CMLT1-102	Basic Human Sciences	24	-	1	25	-	25	50	2	-	-	50	75
CMLT1-102P	Basic Human Sciences Lab.	-	64	2	-	50	50	-	-	100	4	100	150
CMLT1-103	Computer Applications	32	-	2	25	-	25	50	2	-	-	50	75
CMLT1-103P	Computer Applications Lab.	-	96	2	-	50	50	-	-	100	4	100	150
CMLT1-104	Clinical Pathology & Haematology	32	-	2	25	-	25	50	2	-	-	50	75
CMLT1-104P	Clinical Pathology & Haematology Lab.	-	124	4	-	75	75	-	-	100	4	100	175
CMLT1-105	Microbiology-I	16	-	2	25	-	25	50	2	-	-	50	75
CMLT1-105P	Microbiology-I Lab.	-	92	4	-	75	75	-	-	100	4	100	175
CMLT1-106P	#Student Centre Activity	-	48	2	-	25	25	-	-	-	-	-	25
CMLT1-107P	+ 4 – Week Training at the end of Semester	-	-	4	-	-	-	-	-	100	3	100	100
	TOTAL	112	448	27	125	300	425	225	-	550	-	775	1200

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, energy conservation, environment, sports, hobby club, such as, photography, etc., seminars, declamation contest, educational field visits, NCC, NSS, cultural activities, etc.

+ Training

Before completion of the semester, the students will go for training in a relevant field organisation for a minimum period of 4 weeks and prepare a diary. The student will prepare a report at the end of training. This report will be evaluated by the concerned instructor in the presence of one organisation representative from the relevant trade/field.

Total weeks per semester: 16, Total working days per week: 5, Total hours per day: 7, Total hours in a semester: 16x5x7 = 560

One credit is defined as one hour of lecture per week or two hours of practical per week in the programme.

STUDY & EVALUATION SCHEME FOR CERTIFICATE PROGRAMME IN MEDICAL LAB. TECHNOLOGY

SECOND SEMESTER

Code	Units	Study Scheme Total Hrs.		Credits	Marks Evaluation Scheme								Total Marks
		Th	Pr		Internal Assessment			External Assessment					
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
CMLT1-208	Biochemistry	32	-	2	25	-	25	50	2	-	-	50	75
CMLT1-208P	Biochemistry Lab.	-	128	4	-	50	50	-	-	100	4	100	150
CMLT1-209	Microbiology-II	32	-	2	25	-	25	50	2	-	-	50	75
CMLT1-209P	Microbiology-II Lab.	-	128	4	-	50	50	-	-	100	4	100	150
CMLT1-210	Pathology	32	-	2	25	-	25	50	2	-	-	50	75
CMLT1-210P	Pathology Lab.	-	128	4	-	50	50	-	-	100	4	100	150
CMLT1-211P	#Student Centre Activity	-	48	2	-	25	25	-	-	-	-	-	25
CMLT1-212P	+ 4 – Week Training at the end of Semester	-	-	4	-	-	-	-	-	100	3	100	100
TOTAL		96	432	24	75	175	250	150	-	400	-	550	800

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, energy conservation, environment, sports, hobby club, such as, photography, etc., seminars, declamation contest, educational field visits, NCC, NSS, cultural activities, etc.

+ Training

Before completion of the semester, the students will go for training in a relevant field organisation for a minimum period of 4 weeks and prepare a diary. The student will prepare a report at the end of training. This report will be evaluated by the concerned instructor in the presence of one organisation representative from the relevant trade/field.

Total weeks per semester: 16, Total working days per week: 5, Total hours per day: 7, Total hours in a semester: 16x5x7 = 560

One credit is defined as one hour of lecture per week or two hours of practical per week in the programme.

COMMUNICATIVE ENGLISH

Subject Code: CMLT1-101

UNIT – I

Communication Skills: Basics, Understanding the communicative environment, what to listen for and why, when to speak and how, Starting and sustaining a conversation.

UNIT – II

Presentation Skills: Introduction; need of good presentation skills in professional life; preparing a good presentation; group discussion; extempore speaking. Multimedia presentation: Understanding the basics, Communication styles, Speaking in groups.

UNIT – III

Reading & Writing Skills: Importance of reading and writing, improving writing skills through understanding and practicing Notice, E-mail, Tenders, Advertisement, formal letter
Developing key traits: Creativity, critical thinking and problem solving, Motivation, persuasion, negotiation and leadership.

UNIT – IV

Essential and Vocational Skills: Survival strategies, managing time, Managing stress, Resilience, Work-life balance.

Interpersonal Communication: Individuals, groups and cultures, Building Relationships, Social Network, Media and Extending Our Identities.

BASIC HUMAN SCIENCES

Subject Code: CMLT1-102

Note – Paper will be divided into five units. Each unit will consist of one essay type and two short answer type questions. Students are required to attempt either essay type or two short answer type question from each unit. All unit carry equal marks.

UNIT – I

- A. Definitions Terminology of different parts, Structure of Cell and Tissues, General Anatomy of Tissues, bone, Joint, Nervous Tissue, Connective (Tissue, Lymph, Epithelial Tissue, Muscular Tissue).
- B. Anatomy of Upper Extremity - (a) Important region (Axilla, Cubital Fossa), (b) Important blood vessels, brachial Plexus and Nervous, (c) Important Muscles of upper Extremity, (d) Joints of upper Extremity in short.
- C. Anatomy of Lower Extremity - (a) Important Region femoral triangle, (b) and political fossa, (c) Important blood vessels, Nervous joints in short.

UNIT - II

- A. Thorax - (a) Structure of Heart, (b) Mediastinum, (c) Important big blood vessels (aorta, venacava, sublavian artery), (d) Structure in short of Trachea, Oesophagus, Bronchi, (e) Lungs.
- B. Abdomen - (a) In General structure of GI tract liver, spleen, pancreas, kidney, uterus urinary bladder, ovary testes, Biliary apparatus.
- C. Head, Neck and Face- (a) Formation of Trangle of the Neck, (b) Structure of gland (e.g. salivary gland, Thyroid gland, (c) Structure of Eye Ball, *Ear*, Nose and Tongue.
- D. Brain- (a) Structure of Spinal Cord, Brain, Brain stem, cerebellum and CSF.

UNIT - III

- A. General physiology of cell membrane and Tissues.
- B. Composition and function of various Body fluids - (a) Blood: Composition, function, RBC, WBC, Thrombocytes, coagulation of blood, (b) Lymph, composition and function,

(c) Function of Reticular system, (d) C.S.F. composition and function, (e) Anticoagulants and their uses.

- C. **Respiratory System** – (a) Mechanism of Respiration, (b) Composition of inspiratory, expiratory and alveolar air, (c) Exchange of gases, (d) Control of respiration in short,

UNIT - IV

- A. **Circulation system** - (a) General properties of Cardiac muscles, (b) Functional tissues of Heart. (c) Circulation of Heart, (d) Cardiac cycle, Blood pressure, cardiac output in short, (e) Different waves of ECG and their significant.
- B. **Excretory** - (a) Structure and function of Kidney and Nephron, (b) Formation of urine, (c) Composition of urine (normal), (d) Abdominal constituent of urine, (e) Function of skin.
- C. **Digestive system** - (a) Composition and functions of various digestive juices, (b) Digestion of food stuff in short, (c) Functions of Digestive organs in short (e.g. Liver, Stomach), (d) Formation of stool and composition of stool, (e) Vitamins: in short.

UNIT - V

- A. **Reproductive and Endocrine Glands** - (a) Hormones of pituitary, thyroid, para thyroid, IASE Pancreas, Testes, ovary, Supra-renal glands. **Nervous System** – (a) Structure of neuron, Nerve fiber and their properties in short. (b) Synapse and transmission of impulse through synapse, (c) Functions of Brain, cerebellum, (d) Neurotransmitters in short, (e) Special senses.

BASIC HUMAN SCIENCES LAB.

Subject Code: CMLT1-102P

Demonstration & Practical:

1. Muscles of the whole body.
2. Demonstration of organs in thorax and abdomen.
3. Demonstration of viscera in head, face and neck.
4. Demonstration of all the glands in the body.
5. Identification of bony prominences on inspection and palpation in the body, especially of extremities.
6. Points to palpate nerves and arteries.
7. Identification of prominent muscles.
8. Extra-ocular muscles and salient points about the eye ball.
9. Demonstration on Brain.
10. Haematology (Demonstration only)
11. Study of Graphs
 - a) Skeletal muscles- (i) Simple muscle twitch (ii) Effect of increasing strength on SMT. (iii) Effect of increasing load on SMT. (iv) Effect of free load & after load (Starting' aw). (v) Effect of temperature. (vi) Effect of two successive stimuli. (vii) Effect of fatigue. (viii) Effect of multiple stimuli & tetanus
 - b) Cardiac muscles- (i) Simple myocardiogram. (ii) Effect of temperature on the myocardiogram. (iii) Effect of drugs. (iv) All of none law. (v) Staircase phenomenon.
12. Physiology Fitness- (i) Breath holding, (ii) Mercury column test,
 - a. Cardiac efficiency test – Harvard step test – Master step test
 - (i) Recording of arterial blood pressure – effects of change in posture & exercise on A.B.P.
 - (ii) Stethography – (a) Effect of deglutition. (b) Effect of voluntary hyperventilation (c) Effect of exercise.
 - (iii) Spirometry - Lung volumes and capacities.

- (iv) Mosso's finger ergography and bicycle ergography
- (v) Perimetry
- (vi) Clinical examination of (a) Respiratory system. (b) Cardiovascular system. (c) Central Nervous system. (d) Special senses.

COMPUTER APPLICATIONS

Subject Code: CMLT1-103

UNIT – I

Introduction to Computer

- a) History of development of computers
- b) Computer system concepts
- c) Characteristics
- d) Capabilities and limitations
- e) Generations of computers.
- f) Basic components of a computer system – Control Unit, ALU, I/ O Devices, memory – RAM, ROM, EPROM, PROM, Flash Memory and other types of memory.

UNIT – II

Storage Devices

- a) Storage fundamentals – Primary Vs Secondary
- b) Data Storage and Retrieval methods – Sequential, Direct and Index Sequential.
- c) Various Storage Devices – Magnetic Tape, Magnetic Disks, Cartridge Tape, Data Drives, Hard Disk Drives, Floppy (Winchester Disk), Disks, Optical Disks, CD, VCD, CD-R, CD-RW, Zip Drive, DVD, SVCD.

UNIT – III

Computer Software

- 1. Types of Software – System software, Application software, Utility Software, Demoware, Shareware, Freeware, Firmware, Free Software.
- 2. Operating Systems – Functions, Types – Batch Processing, Single User, Multi User, Multiprogramming,
- 3. Multi-Tasking.
- 4. Programming languages – Machine, Assembly, High Level, 4 GL.
- 5. Data representation in computers.
- 6. Number System of computers – Binary, Octal, Hexa Decimal – Representation & their conversion.
- 7. Coding System – ASCII, BCD, and EBCDIC etc.
- 8. Computer Viruses.

UNIT-IV

Windows

- 1. Windows concepts, features, windows structure, desktop, taskbar, start menu, my computer, Recycle Bin.
- 2. Windows Accessories – Calculator, Notepad, Paint, WordPad, Character map.
- 3. Windows Explorer – Creating folders and other Explorer facilities.
- 4. Entertainment – CD Player, DVD Player, Media Player, Sound Recorder, Volume Control.

COMPUTER APPLICATIONS LAB.

Subject Code: CMLT1-103P

MS Office

1. Microsoft Word
2. Microsoft Excel
3. Microsoft PowerPoint

CLINICAL PATHOLOGY AND HAEMATOLOGY

Subject Code: CMLT1-104

Note – Paper will be divided into five units. Each unit will consist of one essay type and two short answer type questions. Students are required to attempt either essay type or two short answer type question from each unit. All unit carry equal marks.

UNIT - I

Clinical Pathology: Reception of patients, noting carefully the test advised, phlebotomy and aftercare of patients. The Microscope –different types, parts of microscope, cleaning & care. Examination of Urine –Formation of urine, Physical examination –Colour, transparency, pH and Sp gravity. Chemical examination - Protein, Sugar, Ketone bodies, Bile pigment/salt, Chyle, Blood. Microscopical examination – Cells (RBC, WBC, Epith), casts, crystals, Detection of micro albumin & 2 hours' urine protein estimation.

UNIT - II

Examinations of body fluids – CSF, Pleural, peritoneal & pericardial fluid, Bronchoalveolar lavage fluid, hydatid cyst fluid, Joint fluid
Examination of Semen –physical characters, count, motility, viability and morphology.
Transportation of different clinical materials to distant laboratories.
Basic concepts of Jaundice.

UNIT - III

Introduction to haematology and laboratory organization Lab safety and Instrumentation.
Formation of blood, Composition and functions of blood, Various anticoagulants, their uses, mode of action and their merits and demerits, Methods of determination of PCV, Calculation of different red cell indices (Haemogram).

UNIT - IV

Physiological variations in HB, PCV, TLC and platelets, drawing of peripheral blood smear, staining & stain preparation, Quality assurance in hematology. Basic concepts of anaemia, Leukemia and hemorrhagic disorder, Cytochemical Stain for diagnosis/differential diagnosis of leukemia.

CLINICAL PATHOLOGY AND HAEMATOLOGY LAB.

Subject Code: CMLT1-104P

1. Urine analysis Physical, Chemical, Microscopic, Microbiological.
2. Stool analysis Physical, Chemical, Microscopic, Microbiological.
3. Sputum analysis Physical, Chemical, Microscopic, Microbiological.
4. Semen analysis Physical, Chemical, Microscopic, Microbiological
5. Collection & preservation of blood for various haematological investigations.
6. Preparation of blood smear.
7. Total leukocyte counts and Differential leukocyte count.
8. Erythrocyte sedimentation rate.
9. Hb%

MICROBIOLOGY-I

Subject Code: CMLT1-105

Note – Paper will be divided into five units. Each unit will consist of one essay type and two short answer type questions. Students are required to attempt either essay type or two short answer type question from each unit. All unit carry equal marks.

UNIT - I

Introduction and brief history of microbiology, Safety measures in microbiology, General characteristics and classification of bacteria and fungi, Growth and nutrition of microbes.

UNIT - II

Principles and methods of sterilization, Uses and mode of action antiseptics and disinfectants, Preparation, uses and standardization of culture media, Principles of staining methods and preparation of reagents, Antibiotic sensitivity tests, Biochemical tests and interpretation.

UNIT - III

General characters and classification of protozoa of medical importance.

Morphology, life cycles and Laboratory diagnosis of intestinal Protozoan-Amoebic-Giardia, Malarial Parasite, Nematodes, Haem flagellates,

UNIT - IV

Culture techniques for protozoa, Helminths Hookworm round worm, E. histolytica.- Giardia –Leishmania.

Casoni's test and its interpretation, Examination and processing of cysticercosis cyst.

Laboratory processing, staining and examination of samples.

MICROBIOLOGY-I LAB.

Subject Code: CMLT1-105P

1. Autoclave –its structure, functioning, control and indicator
2. Staining
 - a) Simple staining - negative staining
 - b) Gram staining - Acid fast staining
3. Demonstration of Fungus in Laboratory

GUIDELINES FOR ASSESSMENT OF STUDENT CENTRED ACTIVITIES (SCA)

The maximum marks for SCA should be 25. The marks may be distributed as follows:

- i) 5 marks for general behaviour and discipline
(by Principal or HOD in consultation with the instructor(s)/trainers)
- ii) 5 marks for attendance as per following
(by the instructors/ trainers of the department)
 - a) Up to 75% Nil
 - b) 75% to 80% 02 marks
 - c) 80% to 85% 03 marks
 - d) Above 85% 05 marks
- iii) 15 marks maximum for sports/ NCC/ NSS/ Cultural/ Co-curricular activities as per following:
(by In-charge of Sports/ Cultural/ NCC/ NSS/ Co-curricular activities)
15 marks - for National level participation or inter-university competition
10 marks - participation any two of the activities
05 marks - participation at the internal sports of the institute/college/university
Note: There should be no marks for attendance in the internal sessional of different subjects.

MRSPTU

TRAINING – I (4 Weeks)

Subject Code: CMLT1-107P

The purpose of training is to:

1. Develop understanding regarding the size and scale of operations and nature of field work in which students are going to play their role after completing the courses of study.
2. Develop confidence amongst the students through first-hand experience to enable them to use and apply institute based knowledge and skills to perform field activities.
3. Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

It is needless to emphasize further the importance of Training of students during their one-year certificate programme. It is training, which provides an opportunity to students to experience the environment and culture of world of work. It prepares students for their future role as skilled person in the world of work and enables them to integrate theory with practice.

An external assessment of 100 marks have been provided in the study and evaluation scheme of 1st Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations.

The instructor along with one organization representative from the concerned trade will conduct performance assessment of students. The components of evaluation will include the following:

- | | |
|-------------------------------|-----|
| a) Punctuality and regularity | 20% |
| b) Industrial training report | 50% |
| c) Presentation and viva-voce | 30% |

BIOCHEMISTRY

Subject Code: CMLT1-208

Note – Paper will be divides into five units. Each unit will consist of one essay type and two short answer type questions. Students are required to attempt either essay type or two short answer type question from each unit. All unit carry equal marks.

UNIT - I

Introduction, properties and simple metabolism of carbohydrates, proteins and fat.

Introduction and general properties of Nucleic acids and Enzymes.

UNIT - II

Radio isotopes and their use in Biochemistry, mole, molar and normal solutions pH, buffer solutions, pH-measurement, Osmosis, dialysis, surface tension.

Collection and recording of biological specimens, separation of serum plasma preservation and disposal of biological samples material.

UNIT - III

Disposal of Laboratory waste,

Basic statistics (mean, SD, CV, normal distribution, probability) Normal or Reference range.

Volumetric analysis - Preparation of Standard acid and base solutions, chloride estimation.

UNIT - IV

Colorimetry, Spectrophotometry, Flame Photometry Atomic Absorption Spectroscopy,

Electrometric determination of Na⁺ and K⁺, chromatography, Electrophoresis.

Radioimmunoassay (RIA) and ELISA.

BIOCHEMISTRY LAB.

Subject Code: CMLT1-208P

1. Preparation of laboratory reagents and standard
2. solutions, storage of chemicals.
3. Urine analysis (qualitative) for physical and chemical constituents i.e. sugar, proteins, bile pigments, ketone bodies, porphobilinogen, faecal occult blood.
4. Principal of Assay procedures for biological material and estimation of kidney function
5. tests.
6. Principles and methods of estimation for serum Urea, Uric acid, Creatinine,
7. Cholesterol, Bilirubin.
8. Estimation of Essential electrolytes: Sodium, potassium, calcium, chloride and phosphorus etc.
9. Estimation of important enzymes.

MICROBIOLOGY-II

Subject Code: CMLT1-209

Unit-I

Identification of Bacteria:

Micrococci, Staphylococci, Streptococci, pneumococci, Corynebacteria, Escherichia, Klebsiella, Enterobacter, Proteus-providencia Salmonella, Shingella, Arizona, Citrobacter, Yersinia, Pseudomonas, Vibrio, Haemophilus, Mycoplasma, Rickettsia, Chlamydia, Tricragents.

Unit-II

Pathogenic and new-pathogenic Fungi:

Candida, Cryptococci, Dermatophytes, Sporotrichoums, Histoplasma, Blastomyces, Coccidioides, Para-coccidioides, Dematiaceous fungi, Mycetoma, Actinomyces, Nocardia and common laboratory contaminants. Biochemical tests used for identification of bacteria and fungi.

Unit-III

Diagnostic serological methods – Agglutination & Flocculation, Latex agglutination tests – to be performed by the students, Elisa testing & RIA – principles and demonstration and interpretation of results of -Widal Test, VDRL Test, Aldehyde Test, ASO Titre, Rheumatoid factor, C-reactive protein, HBsAg, Anti HCV, Anti HIV.

Bacterial Serology, Strep, H. Pylori, Mycoplasma, syphilis.

Unit-IV

Virology: General Characteristics of viruses physical, chemical and Biological Properties, Introduction to use of different laboratory instruments and their safety Precautions, Collections, handling, and storage of samples for viral diagnosis, Washing, cleaning and sterilization of Media and glassware in Virology, Principles of biosafety hoods use of pipettes, syringes and other virus contaminated instruments in the laboratory.

MICROBIOLOGY-II LAB.

Subject Code: CMLT1-209P

Demonstration of Staining Procedures:

Preparation of the following Stains and Demonstration of Viral Inclusion Bodies:

- a) Seller's stain for Negri body demonstration.
- b) Giemsa Stain for CMV and Herpes viral inclusions

Preparation of Reagents for serological Tests:

Phosphate buffered saline, Veronal buffered saline, Alsever's solution, Dextrose gelatine, Veronal buffer and Tris buffer.

Dilutions/Serial dilutions,

RA Test, RPR,

Strep Test,

WIDAL Test, VDRL Test,

Pregnancy Test & HIV Test

PATHOLOGY-II

Subject Code: CMLT1-210

Note – Paper will be divided into five units. Each unit will consist of one essay type and two short answer type questions. Students are required to attempt either essay type or two short answer type question from each unit. All unit carry equal marks.

UNIT - I

Basic concepts of different mammalian tissues and their histological structure. Different human organs and their gross and histological structure and functions.

Receiving of biopsy specimens at laboratory (Clinical notes/fixatives)

Fixation of tissue-different fixatives and their mode of action.

UNIT - II

Methods of decalcification.

Processing of tissues-protocol for manual & automated tissue processors, paraffin embedding & preparation of blocks, preparation of reagents, different techniques & application and frozen section/cryostat.

Use of Microtomes, selection and maintenance of knives, technique of section cutting & mounting on slides.

Staining of tissue sections, preparation of different stains, staining methods for Haematoxylin & Eosin, Reticulin, PAS, Van-Gieson, Massion's trichrome, Lipid & Mucin stains & Perl's stain.

UNIT - III

Preservation of specimens and mounting of museum specimens.

Preparation of cytosmear and H. & E, Papanicolaou & MGG staining of different body fluids

Fine Needle Aspiration cytology & exfoliative cytology & Buccal Smear examination

Cytochemistry & immunohistochemistry.

Cytospin and cell block preparation.

UNIT - IV

Blood Group (ABO & Rh) – methods of grouping & reverse grouping.

Basic blood banking procedures –collection of blood, anticoagulants used, cross matching, different screening tests including Coomb's Test for incomplete antibodies, preparation of different blood components for use and how to serve a requisition.

Preparation of red cell suspension, Blood transfusion & hazards.

PATHOLOGY-II LAB.

Subject Code: CMLT1-210P

Study of histological slides Simple squamous epithelium, Unstriated and striated muscle fibres, cardiac muscle fibres, T.S. of Bone, T.S. of artery, T.S. of Vein, Medullated nerve fibre, non-medullated nerve fibre, V.S. of Skin, T.S. of oesophagus, T.S. of Stomach, T.S. of

duodenum, T.S. of pancreas, T.S. of Liver, T.S. of spleen, T.S. of Lung, T.S. of Kidney, T.S. of Testes, T.S. of ovary .

TRAINING – I (4 Weeks)

Subject Code: CMLT1-212P

The check points to ensure selection of a good laboratory for training

Organization and Personnel
Equipment/Instrumentation
Testing Facilities Operation
Test and Control Articles
Verification of Performance Specifications
Records and Reports
Physical Facilities
Specimen Transport and Management
Personnel Safety
Laboratory Information Systems

MRSPTU

STUDY & EVALUATION SCHEME FOR CERTIFICATE PROGRAMME IN LATHE OPERATOR

Code	Units	Study Scheme Total Hrs		Credits	Marks Evaluation Scheme								Total Marks
		Th	Pr		Internal Assessment			External Assessment					
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
CMEE4-101	Communication Skills	8	-	1	25	-	25	25	1	-	-	25	50
CMEE4-101P	Communication Skills Lab.	-	24	1	-	25	25	-	-	50	3	50	75
CMEE4-102	Introduction	20	-	1	25	-	25	50	2	-	-	50	75
CMEE4-102P	Introduction Lab.	-	60	2	-	50	50	-	-	100	4	100	150
CMEE4-103	Lathe Machine & its Operations	30	-	1	25	-	25	50	2	-	-	50	75
CMEE4-103P	Lathe Machine & its Operations Lab.	-	92	3	-	50	50	-	-	100	4	100	150
CMEE4-104	Tool Geometry	32	-	1	25	-	25	50	2	-	-	50	75
CMEE4-104P	Tool Geometry Lab.	-	90	3	-	75	75	-	-	100	4	100	175
CMEE4-105	Safety	16	-	1	25	-	25	50	2	-	-	50	75
CMEE4-105P	Safety Lab.	-	92	5	-	75	75	-	-	100	4	100	175
CMEE4-106P	#Student Centre Activity	-	48	2	-	25	25	-	-	-	-	-	25
CMEE4-107P	+ 4 – week industrial training at the end of semester	-	-	4	-	-	-	-	-	100	3	100	100
	TOTAL	106	406	25	125	300	425	225	-	550	-	775	1200

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, Industrial tour, environment, sports, hobby club, such as, photography, etc., seminars, declamation contest, educational field visits, NCC, NSS, cultural activities, etc.

+ Industrial Training

Before completion of the semester, the students will go for training in a relevant industry/ field organisation for a minimum period of 4 weeks and prepare a diary. The student will prepare a report at the end of training. This report will be evaluated by the concerned instructor in the presence of one industry representative from the relevant trade/ field.

Total weeks per semester: 16, Total working days per week: 5, Total hours per day: 7, Total hours in a semester: 16x5x7 = 560

One credit is defined as one hour of lecture per week or two hours of practical per week in the programme.

GUIDELINES FOR ASSESSMENT OF STUDENT CENTRED ACTIVITIES (SCA)

The maximum marks for SCA should be 25. The marks may be distributed as follows: -

- i) 5 marks for general behaviour and discipline
(by Principal or HOD in consultation with the instructor(s)/trainers)
- ii) 5 marks for attendance as per following
(by the instructors/ trainers of the department)
 - a) Up to 75% Nil
 - b) 75% to 80% 02 marks
 - c) 80% to 85% 03 marks
 - d) Above 85% 05 marks
- iii) 15 marks maximum for sports/ NCC/ NSS/ Cultural/ Co-curricular activities as per following:
(by In-charge of Sports/ Cultural/ NCC/ NSS/ Co-curricular activities)
15 marks - for National level participation or inter-university competition
10 marks - participation any two of the activities
05 marks - participation at the internal sports of the institute/college/university
Note: There should be no marks for attendance in the internal sessional of different subjects.

SALIENT FEATURES OF THE PROGRAMME

1	Sector	Mechanical Industry
2	Name of the certificate programme	Lathe operator
3	Entry qualification	Matriculation or equivalent NSQF level as prescribed by MRSPTU, Bathinda.
4	Duration of programme	Six (6) months
5	Intake	30
6	Pattern of programme	Semester pattern
7	NSQF level	Level III
8	Ratio of theory & practice	20:80

JOB ROLE AND JOB OPPORTUNITIES OF A LATHE OPERATOR

JOB ROLE

A Lathe operator is expected to perform following job roles in industry

- Should be familiar with Lathe Machine Operation.
- Attaches specified chuck or chuck jaws to headstock.
- Selects correct cutting tool, grinds it if necessary and holds it tight in tool post at correct height.
- Sets feed and speed and starts machine. Manipulates hand wheels or starts automatic controls to guide cutting tool into or along metal.
- Controls flow of coolant (cutting lubricant) on edge of tool.
- knowledge of machine drawings, fits and tolerances.
- Familiar with Boring, drilling, reaming, threading and tapping (both CGS & SI systems)
- knowledge of Material.
- Cleans and oils machine
- Preparation of tools for machining.
- Should have worked in reputed Machine Shop / Work Shop.
- Should meet all safety requirements while performing the work.

JOB OPPORTUNITIES

Lathe operator can get jobs in following industries

- Automobile Industries
- Aerospace Industries
- Manufacturing industries
- Textile Industries
- Mining Industry

RESOURCE REQUIREMENTS
LIST OF TOOLS AND EQUIPMENT
Lab. Equipment and Tools

Sr. No.	Name of Item	Quantity
1.	Hammer brass 500 gm with handle	10
2.	Screw Driver set	20
3.	Spanner double ended -6mm to 32mm.	10
4.	Spanner adjustable 200mm.	10
5.	Pliers long nose- 150mm side cutting.	10
6.	Pliers combination- size 8"	10
7.	Fire Extinguisher	10
8.	Safety goggles clear glass (Good Quality)	30
9.	Oil can ½ pint (pressure feed system)	20
10.	Lathe Mandrels (Different Types)	5
11.	Revolving Centre	05
12.	Universal surface gauge- 250mm.	20
13.	Universal Vernier Caliper-200mm.	30
14.	Hacksaw fixed 200mm (Pistol grip)	20
15.	Drill Chuck with key- Cap. – 12mm	5
16.	Twist Drill Taper shank- 1 to 12 mm step range 0.5mm	15
17.	Tap Wrench (Adjustable)	20
18.	Knurling tool revolving head	10
19.	Tool Holder RH & straight for 3/8" square tool bit	5
20.	Parting Tool Holder	5
21.	SS and SC centre lathe (all geared) with having minimum specification as: centre height 150 mm and centre distance 1000 mm along with 4 jaw and 3 jaw chucks, auto feed system, safety guard, motorized coolant system and lighting arrangement.	1
22.	Lathe Tool Room SS and SC centre lathe (all geared) with having minimum specification as: centre height 150 mm and centre distance 1000 mm along with 4 jaw and 3 jaw chucks, auto feed system, safety guard, motorized coolant system and lighting arrangement.	1
23.	Scriber cutting tools for various operations,	5
24.	Dial gauges	10
25.	Micrometre	5
26.	Bevel Protector	15
27.	Allen Key set	10
28.	Safety goggles	10
29.	Files	10
30.	Steel rule	10
31.	Chisel cold flat	10
32.	Centre Punch	10
33.	Charts of dos and Don'ts in work area	30

CLASS ROOM FURNITURE

Sr. No.	Name of Item	Quantity
1.	Instructor Table & chair	1 set
2.	Students' chairs with writing pads	30 nos.
3	White Board of size 120cm x 90cm	1 no.
4.	LCD Projector with Screen	1 set
5.	Lap top for instructor with latest (Vista & above) configuration pre- loaded with operating system and MS Office package	1 no.

UNIT – I
SUBJECT CODE: CMEE4-101
COMMUNICATION SKILLS

LEARNING OUTCOMES:

After undergoing this unit, the students will be able to:

- Speak confidently.
- Overcome communication barriers.
- Write legibly and effectively.
- Listen in proper prospective.
- Read various genres adopting different reading techniques.
- Respond to telephone calls effectively.

Practical (24 Hours)	Theory (08 Hours)
	Basics of Communication <ul style="list-style-type: none"> • Process of communication • Types of communication - formal and informal, oral and written, verbal and non-verbal • Objectives of communication • Essentials of communication • Barriers to communication <p style="text-align: right;">(1 hour)</p>
<ul style="list-style-type: none"> • Looking up words in a dictionary (meaning and pronunciation) <p style="text-align: right;">(2 hours)</p>	Functional Grammar and Vocabulary <ul style="list-style-type: none"> • Parts of speech • Tenses • Correction of incorrect sentences <p style="text-align: right;">(2 hours)</p>
<ul style="list-style-type: none"> • Self and peer introduction • Greetings for different occasions <p style="text-align: right;">(1 hour)</p>	Listening <ul style="list-style-type: none"> • Meaning and process of listening • Importance of listening • Methods to improve listening skills Speaking <ul style="list-style-type: none"> • Importance • Methods to improve speaking • Manners and etiquettes <p style="text-align: right;">(2 hours)</p>
<ul style="list-style-type: none"> • Newspaper reading <p style="text-align: right;">(1 hour)</p>	Reading <ul style="list-style-type: none"> • Meaning • Techniques of reading: skimming, scanning, intensive and extensive reading <p style="text-align: right;">(1 hour)</p>
<ul style="list-style-type: none"> • Vocabulary enrichment and grammar exercises • Exercises on sentence framing accurately <p style="text-align: right;">(6 hours)</p>	Functional Vocabulary <ul style="list-style-type: none"> • One-word substitution • Commonly used words which are often misspelt • Punctuation • Idioms and phrases <p style="text-align: right;">(2 hours)</p>

<ul style="list-style-type: none"> • Reading aloud articles and essays on current and social issues • Comprehension of short paragraph <p style="text-align: right;">(5 hours)</p>	
<ul style="list-style-type: none"> • Write a short technical report • Letter writing <p style="text-align: right;">(3 hours)</p>	
<ul style="list-style-type: none"> • Participate in oral discussion • Respond to telephonic calls effectively • Mock interview <p style="text-align: right;">(6 hours)</p>	

Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Laboratory and practical work
- Viva-voce

UNIT-II
SUBJECT CODE: CMEE4-102
INTRODUCTION

Learning Outcomes:

After undergoing study of this unit the students will be able to

- Different types of lathe and difference between them
- Understand Measurement standards
- Maintenance importance for lathe machine

Practicals	60 hrs	Theory	20 hrs
<ul style="list-style-type: none"> • Practice on Lathe dismantling & mounting of chuck. • Practice on Lathe on calibration of measuring instruments. • Checking geometrical accuracies of lathe • Practice on calibration of measuring instruments. • Measurement of components by Vernier calliper. • Practice of cleaning, preventive maintenance of machine. • Mount work piece between centres, in chuck, or to faceplate, manually or using hoist. • alignment of work piece on machine, using measuring instruments, such as rules, gauges, or callipers. • Periodical lubrication procedure on lathe, testing of accuracy of alignment. Procedure of checking accuracy of lathe, preventive maintenance of lathe. • Operate lathe machine and identify different parts 		<ul style="list-style-type: none"> • Types of Lathe machine & its accessories • Turret & Capstan Lathe • Lathe specifications, Lathe cutting tools, speed, feed, depth of cut & machining time. • Precision measuring instruments. • Routine Maintenance on lathe machine. • Introduction to CNC and NC machines 	

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-III
SUBJECT CODE: CMEE4-103
LATHE MACHINE & ITS OPERATIONS

Learning Outcomes:

After undergoing study of this unit the students will be able to

- Understated operations of lathe and its practical applications
- Identify different accessories used on lathe machine
- understand various parameters required for operation like cutting speed, feed rate and depth of cut
- To understand about numerical calculation about material removal rate

Practicals	92 hrs	Theory	30 hrs
<ul style="list-style-type: none"> • Plain turning between centre with follower rest (long bar job) • setting practice to check centre axis alignment between machine spindle axis and tail stock axis • Taper turning practice by swiveling compound slide. Taper turning practice by Tail. • Checking of taper angle by bevel protector and sine bar. • Practice on Lathe - Ball Turning. • Practice on Screw thread cutting B.S.W external R/H and L/H. • Checking of thread by using screw thread gauge. 		<p>Various Operations on Lathe:</p> <ul style="list-style-type: none"> • turning operations • drilling • boring • shaping and planning • broaching • knurling • cutting operations • taper turning • chamfering • threading • counter boring 	
<ul style="list-style-type: none"> • Eccentric marking using Vernier height gauge, job holding & eccentric turning practice. • select and install pre-set tooling in tool posts, turrets or indexing heads, and automatic-tool-change magazine, in sequence specified on process sheet • Square thread- Construction and uses. Calculation involved- depth, core Dia, pitches, and module of Acme & Worm Thread. • Practice of boring, counter boring, grooving (external & internal) and radius (concave & convex) turning on lathe. Plain turning practice using solid mandrel. • Practice on Acme threading and tool grinding. • Practice of Crankshaft turning double throws. • Problems in metric and inch thread conversions. 		<ul style="list-style-type: none"> • Tool holding devices • Detailed calculations and numerical related to material removal rate • Influence of tool height on tool angle for lathe operation • Definition and calculation of Cutting speed, feed, depth of cut, and turning time for lathe operation. • Principle of taper turning by compound slide swivelling method, its calculation, advantages & disadvantages. • Taper turning by form tool, its method of turning. Advantages & disadvantage of taper turning by form tool. • Principle of taper turning by tailstock set over method. • Calculation for tailstock set over method. Advantages & disadvantage of taper turning by tailstock. 	

Means of Assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-IV
SUBJECT CODE: CMEE4-104
TOOL GEOMETRY

Learning Outcomes:

After undergoing study of this unit the students will be able to

- Correctly and safely handle different tools
- Tool wear and its prevention
- Understand about tool parts and its uses

Practicals	90 hrs	Theory	32 hrs
<p>Tools grinding Practice Side Cutting tools Offset turning tools Parting tools select and install pre-set tooling in tool posts, turrets or indexing heads, and automatic-tool-change magazine, in sequence specified on process sheet how to replace worn tools, and sharpen dull cutting tools and dies using bench grinders or cutter-grinding machines. install, align & secure tools, attachments, fixtures & work pieces on machines, using hand tools & precision measuring instruments Position, and align cutting tools in tool holders on machines using hand tools and verify their position with measuring instruments. Turning practice by using index able inserts. Methods of measuring cutting forces. Practice of negative rake tool on non-ferrous metals. Produce job using various cutting tools involving different operations. Grinding of cutting tools used on a lathe machine</p>		<p>Importance of tool geometry geometry of single point cutting tool Drilling tools and broaching tools. Introduction to latest cutting tools, materials, their properties and applications types of tool wear tool life variables affecting the tool life Introduction about merchant theory. determination of tool life exponents machinability</p>	

Means of Assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-V
SUBJECT CODE: CMEE4-105
SAFETY

Learning Outcomes:

- After undergoing study of this unit the students will be able to
- Recognize & comply safe working practices, environment regulation and housekeeping.
- Advantages of safety devices
- Important terms used for safety in industry
- safe work environment importance in industry

Practicals	92 hrs	Theory	16 hrs
<ul style="list-style-type: none"> • Health, Safety and Environment guidelines, legislations & regulations as applicable. • Disposal procedure of waste materials like cotton waste, metal chips/burrs etc. • Basic safety introduction, Personal protective Equipment (PPE):- Basic injury prevention, Basic first aid, Hazard identification and avoidance, safety signs for Danger, Warning, caution & personal safety message. • Preventive measures for electrical accidents & steps to be taken in such accidents. • Describe hazard, including the different types of health and safety hazards in the workplace • Use of Fire extinguishers. • Explain the importance of maintaining high standards of health, safety and security • Follow the Safety, Health and Environment related practices • Uses of Safety gloves, Safety shoes, les, Ear plugs • use the health, safety and accident reporting Procedures and the importance of these. • report any identified breaches in health, safety, and security policies and procedures to the designated person. 		<ul style="list-style-type: none"> • Study of importance of complying health safety and environmental regulation at work place. • Study of hazards associated with lathe machines operations. • Safety equipment. • Precautions and remedies. • Response to emergencies eg; power failure, fire, and system failure. • Read and understand the safety signs and instructions on the lathe machine, Identify job-site hazards and apply good housekeeping practices, Organisation's emergency procedures for accident, fires or any other natural calamity. 	

Means of Assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

SUBJECT CODE: CMEE4-107P
INDUSTRIAL TRAINING – I (4 Weeks)

The purpose of industrial training is to:

- Develop understanding regarding the size and scale of operations and nature of industrial/field work in which students are going to play their role after completing the courses of study.
- Develop confidence amongst the students through first-hand experience to enable them to use and apply institute based knowledge and skills to perform field activities.
- Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

It is needless to emphasize further the importance of Industrial Training of students during their one-year certificate programme. It is industrial training, which provides an opportunity to students to experience the environment and culture of world of work. It prepares students for their future role as skilled person in the world of work and enables them to integrate theory with practice.

An external assessment of 100 marks have been provided in the study and evaluation scheme of 1st Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations.

The instructor along with one industrial representative from the concerned trade will conduct performance assessment of students. The components of evaluation will include the following:

- | | |
|-------------------------------|-----|
| a) Punctuality and regularity | 20% |
| b) Industrial training report | 50% |
| c) Presentation and viva-voce | 30% |

STUDY & EVALUATION SCHEME FOR CERTIFICATE PROGRAMME IN SEWING MACHINE OPERATOR

Code	Units	Study Scheme Total Hrs		Credits	Marks Evaluation Scheme								Total Marks
		Th	Pr		Internal Assessment			External Assessment					
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
CSEO-101	Communication Skills	8	-	1	25	-	25	25	1	-	-	25	50
CSEO-101P	Communication Skills Lab.	-	24	1	-	25	25	-	-	50	3	50	75
CSEO-102	Fundamentals of Fabrics & Preparation for Cutting	24	-	1	25	-	25	50	2	-	-	50	75
CSEO-102P	Fundamentals of Fabrics & Preparation for Cutting Lab.	-	64	2	-	50	50	-	-	100	4	100	150
CSEO-103	Sewing Machines – Basics & Overlock with Aids	32	-	2	25	-	25	50	2	-	-	75	75
CSEO-103P	Sewing Machines – Basics & Overlock with Aids Lab.	-	96	2	-	50	50	-	-	100	4	100	150
CSEO-104	Variety of Techniques in Garment Making	32	-	2	25	-	25	50	2	-	-	50	75
CSEO-104P	Variety of Techniques in Garment Making Lab.	-	124	4	-	75	75	-	-	100	4	100	175
CSEO-105	Trims - Application in Garments and Sample Making	16	-	2	25	-	25	50	2	-	-	50	75
CSEO-105P	Trims - Application in Garments and Sample Making Lab.	-	92	4	-	75	75	-	-	100	4	100	175
CSEO-106P	#Student Centre Activity	-	48	2	-	25	25	-	-	-	-	-	25
CSEO-107P	+ 4 – Week Industrial Training at the end of Semester	-	-	4	-	-	-	-	-	100	3	100	100
TOTAL		112	448	27	150	300	450	225	-	550	-	775	1200

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, energy conservation, environment, sports, hobby club, such as, photography, etc., seminars, declamation contest, educational field visits, NCC, NSS, cultural activities, etc.

+ Industrial Training

Before completion of the semester, the students will go for training in a relevant industry/ field organisation for a minimum period of 4 weeks and prepare a diary. The student will prepare a report at the end of training. This report will be evaluated by the concerned instructor in the presence of one industry representative from the relevant trade/ field.

Total weeks per semester: 16, Total working days per week: 5, Total hours per day: 7, Total hours in a semester: 16x5x7 = 560

One credit is defined as one hour of lecture per week or two hours of practical per week in the programme.

GUIDELINES FOR ASSESSMENT OF STUDENT CENTRED ACTIVITIES (SCA)

The maximum marks for SCA should be 25. The marks may be distributed as follows:-

- i) 5 marks for general behaviour and discipline
(by Principal or HOD in consultation with the instructor(s)/trainers)
- ii) 5 marks for attendance as per following
(by the instructors/ trainers of the department)
 - a) Up to 75% Nil
 - b) 75% to 80% 02 marks
 - c) 80% to 85% 03 marks
 - d) Above 85% 05 marks
- iii) 15 marks maximum for sports/ NCC/ NSS/ Cultural/ Co-curricular activities as per following:
(by In-charge of Sports/ Cultural/ NCC/ NSS/ Co-curricular activities)
15 marks - for National level participation or inter-university competition
10 marks - participation any two of the activities
05 marks - participation at the internal sports of the institute/college/university
Note: There should be no marks for attendance in the internal sessional of different subjects.

SALIENT FEATURES OF THE PROGRAMME

1	Sector	Tailoring
2	Name of the certificate programme	Sewing machine operator
3	Entry qualification	Matriculation or equivalent NSQF level as prescribed by MRSPTU, Bathinda.
4	Duration of programme	Six (6) months
5	Intake	30
6	Pattern of programme	Semester pattern
7	NSQF level	Level III
8	Ratio of theory & practice	20:80

JOB ROLE AND JOB OPPORTUNITIES OF A SEWING MACHINE OPERATOR

JOB ROLE

A sewing machine operator is expected to perform following job roles in industry

- Recognise the fabric materials and fabric types
- Understand the grains, pile directions
- Carry out accurate marking and measurements and cut the fabrics accordingly
- Set the sewing machine that will be used
- Methodically stitch the garments taking proper care of the design and measurements
- Use proper stitches and seams
- Add accessories and embellishments properly
- Possess the concept of overall balance in the design of the garment
- Correctly sew/ join the cut components without distortions
- Mend the garment after manufacturing
- Possess basic concept of the quality of the garment.

JOB OPPORTUNITIES

The clothing and garment making is the basic requirement of human civilisation and exists from the beginning of civilisation. Sewing machine is a widely prevalent simple machine which is seen at every village and nooks of towns. Although most of the sewing machines operate in non-organised sector there are some fairly large garment manufacturing units in the country. A sewing machine operator can find employment in any of the micro, small or large tailoring or garment making establishments.

Another feature of this trade is self-employment or entrepreneurship. A properly trained person can set up his own establishment as the requirement of finance and space is not very high. However, since this trade is widely prevalent, the entrepreneur should have adequate technical and communication skill to survive in the competition.

UNIT-1.1
Subject Code: CSEO-101
COMMUNICATION SKILL

LEARNING OUTCOMES:

After undergoing this unit, the students should be able to

- Speak confidently
- Overcome communication barriers
- Write legibly and effectively
- Listen in proper perspective
- Read various genres adopting different reading techniques
- Respond to telephone calls effectively

Practical	24 hrs	Theory	8 hrs
		Basic communication	<ul style="list-style-type: none"> • Process of communication • Types of communication – formal and informal, oral and written, verbal and non-verbal
Looking up words in dictionary (meaning and pronunciation)		Functional grammar and vocabulary	<ul style="list-style-type: none"> • Parts of speech • Tenses • Correction of incorrect sentences
<ul style="list-style-type: none"> • Self and peer introduction • Greetings for different occasions 		Listening	<ul style="list-style-type: none"> • Meaning and process of listening • Importance of listening • Methods to improve listening skills
		Speaking	<ul style="list-style-type: none"> • Importance • Methods to improve speaking • Manners and etiquettes
Newspaper reading		Reading	<ul style="list-style-type: none"> • Meaning • Technique of reading – skimming, scanning, intensive and extensive reading
<ul style="list-style-type: none"> • Vocabulary enrichment and grammar exercises • Exercises on sentence framing accuracy 		Functional vocabulary	<ul style="list-style-type: none"> • One word substitution • Commonly used words which are often misspelt • Punctuation • Idioms and phrases
<ul style="list-style-type: none"> • Reading aloud articles and essays on current and social issues • Comprehension of short paragraph 			
<ul style="list-style-type: none"> • Write short technical report • Letter writing 			
<ul style="list-style-type: none"> • Participate in oral discussion • Respond to telephonic calls effectively 			

• Mock interview	
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Means of Assessment

- Assignment and quiz/ class test
- Mid-term and end term written tests
- Laboratory and practical work
- Viva voce

UNIT-1.2	
Subject Code: CSEO-102	
FUNDAMENTALS OF FABRICS & PREPARATION FOR CUTTING	
Learning Outcomes:	
After undergoing study of this unit the students will be able to	
<ul style="list-style-type: none"> • Correctly and safely handle different tools • Identify different types of fabrics and the weaves • Carry out proper measurements • Accurately cut the fabrics 	
Practicals	64 hrs
Theory	24 hrs
<ul style="list-style-type: none"> • Familiarisation of the Institute • Familiarisation with handling of tools • Safety precautions while handling the tools • Identification of fabrics & texture • Handling of fabrics • Collection of different fabric samples with basic weaves • Preparation of fabrics for cutting • Recognition of fabric grain, selvedge and straightening of grains 	<ul style="list-style-type: none"> • Trade related tools, their importance, usage and their safety:- Measuring tools, drafting tools, marking tools, cutting tools, sewing tools, finishing tools • Fabric fundamentals like brief idea about fibres, types of fabrics, selection of needles and threads according to fabric types • Broken needle policy • Fabric preparation for cutting: fabric grains, selvedge, shrinkage and straightening of selvedge • Measurements- Units and Measuring techniques.

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-1.3	
Subject Code: CSEO-103	
FUNDAMENTALS OF FABRICS & PREPARATION FOR CUTTING	
Learning outcomes	
After undergoing the study of this unit the students will be able to	
<ul style="list-style-type: none"> • Recognise and understand the functions of critical machine parts in a single needle lock stitch machine and overlock machine • Set up machines with different threads and fabrics • Operate the machines correctly • Understand the faults in machine operation • Carry out basic maintenance work 	
Practicals	96 hrs
Theory	32 hrs
Practice on industrial single needle lock stitch machine: <ul style="list-style-type: none"> • Ergonomic principle of seating on lock stitch machine • Speed control • Practice on paper • Threading on machine • Bobbin winding and loading • Practice on machine • Running on straight line, square, zig-zag line, circles, semi-circle and spiral 	Basic sewing machine: <ul style="list-style-type: none"> • Parts and function • Machine needle • Stitch formation • Sewing machine practice • Care and maintenance • Trouble shooting • Types of industrial sewing machines
Practice on overlock machine: <ul style="list-style-type: none"> • Threading • Running • Minor adjustments 	Over lock machine <ul style="list-style-type: none"> • Parts and functions • Machine practice • Care and maintenance • Trouble shooting Basic garment analysis
Practice of making seams <ul style="list-style-type: none"> • Plain seam (straight & curved) with seam finishes • Self-enclosed seam • Top stitched seam • Corded seam • Decorative seam Practice with sewing aids.	Seams <ul style="list-style-type: none"> • Classification • Uses • Properties • Seam finishes Sewing aids: <ul style="list-style-type: none"> • Presser foot • Folders • Guides

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-1.4	
Subject Code: CSEO-104	
VARIETY OF TECHNIQUES IN GARMENT MAKING	
Learning Outcomes: After going through this unit the students will be able to make different components of garment	
<ul style="list-style-type: none"> • Use proper needles and threads • Efficiently use hand stitches • Correctly make variations in garment decoration 	
Practicals	124 hrs
Theory	32 hrs
Making samples of: <ul style="list-style-type: none"> • Darts • Pleats 	Introducing Fullness <ul style="list-style-type: none"> • Darts – Necessity, types and precaution during stitching • Pleats – necessity, types and uses
Making samples of <ul style="list-style-type: none"> • Tucks • Gathers and shirrs • Frills 	Introducing Fullness <ul style="list-style-type: none"> • Tucks – Types and uses • Gathering and shirring • Flare • Ruffles/ frills – types (straight and circular) and uses
Practice of hand stitch making and making of simple samples with hand stitch	Hand stitches <ul style="list-style-type: none"> • Hand needles – size and type • Sewing thread • Types and application of hand stitches
Making samples of <ul style="list-style-type: none"> • Faced Hem • Edge stitched Hem • Double stitch hem • Band hem • Ease in hem • Mitered hem Practice of corner making <ul style="list-style-type: none"> • Self-turned • With additional strip 	Study of Hems – <ul style="list-style-type: none"> • Types and uses Corner making <ul style="list-style-type: none"> • Types and uses
Making samples of <ul style="list-style-type: none"> • Casing & draw string • Casing with elastic • Casing with heading • Inside applied casing • Outside applied casing 	Study of casing <ul style="list-style-type: none"> • Introduction and uses
Making samples of edge finishing <ul style="list-style-type: none"> • Biased facing • Combination shaped facing • Outside shaped facing • Shaped facing • Self-facing • Binding 	Edge finishing <ul style="list-style-type: none"> • Facings • Bindings • Pipings

<ul style="list-style-type: none"> • Piping 	
Making samples of different shaped necklines	Necklines <ul style="list-style-type: none"> • Different shapes of necklines
Making of samples of plackets <ul style="list-style-type: none"> • Faced plackets • Continuous placket • One-piece placket • Two-piece placket • Two-piece placket with pleat • Zippered placket – Lapped, Fly front, Open end, Visible, Invisible. 	Plackets <ul style="list-style-type: none"> • Types • Sample making
Making samples of different pockets <ul style="list-style-type: none"> • Patch • Inseam • Cut/ slash 	Pockets <ul style="list-style-type: none"> • Types • Design variation
Samples of making collars	Collars <ul style="list-style-type: none"> • Classifications • Collar terms
Samples of making sleeves with and without cuff	Sleeves <ul style="list-style-type: none"> • Classification • Sleeve length variation

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-1.5	
Subject Code: CSEO-105	
TRIMS - APPLICATIONS IN GARMENTS AND SAMPLE MAKING	
Learning Outcomes:	
After undergoing study of this unit the students will be able to	
<ul style="list-style-type: none"> • Recognise the variety in fasteners • Properly fix the fasteners in the garment • Prepare draft and pattern for ladies' suits • Make the complete suit. 	
Practicals	92 hrs
Theory	16 hrs
Practice of fixing fasteners, such as buttons, hooks, eyes and press studs. Practice of making button holes by hand. Practice of darning and patching. Stitching of complete ladies' suits after drafting and developing patterns.	Trimmings <ul style="list-style-type: none"> • Types • Applications • Fixing of buttons, hooks, etc. • Making of button holes Mending <ul style="list-style-type: none"> • Darning • Patching Drafting and developing patterns for ladies' suits.

Means of Assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

SUBJECT CODE: CSEO-107
INDUSTRIAL TRAINING – I (4 Weeks)

The purpose of industrial training is to:

- Develop understanding regarding the size and scale of operations and nature of industrial/field work in which students are going to play their role after completing the courses of study.
- Develop confidence amongst the students through firsthand experience to enable them to use and apply institute based knowledge and skills to perform field activities.
- Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

It is needless to emphasize further the importance of Industrial Training of students during their one-year certificate programme. It is industrial training, which provides an opportunity to students to experience the environment and culture of world of work. It prepares students for their future role as skilled person in the world of work and enables them to integrate theory with practice.

An external assessment of 100 marks have been provided in the study and evaluation scheme of 1st Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations.

The instructor along with one industrial representative from the concerned trade will conduct performance assessment of students. The components of evaluation will include the following:

- | | |
|-------------------------------|-----|
| a) Punctuality and regularity | 20% |
| b) Industrial training report | 50% |
| c) Presentation and viva-voce | 30% |

RESOURCE REQUIREMENTS

LIST OF TOOLS AND EQUIPMENT

Lab Equipment and Tools

Sr. No.	Name of Item	Quantity
1.	Measuring tape 150 cm	30
2.	Seam Ripper	30
3.	Thimble	30
4.	Tailor's card scale triangular	30
5.	Tailor's square - plastic	30
6.	French curve set of three	30
7.	Thread cutter	30
8.	Scale (plastic) 24 inch	30
9.	Scissors – 25cm	30
10.	Pinking shears	5
11.	Leg shaper - plastic	30
12.	Garment Hangers	30
13.	Screw driver set	4
14.	Table sharpener	4
15.	Pressing table	5
16.	Blanket for pressing	5
17.	Sprayer	5
18.	Waste bin	10
19.	Pattern punch	5
20.	Pattern notcher	5
21.	Pattern hanging stand	4
22.	Water tub	1
23.	Stand for hanging dresses	5
24.	Trial room with 3 side mirrors of size 150cm x 60cm each and arrangement for hanging dresse	1
25.	Electric automatic steam press	5
26.	Sewing machine – single needle lock stitch industrial model	15
27.	Over lock machine – three thread	1
28.	Zig – zag multi-purpose machine	1
29.	Double needle machine	1
30.	Button hole machine	1
31.	Button sewing machine	1
32.	Machine attachment	As per requirement
33.	Chairs with low back rest or stools for the machines	30 nos.
34.	Drafting Tables	10
35.	Display board covered with glass or acrylic sheet 120 cm x 90 cm	2
36.	Instructor Table	1
37.	Instructor chairs	2
38.	Steel Amirah 195x90x60 cm	2

39.	Pigeon hole Amirah with 15 lockers and separate locking arrangement for trainees	2
40.	Calculator – desk type	1
41.	White board with accessories	1
42.	Dummy lady, men kids	1 each

Class Room Furniture

Sr. No.	Name of Item	Quantity
1.	Instructor Table & chair	1 set
2.	Students' chairs with writing pads	30 nos
3	White Board of size 120cm x 90cm	1 no.
4.	LCD Projector with screen	1 set
5.	Lap top for instructor with latest (Vista & above) configuration pre- loaded with operating system and MS office package	1 no.

ONE YEAR CERTIFICATE COURSE IN FASHION AND APPAREL TECHNOLOGY

CONTENTS

Sr No.	Particulars	Page no.
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3	Study & Evaluation scheme	4
4	Guidelines for assessment of student centred activities	6
5	Job role and job opportunities for Fashion & Apparel Technician	7
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1. GENERAL INFORMATION

2. Name of trade : Fashion & Apparel Technology

3. Duration : 1 year

4. Entry qualification : 10th pass

5. Power norm : 8 kW

6. Space norm :

Class room: 65 sq. m

Sewing Lab: 120 sq. m

Computer lab: 65 sq. m

Drafting lab : 65 sq. m

Faculty room : 25 sq. m

7. Faculty/ Instructor's qualification :

Academic: 12th pass

Technical: Degree (4 yr) in Fashion and/ or Apparel Technology/ Fashion and Apparel Engineering from any recognised university with ONE year working experience in Fashion Design/ Apparel Manufacturing

OR

Academic: 10th pass

Technical: Three year degree/ diploma in Fashion Designing/ Technology/ CDDM from a recognised Board/ Institution/ Polytechnic (AICTE approved with three year experience in Fashion Design and Technology

8. No. of Faculty required: Two (2)

9. Artisan's qualification: Academic: 8th pass

Technical: Minimum 5 year experience in Fashion Design/ Apparel Manufacturing/ Tailoring and will be able to carry out all the operations associated with apparel manufacturing independently. Also S/he will be able to carry out minor repairs in the equipment and instruments.

10. No. of Artisans required : Two (2)

2. SALIENT FEATURES OF THE PROGRAMME

1	Sector	Apparel manufacturing & Tailoring
2	Name of the certificate programme	Fashion and Apparel Technology
3	Entry qualification	Matriculation or equivalent NSQF level as prescribed by MRSPTU, Bathinda.
4	Duration of programme	Twelve (12) months
5	Intake	30
6	Pattern of programme	Semester pattern
7	NSQF level	Level III
8	Ratio of theory & practice	25:75

3. STUDY & EVALUATION SCHEME FOR CERTIFICATE PROGRAMME IN FASHION AND APPAREL TECHNOLOGY FIRST SEMESTER

Code	Units	Study Scheme Total Hrs		Credits	Marks Evaluation Scheme								Total Marks
		Th	Pr		Internal Assessment			External Assessment					
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
CFAT-101	*Communication Skills	8	-	1	25	-	25	25	1	-	-	25	50
CFAT-101P	*Communication Skills Lab.	-	24	1	-	25	25	-	-	50	3	50	75
CFAT-102	Fundamentals of Fabrics & Preparation for Cutting	24	-	1	25	-	25	50	2			50	75
CFAT-102P	Fundamentals of Fabrics & Preparation for Cutting Lab.	-	64	2	-	50	50	-	-	100	4	100	150
CFAT-103	Sewing Machines – Basics & Overlock with Aids	32	-	2	25	-	25	50	2	-	-	50	75
CFAT-103P	Sewing Machines – Basics & Overlock with Aids Lab.	-	96	2	-	50	50	-	-	100	4	100	150
CFAT-104	Variety of Techniques in Garment Making	32	-	2	25		25	25	2	-	-	25	50
CFAT-104P	Variety of Techniques in Garment Making Lab.	-	124	4	-	75	75	-	-	100	4	100	175
CFAT-105	Trims - Application in Garments and Sample Making	16	-	2	25	-	25	50	2	-	-	50	75
CFAT-105P	Trims - Application in Garments and Sample Making Lab.	-	92	4	-	75	75	-	-	100	4	100	175
CFAT-106P	#Student Centre Activity		48	2	-	25	25	-	-	-	-	-	25
CFAT-107P	+ 4 – Week Industrial Training at the end of Semester	-	-	4	-	-	-	-	-	100	3	100	100
TOTAL		112	448	26	150	300	450	225	-	550	-	775	1175

*Common with other certificate programmes.

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, energy conservation, environment, sports, hobby club, such as, photography, etc., seminars, declamation contest, educational field visits, NCC, NSS, cultural activities, etc.

+ **Industrial Training**

Before completion of the semester, the students will go for training in a relevant industry/ field organisation for a minimum period of 4 weeks and prepare a diary. The student will prepare a report at the end of training. This report will be evaluated by the concerned instructor in the presence of one industry representative from the relevant trade/ field.

Total weeks per semester: 16, Total working days per week: 5, Total hours per day: 7

Total hours in a semester: $16 \times 5 \times 7 = 560$

One credit is defined as one hour of lecture per week or two hours of practical per week in the programme.

SECOND SEMESTER

Code	Units	Study Scheme Total Hrs		Credits	Marks Evaluation Scheme								Total Marks
		Th	Pr		Internal Assessment			External Assessment					
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
CFAT-208	Human figures and Body Measurements	16	-	2	25	-	25	50	2	-	-	50	75
CFAT-208P	Human figures and Body Measurements Lab.	-	24	1	-	50	50	-	-	100	3	100	150
CFAT-209	Pattern Making and Drafting	32	-	2	25	-	25	50	2	-	-	50	75
CFAT-209P	Pattern Making and Drafting Lab.	-	72	3	-	50	50	-	-	100	4	100	150
CFAT-210	Cutting, Sewing and Finishing of Simple Garments	24	-	2	25	-	25	50	2	-	-	50	75
CFAT-210P	Cutting, Sewing and Finishing of Simple Garments Lab.	-	64	2	-	50	50	-	-	100	4	100	150
CFAT-211	Making of Ladies' Wear	24	-	2	25	-	25	50	2	-	-	50	75
CFAT-211P	Making of Ladies' Wear Lab.	-	64	2	-	50	50	-	-	100	4	100	150
CFAT-212	Making of Kids' Wear	16	-	1	25	-	25	50	2	-	-	50	75
CFAT-212P	Making of Kids' Wear Lab.	-	48	2	-	50	50	-	-	100	4	100	150
CFAT-213	Making of Gents' Wear	16	-	1	25	-	25	50	2	-	-	50	75
CFAT-213P	Making of Gents' Wear Lab.	-	48	2	-	50	50	-	-	100	4	100	150
CFAT-214	Apparel inspection and Finishing	16	-	1	25	-	25	50	2			50	75
CFAT-214P	Apparel inspection and Finishing Lab.	-	48	1	-	50	50	-	-	100	4	100	150
CFAT-215P	#Student Centre Activity	-	48	2	-	25	25	-	-	-	-	-	25
CFAT-216P	+ 2- week industrial training at the end of semester	-	-	2	-	-	-	-	-	100	3	100	100
TOTAL		144	416	28	175	375	550	225	---	800	-	775	1700

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, energy conservation, environment, sports, hobby club, such as, photography, etc., seminars, declamation contest, educational field visits, NCC, NSS, cultural activities, etc.

+ **Industrial Training**

Before completion of the semester, the students will go for training in a relevant industry/ field organisation for a minimum period of 4 weeks and prepare a diary. The student will prepare a report at the end of training. This report will be evaluated by the concerned instructor in the presence of one industry representative from the relevant trade/ field.

Total weeks per semester: 16, Total working days per week: 5, Total hours per day: 7

Total hours in a semester: $16 \times 5 \times 7 = 560$

4. GUIDELINES FOR ASSESSMENT OF STUDENT CENTRED ACTIVITIES (SCA)

The maximum marks for SCA should be 25. The marks may be distributed as follows:-

- i) 5 marks for general behaviour and discipline
(by Principal or HOD in consultation with the instructor(s)/ trainers)
- ii) 5 marks for attendance as per following
(by the faculty/ instructors/ trainers of the department)
 - a) Up to 75% Nil
 - b) 75% to 80% 02 marks
 - c) 80% to 85% 03 marks
 - d) Above 85% 05 marks
- iii) 15 marks maximum for sports/ NCC/ NSS/ Cultural/ Co-curricular activities as per following:
(by In-charge of Sports/ Cultural/ NCC/ NSS/ Co-curricular activities)
 - 15 marks - for National level participation or inter-university competition
 - 10 marks - participation any two of the activities
 - 05 marks - participation at the internal sports of the institute/ college/ university

Note: There should be no marks for attendance in the internal sessional of different subjects.

5. Job Role and Job opportunities of a Fashion and Apparel Technologist Job Role

A fashion and apparel technologist is expected to perform following job roles in industry

- Design the garment on hard and soft copy
- Recognise the fabric materials and fabric types
- Understand the grains, pile directions
- Carry out accurate marking and measurements and cut the fabrics accordingly
- Set the sewing machine that will be used
- Methodically stitch the garments taking proper care of the design and measurements
- Use proper stitches and seams
- Add accessories and embellishments properly
- Possess the concept of overall balance in the design of the garment
- Correctly sew/ join the cut components without distortions
- Mend the garment after manufacturing
- Possess basic concept of the quality of the garment.

Job opportunities

The clothing and garment making is the basic requirement of human civilisation and exists from the beginning of civilisation. Manufacturing of apparel is not restricted to tailors who are seen at every village and nooks of towns. Apparel manufacturing units are spread across the length and breadth of the country. An apparel technologist can find employment in any of the micro, small or large tailoring or garment making establishments.

Another feature of this trade is self-employment or entrepreneurship. A properly trained person can set up his own establishment as the requirement of finance and space is not very high. However, since this trade is widely prevalent, the entrepreneur should have adequate technical and communication skill to survive in the competition.

6. DETAILED CONTENT OF THE PROGRAMME

FIRST SEMESTER

UNIT-1.1 SUBJECT CODE: CFAT-101 COMMUNICATION SKILLS	
LEARNING OUTCOMES: After undergoing this unit the students should be able to <ul style="list-style-type: none"> • Speak confidently • Overcome communication barriers • Write legibly and effectively • Listen in proper perspective • Read various genres adopting different reading techniques • Respond to telephone calls effectively 	
Practical	24 hrs
	Theory
	8 hrs
	Basic communication <ul style="list-style-type: none"> • Process of communication • Types of communication – formal and informal, oral and written, verbal and non-verbal
Looking up words in dictionary (meaning and pronunciation)	Functional grammar and vocabulary <ul style="list-style-type: none"> • Parts of speech • Tenses • Correction of incorrect sentences
<ul style="list-style-type: none"> • Self and peer introduction • Greetings for different occasions 	Listening <ul style="list-style-type: none"> • Meaning and process of listening • Importance of listening • Methods to improve listening skills Speaking <ul style="list-style-type: none"> • Importance • Methods to improve speaking • Manners and etiquettes

Newspaper reading	<p>Reading</p> <ul style="list-style-type: none"> • Meaning • Technique of reading – skimming, scanning, intensive and extensive reading
<ul style="list-style-type: none"> • Vocabulary enrichment and grammar exercises • Exercises on sentence framing accuracy 	<p>Functional vocabulary</p> <ul style="list-style-type: none"> • One word substitution • Commonly used words which are often misspelt • Punctuation • Idioms and phrases
<ul style="list-style-type: none"> • Reading aloud articles and essays on current and social issues • Comprehension of short paragraph 	
<ul style="list-style-type: none"> • Write short technical report • Letter writing 	
<ul style="list-style-type: none"> • Participate in oral discussion • Respond to telephonic calls effectively • Mock interview 	

Means of assessment

- Assignment and quiz/ class test
- Mid-term and end term written tests
- Laboratory and practical work
- Viva voce

UNIT-1.2
SUBJECT CODE: CFAT-102
FUNDAMENTALS OF FABRICS & PREPARATION FOR CUTTING

LEARNING OUTCOMES:

After undergoing study of this unit the students will be able to

- Correctly and safely handle different tools
- Identify different types of fabrics and the weaves
- Carry out proper measurements
- Accurately cut the fabrics

Practicals	64 hrs	Theory	24 hrs
<ul style="list-style-type: none"> • Familiarisation of the Institute • Familiarisation with handling of tools • Safety precautions while handling the tools • Identification of fabrics & texture • Handling of fabrics • Collection of different fabric samples with basic weaves • Preparation of fabrics for cutting • Recognition of fabric grain, selvedge and straightening of grains 		<ul style="list-style-type: none"> • Trade related tools, their importance, usage and their safety:- Measuring tools, drafting tools, marking tools, cutting tools, sewing tools, finishing tools • Fabric fundamentals like brief idea about fibres, types of fabrics, selection of needles and threads according to fabric types • Broken needle policy • Fabric preparation for cutting: fabric grains, selvedge, shrinkage and straightening of selvedge • Measurements- Units and Measuring techniques. 	

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-1.3
SUBJECT CODE: CFAT-103
SEWING MACHINES – BASICS AND OVERLOCK WITH AIDS

Learning outcomes

After undergoing the study of this unit the students will be able to

- Recognise and understand the functions of critical machine parts in a single needle lock stitch machine and overlock machine
- Set up machines with different threads and fabrics
- Operate the machines correctly
- Understand the faults in machine operation
- Carry out basic maintenance work

Practicals	96 hrs	Theory	32 hrs
Practice on industrial single needle lock stitch machine:	<ul style="list-style-type: none"> • Ergonomic principle of seating on lock stitch machine • Speed control • Practice on paper • Threading on machine • Bobbin winding and loading • Practice on machine • Running on straight line, square, zig-zag line, circles, semi-circle and spiral 	Basic sewing machine:	<ul style="list-style-type: none"> • Parts and function • Machine needle • Stitch formation • Sewing machine practice • Care and maintenance • Trouble shooting • Types of industrial sewing machines
Practice on overlock machine:	<ul style="list-style-type: none"> • Threading • Running • Minor adjustments 	Over lock machine	<ul style="list-style-type: none"> • Parts and functions • Machine practice • Care and maintenance • Trouble shooting
Practice of making seams	<ul style="list-style-type: none"> • Plain seam (straight & curved) with seam finishes • Self enclosed seam • Top stitched seam • Corded seam 	Basic garment analysis	Seams
		<ul style="list-style-type: none"> • Classification • Uses • Properties • Seam finishes 	

<ul style="list-style-type: none">• Decorative seam Practice with sewing aids.	Sewing aids: <ul style="list-style-type: none">• Presser foot• Folders• Guides
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Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-1.4
SUBJECT CODE: CFAT-104
VARIETY OF TECHNIQUES IN GARMENT MAKING

Learning outcome:

After going through this unit the students will be able to Make different components of garment

- Use proper needles and threads
- Efficiently use hand stitches
- Correctly make variations in garment decoration

Practicals	124 hrs	Theory	32 hrs
Making samples of: <ul style="list-style-type: none"> • Darts • Pleats 		Introducing Fullness <ul style="list-style-type: none"> • Darts – Necessity, types and precaution during stitching • Pleats – necessity, types and uses 	
Making samples of <ul style="list-style-type: none"> • Tucks • Gathers and shirrs • Frills 		Introducing Fullness <ul style="list-style-type: none"> • Tucks – Types and uses • Gathering and shirring • Flare • Ruffles/ frills – types (straight and circular) and uses 	
Practice of hand stitch making and making of simple samples with hand stitch		Hand stitches <ul style="list-style-type: none"> • Hand needles – size and type • Sewing thread • Types and application of hand stitches 	
Making samples of <ul style="list-style-type: none"> • Faced Hem • Edge stitched Hem • Double stitch hem • Band hem • Ease in hem • Mitered hem Practice of corner making <ul style="list-style-type: none"> • Self-turned • With additional strip 		Study of Hems – <ul style="list-style-type: none"> • Types and uses Corner making <ul style="list-style-type: none"> • Types and uses 	

<p>Making samples of</p> <ul style="list-style-type: none"> • Casing & draw string • Casing with elastic • Casing with heading • Inside applied casing • Outside applied casing 	<p>Study of casing</p> <ul style="list-style-type: none"> • Introduction and uses
<p>Making samples of edge finishing</p> <ul style="list-style-type: none"> • Biased facing • Combination shaped facing • Outside shaped facing • Shaped facing • Self facing • Binding • Piping 	<p>Edge finishing</p> <ul style="list-style-type: none"> • Facings • Bindings • Pipings
<p>Making samples of different shaped necklines</p>	<p>Necklines</p> <ul style="list-style-type: none"> • Different shapes of necklines
<p>Making of samples of plackets</p> <ul style="list-style-type: none"> • Faced plackets • Continuous placket • One piece placket • Two piece placket • Two piece placket with pleat • Zippered placket – Lapped, Fly front, Open end, Visible, Invisible. 	<p>Plackets</p> <ul style="list-style-type: none"> • Types • Sample making
<p>Making samples of different pockets</p> <ul style="list-style-type: none"> • Patch • Inseam • Cut/ slash 	<p>Pockets</p> <ul style="list-style-type: none"> • Types • Design variation
<p>Samples of making collars</p>	<p>Collars</p>

	<ul style="list-style-type: none"> • Classifications • Collar terms
Samples of making sleeves with and without cuff	Sleeves <ul style="list-style-type: none"> • Classification • Sleeve length variation

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-1.5
SUBJECT CODE: CFAT-105
TRIMS - APPLICATION IN GARMENTS AND SAMPLE MAKING

Learning Outcomes

After undergoing study of this unit the students will be able to

- Recognise the variety in fasteners
- Properly fix the fasteners in the garment
- Prepare draft and pattern for ladies' suits
- Make the complete suit.

Practical	92 hrs	Theory	16 hrs
Practice of fixing fasteners, such as buttons, hooks, eyes and press studs. Practice of making button holes by hand. Practice of darning and patching. Stitching of complete ladies' suits after drafting and developing patterns.		Trimmings <ul style="list-style-type: none"> • Types • Applications • Fixing of buttons, hooks, etc. • Making of button holes Mending <ul style="list-style-type: none"> • Darning • Patching Drafting and developing patterns for ladies' suits.	

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

SECOND SEMESTER

UNIT-2.1 SUBJECT CODE: CFAT-208 HUMAN FIGURES AND BODY MEASUREMENTS	
Learning Outcomes After undergoing study of this unit, the students will be able to <ul style="list-style-type: none"> • Take proper body measurements • Understand the fine points in taking measurements • Understand the nuances of size charts and differences in various size charts 	
Practical	24 hours
Theory	16 hours
Revision work done in Semester I Practice of taking body measurements	Human figures <ul style="list-style-type: none"> • Eight head theory • Brief introduction about joints and muscles Types of figures in body measurements & its importance <ul style="list-style-type: none"> • Types of measuring techniques and precautions • Size charts (national and international) for children, gents and ladies' wear • Importance of size charts

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-2.2	
SUBJECT CODE: CFAT-209	
PATTERN MAKING AND DRAFTING	
Learning outcome	
After undergoing this unit, the students will be able to	
<ul style="list-style-type: none"> • Recognise different patterns • Make lay plan methodically using patterns of a garment • Carry out proper drafting of patterns 	
Practical	72 hours
Practice of different types of spreading using different types of fabrics Practice of different types of layout using the given pattern Generation of patterns using an appropriate software Designing of apparel using a design software	Theory
	32 hours
	Patterns <ul style="list-style-type: none"> • Importance and types Spreading <ul style="list-style-type: none"> • Types of spreading • Methods • Types of lay pattern layout and their importance Drafting <ul style="list-style-type: none"> • Principles of drafting pattern • Terminology Use of computer for apparel designing <ul style="list-style-type: none"> • Concept of computer designing and its benefits • Terminology in computer designing

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-2.3	
SUBJECT CODE: CFAT-210	
CUTTING, SEWING AND FINISHING OF SIMPLE GARMENTS	
Learning outcomes	
After undergoing this unit the students will be able to	
<ul style="list-style-type: none"> • Sketch and draft a saree petticoat • Estimate the quantity of fabric required for saree petticoat • Carry out operations of cutting, sewing, pressing and folding of saree petticoat 	
Practical	64 hours
Pattern making, fabric estimation, cutting , sewing, pressing and folding of Saree petticoat	
	Theory
	24 hours
	Pressing <ul style="list-style-type: none"> • Tools • Methods Importance of pressing Trial Room <ul style="list-style-type: none"> • Necessity • Specification Sketching and drafting of saree petticoat

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-2.4
SUBJECT CODE: CFAT-211
MAKING OF LADIES' WEAR

Learning outcome

After undergoing this unit the students will be able to

- Sketching and drafting of ladies' wear like tops, short kurties, suits, night wear and blouse
- Carry out fabric estimation, cutting, sewing, pressing and folding of above garments
- Check the fitting of garments

Practical	64 hours	Theory	24 hours
Pattern making, Fabric estimation, cutting, sewing, pressing and folding of following garments with design variation: <ul style="list-style-type: none"> • Ladies' top, short kurties • Ladies' suit • Night wear (one piece/ two piece) • Blouse Checking the fitting of garments		Sketching and drafting of following garments <ul style="list-style-type: none"> • Ladies' top, short kurties • Ladies' suit • Night wear (one piece/ two piece) • Blouse 	

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-2.5
SUBJECT CODE: CFAT-212
MAKING OF KIDS' WEAR

Learning outcomes

After undergoing this unit the students will be able to

- Sketching and drafting of various dresses for new born, toddlers and kids
- Carry out fabric estimation, cutting, sewing, pressing and folding of garments to be made
- Check the fitting of garments

Practical	48 hours	Theory	16 hours
<p>Kidswear Pattern making using adaptation technique, Fabric Estimation, Cutting, sewing, pressing and folding of following garments with design variations:</p> <ul style="list-style-type: none"> • Dresses for new born • Dresses for toddlers • Dresses for kids <p>Checking the fitting of garments</p>		<p>Sketching and drafting of following garments:</p> <ul style="list-style-type: none"> • Dresses for new born • Dresses for toddlers • Dresses for kids 	

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-2.6
SUBJECT CODE: CFAT-213
MAKING OF GENTS' WEAR

Learning outcomes

After undergoing this unit the students will be able to

- Sketching and drafting of gents' garments like kurta and pyjama and casual shirts and trousers
- Carry out fabric estimation, cutting, sewing, pressing and folding of above garments
- Check the fitting of garments

Practical	48 hours	Theory	16 hours
<p>Gents wear Pattern making, Fabric estimation, cutting, sewing, pressing and folding of following garments with design variation:</p> <ul style="list-style-type: none"> • Kurta & Pyjama • Casual Shirts and Trousers <p>Checking & fitting of the garments</p>		<p>Gents wear Pattern making, Fabric estimation, cutting, sewing, pressing and folding of following garments with design variation:</p> <ul style="list-style-type: none"> • Kurta & Pyjama • Casual Shirts and Trousers <p>Checking & fitting of the garments</p>	

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-2.7
SUBJECT CODE: CFAT-214
APPAREL INSPECTION AND FINISHING

Learning outcomes

After undergoing this unit the students will be able to

- Recognise and remove stains correctly
- Inspect the garments for all the defects
- Adopt corrective measures to remove the defects

Practical	48 hours	Theory	16 hours
Methods of removing different kinds of stains in the fabrics Checking of garments with respect of <ul style="list-style-type: none"> • Measurements • Stitching • Stains • Defects • Corrective measures 		Laundry – its purpose and methods Stains <ul style="list-style-type: none"> • Classification • Removing techniques Quality Control <ul style="list-style-type: none"> • Definition, Needs & Planning • Types of inspection • Stages of inspection Role of Quality Controller	

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

7. RESOURCE REQUIREMENTS

LIST OF TOOLS AND EQUIPMENT

A. Lab equipment and tools

Sr no.	Name of Item	Quantity	Approx. Price/ piece (Rs)	Amount (Rs)
1.	Measuring tape 150 cm	30	20	600
2.	Seam Ripper	30	20	600
3.	Thimble	30	25	750
4.	Tailor's card scale triangular	30	05	150
5.	Tailor's square - plastic	30	35	1050
6.	French curve set of three	30 sets	20	600
7.	Thread cutter	30	25	750
8.	Scale (plastic) 24 inch	30	25	750
9.	Scissors – 25cm	30	250	7,500
10.	Pinking shears	5	250	1,250
11.	Leg shaper - plastic	30	150	4,500
12.	Garment Hangers	30	30	900
13.	Screw driver set	4	250	1,000
14.	Table sharpener	4	45	180
15.	Pressing table	5	2000	10,000
16.	Blanket for pressing	5	500	2,500
17.	Sprayer	5	50	250
18.	Waste bin	10	100	1,000
19.	Pattern punch	5	100	500
20.	Pattern notcher	5	80	400
21.	Pattern hanging stand10	4	1000	4,000
22.	Water tub	1	200	200
23.	Stand for hanging dresses	5	1000	5,000

24.	Trial room with 3 side mirrors of size 150cm x 60cm each and arrangement for hanging dresse	1	5000	5,000
25.	Electric automatic steam press	5	2000	10,000
26.	Sewing machine – single needle lock stitch industrial model	15	17,500	2,62,500
27.	Over lock machine – three thread	1	15,000	15,000
28.	Zig – zag multipurpose machine	1	35,000	35,000
29.	Double needle machine	1	35,000	35,000
30.	Button hole machine	1	1,00,000	1,00,000
31.	Button sewing machine	1	1,00,000	1,00,000
32.	Machine attachment	As per requirement	5,000	5,000
33.	Chairs with low back rest or stools for the machines	30 nos.	1,500	45,000
34.	Drafting Tables	10	15,000	1,50,000
35.	Display board covered with glass or acrylic sheet 120cm x 90cm	2	5,000	10,000
36.	Instructor Table	1	3,000	3,000
37.	Instructor chairs	2	6,000	12,000
38.	Steel almirah 195x90x60 cm	2	12,000	24,000
39.	Pigeon hole almirah with 15 lockers and separate locking arrangement for trainees	2	12,000	24,000
40.	Calculator – desk type	1	250	250
41.	White board with accessories	1	11,000	11,000
42.	Dummy lady, men and kids	1 each	8,000	8,000
43.	Desk top computers loaded with Apparel Design software and other standard software	5 nos.	50,000	2,50,000

TOTAL: Rs.11,49,180

Class room furniture

Sr no.	Name of Item	Quantity	Approx. Price/ set or piece (Rs)	Amount (Rs)
1.	Instructor Table & chair	1 set	6,000	6,000
2.	Students' chairs with writing pads	30 nos	1,000	30,000
3	White Board of size 120cm x 90cm	1 no.	5,000	5,000
4.	LCD Projector with screen	1 set	20,000	20,000
5.	Computer table with chairs	5 sets	2,500	12,500
5.	Lap top for instructor with latest (Vista & above) configuration pre- loaded with operating system and MS office package	1 no.	30,000	30,000

TOTAL: Rs.1,03,500

Faculty room furniture

Sr no.	Name of item	Quantity	Approx. Price/ set or piece (Rs)	Amount (Rs)
1	Office Table and chairs	3 sets	7,000	21,000
2	Steel Almirah	3 pieces	12,000	36,000
3	Steel racks	3 pieces	5,000	15,000

TOTAL: Rs.72,000

GRAND Total : Rs. 13,24,680



A MEMORANDUM OF UNDERSTANDING

Between

INSEEC MSC AND MBA, PARIS, BORDEAUX, LYON AND CHAMBERY (FRANCE)

AND

**MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA,
PUNJAB, INDIA.**

Maharaja Ranjit Singh Punjab Technical University, Bathinda, Punjab, India and INSEEC Msc and MBA, Paris, Bordeaux, Lyon and Chambéry (France) recognizes the value of establishing a collaborative relationship and to explore, develop and implement joint activities that are mutually beneficial


Maharaja Ranjit Singh Punjab Technical University, Bathinda, Punjab, India and INSEEC Msc and MBA, Paris, Bordeaux, Lyon and Chambéry (France) hereby enter into memorandum of understanding to use their collective expertise and resources to promote academic exchange and cooperation in teaching and research in business for the mutual advancement of learning by

- Promoting cultural and academic exchange for the students by a short medium and long-term student exchange programs summer schools in various faculties run by the respective university
- Promoting faculty exchange for better academic understanding and advancement
- Involving faculty from both the institutions in preparing curriculum and imparting instructions in the newly established programs and also arranged for the participation of faculties students in seminars and conferences organized by the respective institutions
- Involving faculties and students from both the institutions in preparing case studies relevant to the contemporary international business environment
- Exploring possibilities of offering joint degrees for bachelor's/Masters level program in management leadership and hospitality
- Encouraging student exchanges at under/post Graduate levels: exchanging academic and technical information of mutual interest and identifying opportunities in joint research and development in specific disciplines of interest
- This MOU will take effect from the date of its signature by all appropriate authorities and will remain in effect for a period of five (5) years. The MOU may be evaluated annually for any necessary revision and amended by mutual written agreement

[Handwritten signatures and initials]

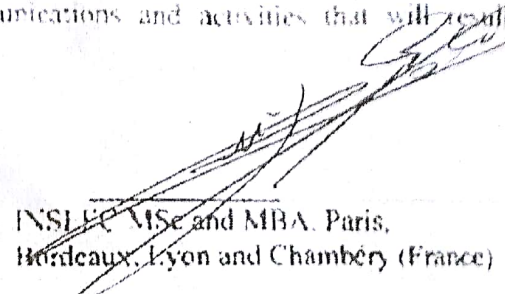
- This MOU may be terminated by either party at any time provided that the terminating party gives a minimum of six months' notice in writing

MRSPTU, Bathinda and INSEEC will designate representatives of both the institutions to develop plans of action, identify the roles and responsibilities of the participants, and work cooperatively to promote collaborations, communications and activities that will result in achieving the goals of the MOU



16th Jan, 2018

Prof. (Dr) Jasbir Singh Hundal
Registrar
Maharaja Ranjit Singh Punjab Technical
University, Bathinda, Punjab, India

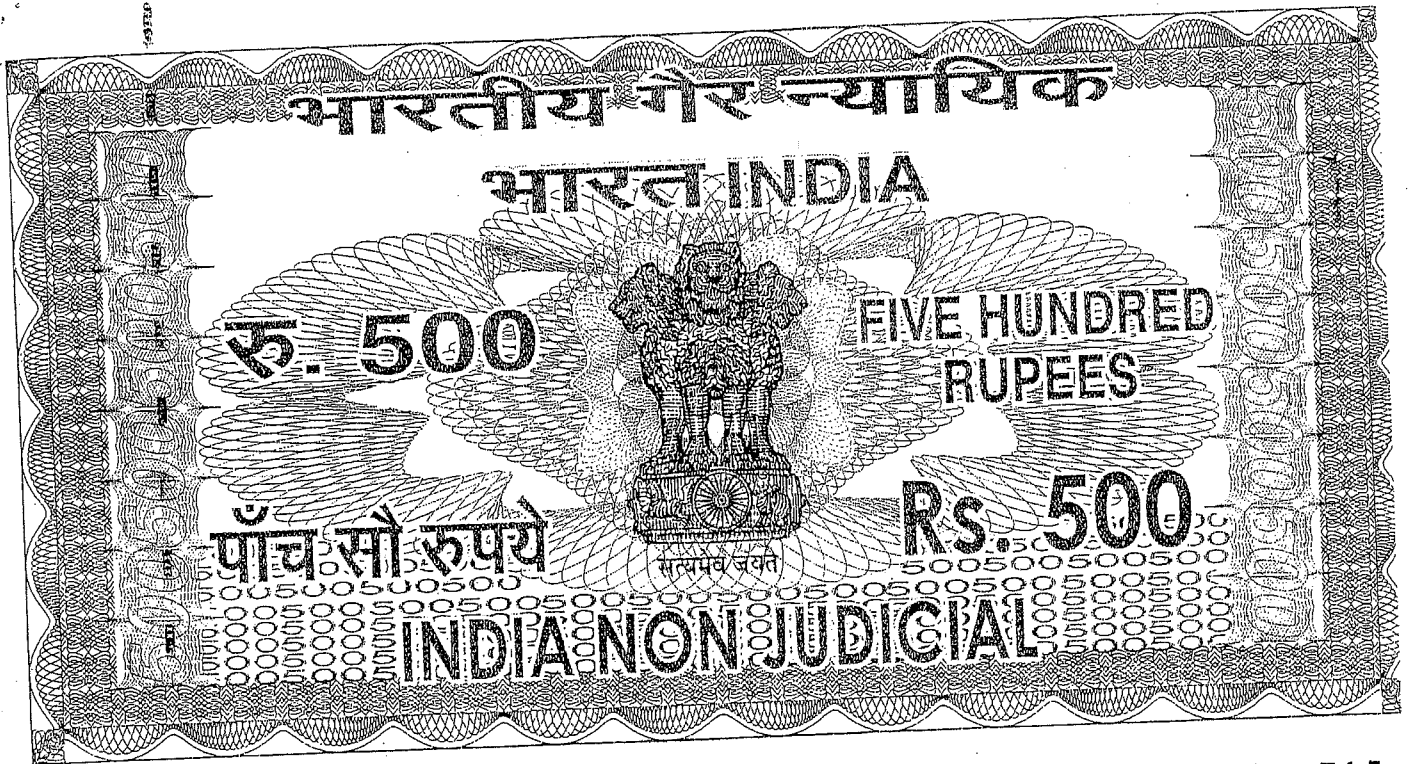


INSEEC MSc and MBA, Paris,
Bordeaux, Lyon and Chambéry (France)

Witness:



Prof. (Dr) Ashok K Goel
Director, College Development Council
Maharaja Ranjit Singh Punjab
Technical University, Bathinda,
Punjab, India



ਪੰਜਾਬ ਪੰਜਾਬ PUNJAB

L 781315

This Agreement is entered into By and Between

Maharaja Ranjit Singh Punjab Technical University ,Bathinda ,Punjab-151001, (which expression shall unless repugnant or inconsistent with the context or meaning thereof, be deemed to mean and include its business administrators, successors in title, legal representatives and permitted assigns) as the first part;

And

CDSL Ventures Limited ,Marathon Futurex, 'A' Wing, 25th Floor, Mafatlal Mills Compound, N M Joshi Marg, Mumbai - 400 013. (which expression shall unless repugnant or inconsistent with the context or meaning thereof, be deemed to mean and include its business administrators, successors in title, legal representatives and permitted assigns)as the other part.

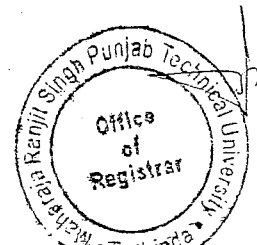
Whereas

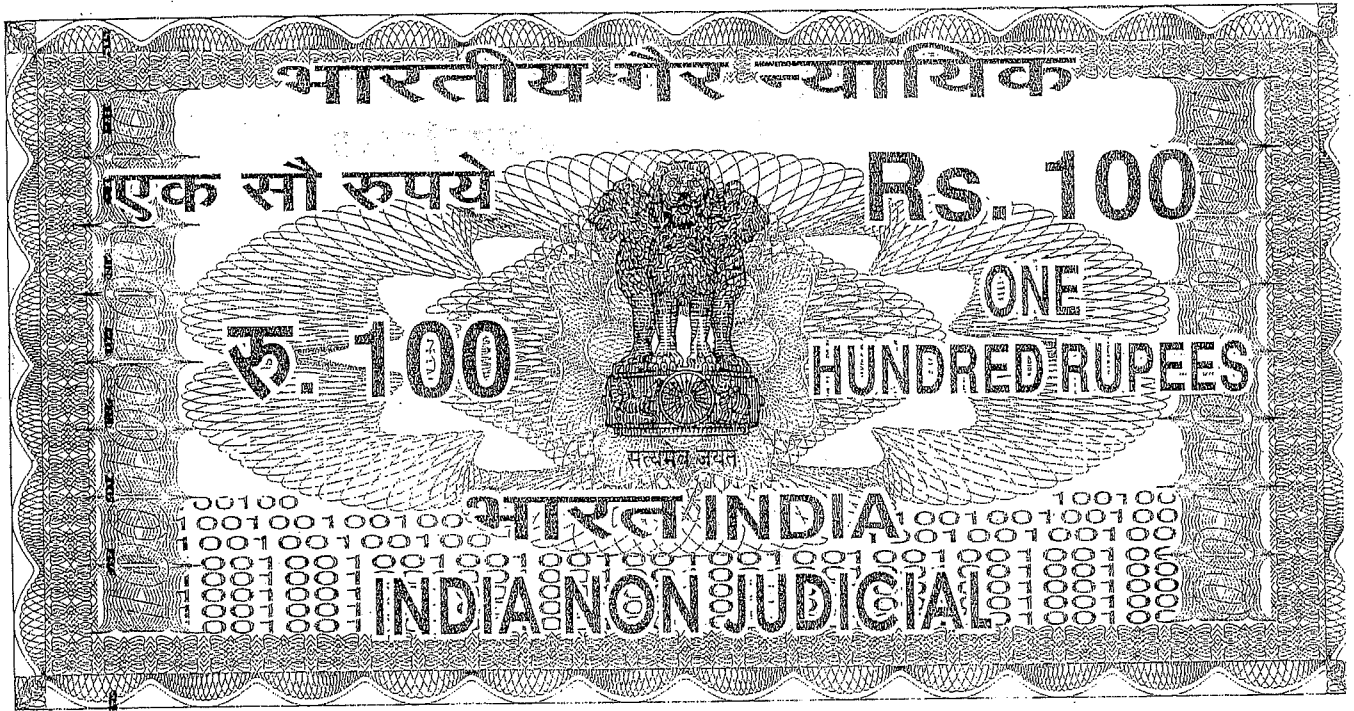
The first part is desirous of lodging its academic awards which would be the awards listed by the University Grants Commission (UGC) amongst the following categories:

- any certificate or degree or diploma including related mark-sheets, transcript or evaluation reports or provisional certificates, as the case may be, granted by an Academic Institution; this will also include certificate, degree, diploma for skill development;



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पंजाब PUNJAB

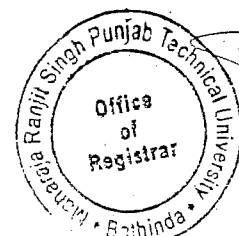
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- (b) all certifications by National Skill Qualification Framework (NSQF) aligned bodies. This would include all training courses/short term and long term certificate courses/any other courses as offered by institutions approved by the Ministry of Skill Development & Entrepreneurship (MSDE) for participating in NAD;
- (c) certificates issued by the boards;
- (d) Certificates issued by eligibility test conducting bodies.

And the other part, having been authorized as one of the digital depositories in NAD for the purposes of establishment of National Academic Depository (NAD), agree to offer its services for the purpose of enabling the lodging, authentication and verification of academic awards through the NAD.

Therefore this agreement is entered into between the first part and the other part for a term which is coterminous with the appointment of the other part as Depository by UGC. Provided further that the first part shall ensure that provisions of General Financial Rules, 2017 (as amended from time to time)/State Government Financial rules(as applicable), and the Central Vigilance Commission guidelines and extant Rules, Regulations and Acts are strictly adhered to, while entering into this agreement.

Service Level Agreement (SLA) defines the terms of the other part's responsibility in ensuring the timely delivery of the deliverables and the correctness of the same.



THE PARTIES AGREE AS FOLLOWS:

1. Purpose

- The objective of this Agreement is for the first part to enter into an understanding with the other part to enable the first part to lodge the academic awards of its students/awardees from the current academic year and also for previous academic years in the NAD Portal.

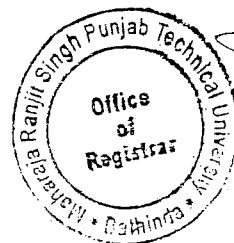
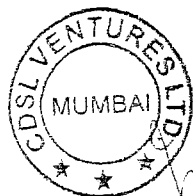
2. Obligations of the first part

- a) The first part shall provide the necessary information such as Award templates, data masters, student identity details, Aadhar, NAD ID of the student etc. etc to the other part.
- b) The first part shall review and confirm the, master data, Award Images and Award data lodged in NAD system.
- c) The first part shall issue necessary administrative and procedural instructions as are necessary to bring and mandate use of NAD services.
- d) The first part shall lodge the digitally signed XML data and Images of all the academic awards to the other part before issue of the academic awards.
- e) The first part may take necessary steps to popularize the use of the system and facilitate expansion of the system usage.
- f) The accuracy of the data of academic awards and student's identity provided by the first part to the other part, shall be the sole responsibility of the first part. The other part shall avail the data from the first part on "AS IS" basis.
- g) The first part shall ensure that the data downloaded by the authorized users of the first part is used only for authorized purposes.
- h) The first part shall ensure to revoke the access of such of its officials who are no longer required to access NAD system for uploading / downloading information or using NAD system.
- i) The first part shall identify the officials to be trained for using NAD system and arrange to set-up training programs and issue internal instructions in this regard.
- j) The first part shall appoint and notify project coordinators from its side who will meet with the other part on a regular basis and provide necessary guidance, support and review the progress made.

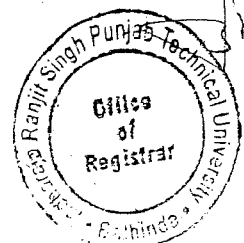
3. Obligations of the other part

The other part shall provide system features and perform incidental services as may be necessary to:

- a. Register first part on NAD;
- b. Provide access to the first part to its digital depository in NAD;
- c. Facilitate first part to efficiently lodge, in its digital depository in NAD, the details of academic awards awarded by it;
- d. Train first part in the process of lodging and retrieval of records in its digital depository in NAD;
- e. Provide efficient online verification of academic awards lodged in by the first part in its digital depository in NAD(with prior student consent);
- f. Provide authenticated copy/copies of the academic award with such security features as may be decided by UGC.



- g. Provide an authenticated copy of academic award in its digital depository in NAD when so requested by the student or an entity authorised by the student;
- h. Register students in NAD, based on Aadhaar / Unique NAD ID;
- i. Map academic awards to concerned student on the basis of Aadhaar ID or the verified NAD-ID seeded in the Award data;
- j. Maintain the authenticity, integrity and confidentiality of its digital depository in NAD database and block access to any unauthorized users;
- k. Mandatory inclusion of Student's identity details i.e. Aadhaar / NAD Registration ID in Academic Awards made available from NAD;
- l. Allow lodging of academic awards by first part in NAD system in XML data formats/ image format and after applying due process of internal data review, validations, authorization and submitted to NAD with Digital Signature Certificates; both data and image format would be required for uploading/ lodging of academic awards in the NAD;
- m. Ensure that all data lodged by the first part remain secure in its digital depository in the NAD and no data loss happens due to destruction, unauthorized manipulation, archiving etc;
- n. Ensure that the academic awards lodged by the first part in the digital depository in NAD is, at all times, accessible online to either the first part, or the concerned awardee/ student or to a person authorized by the concerned awardee/student to access his/her award.
- o. Ensure that the academic awards lodged by the first part facilitate online interaction and exchange of information with the Central Identities Data Repository created by the Unique Identification Authority of India,;
- p. Ensure that the academic awards lodged by the first part are compliant with the Digital Locker technology of MeitY.
- q. Ensure that the academic awards lodged by the first part are transmitted to the other depository/ies in NAD in mutually agreed format between the digital depositories and also therefore to ensure inter-operability of system design and software between them. Syncing of data shall take place, between the two depositories in the NAD in order to resolve transmission errors, on multiple occasions in a day.
- r. Report and confirm back to the first part, after lodging of records, indicating, inter-alia, the NAD ID of the student and the Individual records/certificate ID created against each record.
- s. Provide/share the academic award data only upon receipt of consent from the student.
- t. Make available for verification data relating to academic award to Authorized Users with prior consent of the student.
- u. Provide Reports/Statistics or authenticated copy/ies of any specific academic award pertaining to any student/s in the digital depository when so requested in writing by any Statutory/Regulatory authority subject to approval by UGC.
- v. Not to use the data for any other purpose than as defined under this agreement.
- w. Perform such other duties as may be mutually agreed between the first part and the other part.
- x. The source course/object code together with any related materials or documentation shall remain the property of the other part. However, the same shall be shared by the other part with UGC as and when required.
- y. Consent from the student for sharing of the academic awards/data shall not be required in cases like verification sought by statutory bodies/constitutional bodies/investigating agencies during the course of any enquiry/investigation.
- z. If the student chooses to shift his account from one constituent depository of NAD to the other, the other part shall ensure seamless transfer of registration details and records.



aa. Where an inspection or enquiry or investigation is undertaken by the UGC, the other part or its shareholder or associate and every manager, director, managing director, chairperson or officer and other employee of depository shall co-operate with the investigation team.

4. Process of verification and authentication

- a. A person requiring verification and authentication of any specific academic award in the NAD will register on the depository system after complying with a process of KYC and on the payment of applicable charges.
- b. The other part shall, on the same day (within 24 hours), the day on which such application is received, verify and authenticate the specific academic award, if lodged in the digital depository, or inform the applicant of the non-availability of such academic award with it on the same day (within 24 hours)/next working day (in case the same day is a holiday) and would refund the charges paid by the applicant, within two working days in case the academic award is not lodged with the digital depository. However, the third party verification would be subject to the consent of the student concerned and the period of same day would apply only after receiving the consent of the concerned student.

5. Reports

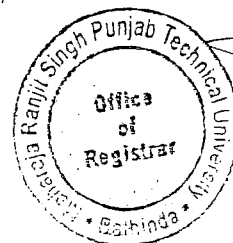
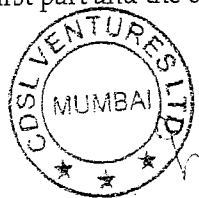
- a. The other part shall provide tools to the first part for checking the progress of the project. This shall include the department wise, daily, weekly, monthly and overall progress.
- b. The other part shall provide prescribed MIS reports as per requirements to the first part as well as to the UGC.
- c. The format, content, periodicity and other information related to reports shall be discussed, approved in writing and finalized with the other part.

6. Training

- a. The other part would provide training to the identified Staff of the first part. The training would happen in the premises notified / provided by the first part.
- b. The training shall be conducted in batches of 25 each. The other part will train and make the staff of the first part conversant with the processes involved in the lodging of academic awards and other related processes in the digital depository.
- c. The training shall be carried out as per mutually convenient timelines.
- d. The training shall concentrate on -
 - Basics of the proposed solution
 - Processes involved in lodging of academic awards and other related processes.
 - Generation of reports and interpretation of the same

7. Payment Terms

- a. The other part shall notify the charges/tariffs payable by all users in the form of ceilings on each of the NAD services and the same shall be prominently displayed on its website.
- b. Payment for any service(s) shall be made by the first part as per the rates as agreed between the first part and the other part.



- c. The charges agreed upon after following due process between the first part for any service(s) being availed by it and the other part shall not exceed the corresponding charge ceilings as notified by the other part and published on its website.
- d. The list of various service charges is at Annexure A. These rates cannot be modified to the disadvantage of the first part/students of the first part for the first two years or till 30th September, 2019 whichever is earlier.
- e. In case the notified tariffs and charges against the NAD services are found unreasonable at any stage, the competent authority as decided by the Government may form an investigation team to look at the reasonableness of the tariff/charges and its order on the matter shall be final and binding on the other part.

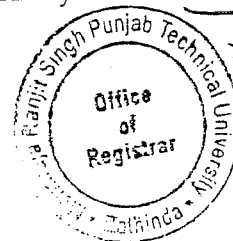
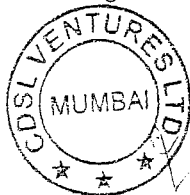
8. Hardware & Software Infrastructure

8.1. Infrastructure

- a. The other part shall use its own infrastructure. This shall include, all hardware as is required for the successful operation, maintenance and implementation of the Project;
- b. The other part shall host the server infrastructure of digital depository of NAD in a data centre facility as decided by it;
- c. The other part shall deploy its own human resource / vendor for all the aforementioned activities and would deploy adequately skilled manpower resources to implement NAD within the specified time.
- d. The other part shall use its own hardware and licensed software including other software such as required for this application.
- e. The application software will be a web based application.
- f. The NAD system comprising depositories/portal/IT infrastructure/stakeholders should adhere to the Information Technology Act 2000 and all amendments thereof.
- g. The two depositories should also have Disaster Recovery (DR) sites highlighting the DR type and location.
- h. The web-based NAD application provided by the two depositories should meet the Uptime requirement of at least 99.5%.
- i. The website of NAD should be GIGW compliant.
- j. The other part should comply with all technical audit requirements as prescribed by UGC from time to time and shall publish such reports and certificates in their website. However, the first part, if it so desires to conduct an additional periodic Vulnerability Assessment Penetration Testing (VAPT) or any such other technical audit, may do so either through its own technical cell or through any other agency at its own cost.

8.2. Archival and Duration of storage

The academic awards data shall be stored on the SAN (Storage Area Network). The other part shall have a well designed archival facility with an audit trail for NAD system. The UGC shall



define the time limit (in years) for archiving the data (i.e. years after which the academic awards would be archived).

8.3. Ownership of Hardware, Software & Data

The ownership of hardware and software resources deployed by the other part shall rest with it. The data received by the other part from the first part shall, at all times, remain the exclusive property of the first part.

9. Confidentiality

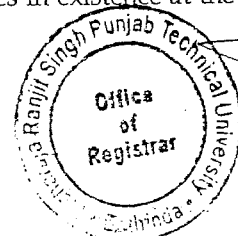
The data/academic awards are provided by the first part to the other part for hosting on the NAD portal for the purpose of being ultimately downloaded by various stakeholders. Such data/academic awards shall be considered as "Confidential Information" from the date on which it is received by the other part (as per the process of supply of data that has been mutually agreed to between the first part and the other part in writing) till the date on which it is hosted on the NAD portal and made available to public at large. The other part shall ensure complete confidentiality of such data/academic awards provided by the first part, until the time it is hosted on NAD portal and it agrees to limit disclosure of confidential information to employees, software developers on a "need to know" basis. The other part shall not make or allow any of its employees, developers or agents working on the NAD project to make any unauthorized use of the confidential information for any purpose directly or indirectly. Employees, agents and developers working on NAD project shall be under written obligations of confidence and non-use with respect to such confidential information received thereto. The other part will be responsible to ensure that no piece of confidential information will be passed on to any other third party without written permission of the first part or any Official authorised by the first part. Adequate provisions shall be made not to allow unrestricted access to such confidential information to employees who are not involved on the NAD Project.

The other part may disclose such Confidential data only to the extent the other part is required to disclose on account of order of any competent court or tribunal provided however that while disclosing such data, the other part shall keep the first part informed of the same vide a prior notice unless such notice is prohibited by applicable law.

Provided further that both the first and other part shall maintain the confidentiality of Aadhar information as specified under the the Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016

9.1. **Exceptions.** Notwithstanding the above, the other part will have no liability to the first part with regard to any Confidential Information of the first part which the other part can demonstrate:

- a) was in the public domain at the time it was disclosed to the other part or has become in the public domain through no fault of the other part;
- b) was known to the other part through no breach of any other confidentiality agreement at the time of disclosure, as evidenced by the other part's files in existence at the time of disclosure;



- c) was independently developed by the other part as evidenced by the other part's files in existence at the time of disclosure;

10. Service Quality

- a) The other part shall comply *with the provisions as stipulated in the tripartite agreement carried out between UGC and depositories.*
- b) The other part shall strictly follow the uptime application norms as devised and amended from time to time by Ministry of Electronics and Information Technology (MeitY). Further, the other part shall adhere to all applicable norms of MeitY to make NAD system efficient and user-friendly.
- c) *The other part shall use the data provided to them by the first part strictly in the manner as stipulated in the tripartite agreement (between UGC and depositories)/Agreement (between first part and second part) and in no other manner. In the event of any misuse of data by the other part by way of interpolations or tampering of the data provided to them by the first part, shall be dealt with as per the penal provisions provided under the Indian Law.*

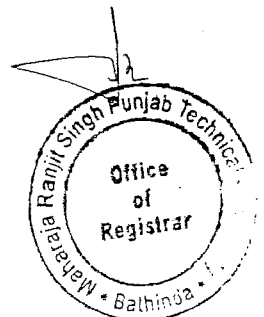
11. Indemnity

1. Both the parties shall indemnify each other as mentioned herein. The Indemnifying Party undertakes to indemnify and hold harmless the Indemnified Party from and against all losses, claims or damages to tangible personal property arising in favor of any person, corporation or other entity (including the Indemnified Party) attributable to :
- a. the Indemnifying Party's breach or non performance of any of the Indemnifying Party's undertakings, warranties, covenants, declarations or obligations under this Agreement;
- b. The first part shall indemnify and hold harmless the other part from any claims by third parties for damages or loss caused arising from the inaccuracy or deficiency in the data of academic awards as provided by the first part to the other part and hosted on the NAD portal.

12. Term & Termination

12.1. Term

- I. The agreement shall be valid initially for a period of two years from the date of signing the agreement but not later than 30th September, 2019 subject to continuity of the appointment of the other part as "Depository" by UGC. This agreement may be renewed with the approval of the Competent Authority from time to time. In the event of termination / revocation / withdrawal of the appointment of the other part as "Depository" by UGC, the agreement shall be deemed to have automatically lapsed on the date on which such termination / revocation / withdrawal comes into effect.
- II. *In the event of the agreement having lapsed, the other part shall transfer all the records/data provided to them by the first part to UGC/or to the entity as directed by the UGC.*



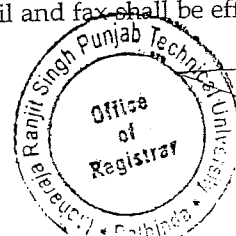
12.2. Termination

Revocation of appointment of the other part:

1. The first part may, if it is satisfied after making such enquiry as it deems fit, revoke the appointment of the other part on any or all of the following grounds, namely;
 - a. where other part, in the opinion of the first part, makes willful or continuous default in any act of commission or omission as required by or under the Service Level Agreement;
 - b. where the other part commits breach of any of the terms or conditions of the appointment as digital depository of NAD which is expressly declared by such appointment to render it liable to revocation;
 - c. where the other part fails, within the period fixed in this behalf by its appointment, or any longer period which the first part may have granted therefore, to show, to the satisfaction of the first part, that such agency is in a position fully and efficiently to provide the services required of it and discharge its duties and obligations imposed on it by its appointment;
 - d. where in the opinion of the first part, the financial position of the other part is such that such agency is unable fully and efficiently to provide the services required of it or discharge the duties and obligations imposed on it, by its appointment;
2. No appointment shall be revoked under Clause 12.2(1) unless the first part has given to the other part not less than thirty days notice, in writing, stating the grounds on which it is proposed to revoke the appointment, and has considered any cause shown by the other part within the period of that notice, against the proposed revocation.
3. Where the first part revokes the appointment under Clause 12.2(1), it shall serve an order of revocation upon the other part and fix a date on which the revocation shall take effect; which shall not be less than 30 days from the date of the said order; and such revocation shall be without prejudice to the action which may be taken against it in under any other law for the time being in force.
4. The first part may, instead of revoking a appointment under Clause 12.2(1), permit such appointment to remain in force subject to such further terms and conditions as it thinks fit to impose and as agreed by the other part in writing, and any further terms or conditions so imposed shall be binding upon and be observed by the other part for digital depository in NAD and shall be of like force and effect as if they were contained in the initial appointment at the time of signing the agreement.
5. In the event of the agreement being revoked by the first part, the other part shall transfer all the records/data to the other constituent depository of NAD.

13. Notices

All notices or other communications required to be given hereunder shall be in writing, in the English language and delivered either personally or by e-mail, fax requesting delivery receipt or prepaid registered postage with acknowledgement due, to the following address or as otherwise requested in writing by the receiving party in accordance with terms of this clause. Notices delivered personally shall be effective upon delivery and notices delivered by e-mail and fax shall be effective

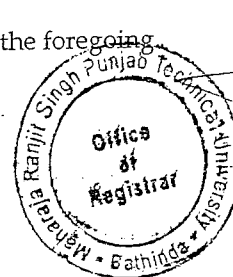


upon sending and successful delivery/ receipt by the party to whom they are addressed. Notices delivered under prepaid registered postage shall be effective seven days from the date of dispatch:

The First Part	For the other part
Attention: Head of the institution of the first part	Attention: Managing Director & CEO of the other part

14. Force Majeure

1. Force Majeure would include natural and unavoidable catastrophe that interrupts the expected course of events.
2. The other part shall not be liable for penalty, liquidated damages or for default, if and to the extent that, its delay in performance or other failure to perform his obligations under the contract is the result of an event of Force Majeure.
3. For purposes of this clause, "Force Majeure" means an event beyond the control of the other part and not involving other part and not involving the other part's fault or negligence and not foreseeable. Such events may include, but are not restricted to, instances of, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes which would have an impact on the performance of NAD.
4. If a Force Majeure situation arises, the other part shall promptly notify the first part in writing of such conditions and the cause thereof. Unless otherwise directed by the first part, the other part shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.
5. The Force Majeure circumstances and events shall include the following events to the extent that such events or their consequences (it being understood that if a causing event is within the reasonable control of the affected party, the direct consequences shall also be deemed to be within such party's reasonable control) satisfy the appropriate definition as per this agreement. Without limitation to the generality of the foregoing, Force Majeure Event shall include the following classes of events and circumstances and their effects:
 - (i) Natural events ("Natural Events") to the extent they satisfy the foregoing requirements including:
 - a. Any material effect on the natural elements, including lightning, fire, earthquake, cyclone, flood, storm, tornado, or typhoon;
 - b. Explosion or chemical contamination (other than resulting from an act of war);
 - c. Epidemic such as plague;
 - d. Any event or circumstance of a nature analogous to any of the foregoing.



- (ii) Other Events (Political Events) to the extent that they satisfy the foregoing requirements including:
- a. Act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, revolution, riot, insurrection, civil commotion, act of terrorism or sabotage;
 - b. Strikes, work to rules, go-slows which are either widespread, nation-wide, or statewide and are of political nature;
 - c. Any event or circumstance of a nature analogous to any of the foregoing.

15. Resolution of Disputes

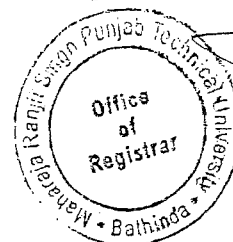
1. The first part and the other part shall make every effort to resolve amicably by direct informal negotiation, any disagreement or dispute, arising between them under or in connection with this agreement.
2. Any dispute or difference whatsoever arising between the parties to this Agreement out of or relating to the construction, meaning, scope, operation or effect of this Agreement or the validity of the breach thereof, which cannot be resolved through the above mentioned method, shall be referred to a sole Arbitrator to be appointed by mutual consent of both the parties herein. If the parties cannot agree on the appointment of the Arbitrator within a period of one month from the notification by one party to the other of existence of such dispute, then the Arbitration shall be governed by UGC. The provisions of the Arbitration and Conciliation Act, 1996 will be applicable and the award made there under shall be final and binding upon the parties hereto, subject to legal remedies available under the law. Such differences shall be deemed to be a submission to arbitration under the Indian Arbitration and Conciliation Act, 1996, or of any modifications, Rules or re-enactments thereof. The Arbitration proceedings will be held at Delhi.
3. *Wherever dispute is raised by the first part during the course of implementation of the agreement/contract, prior legal advice should be sought by the first part before initiating any such action and the statement of claim for arbitration should also be got vetted by the first part by obtaining legal and financial advice.*

16. Severability

Should any part of this Agreement be declared illegal or unenforceable, the Parties hereto will cooperate in all ways open to them to obtain substantially the same result or as much thereof as may be possible, including taking appropriate steps to amend, modify or alter this Agreement.

17. Entire Agreement

Subject to any terms implied by law, this Agreement along with its Annexure constitutes the entire Agreement between the first part and the other part and supersedes any previous Agreements or understandings between the parties in relation to the subject matter of this Agreement. Each party acknowledges that it has not relied on or been induced to enter into this Agreement by a representation or warranty other than those expressly set out in this Agreement. To the extent permitted by Applicable Law, a party is not liable to another party in contract or



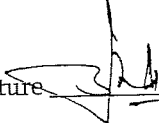
tort or in any other way for a representation or warranty that is not set out in this Agreement or otherwise agreed to by mutual consent of both the parties given in writing.

18. Effective Date of Agreement

This Agreement shall be with effect from the date of signing this agreement and will be valid subject to continuity of the appointment of the other part as "Depository" by UGC. In the event of termination / revocation / withdrawal of the appointment of the other part as "Depository" by UGC, the agreement shall be deemed to have automatically lapsed on the date on which such termination / revocation / withdrawal comes into effect.

In WITNESS WHEREOF the parties hereto have executed this agreement as of the day and year herein above written

SIGNED by Authorised
representative of the first part
By (Dr.) JASBIR SINGH HUNDAL

Signature 
Registrar
Maharaja Ranjit Singh
Punjab Technical University, Bathinda
Designation REGISTRAR

Address

Gursharan 25/01/18

Witness _____

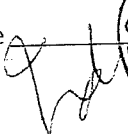
Name: DR - GURSHARAN SINGH

Address Dean Academic Affairs
MRSPTU, Bathinda

Place: Bathinda

Date: 25/01/18

SIGNED by Authorised
representative of other part
By Mr. Inderjeet Singh

Signature 
Designation Deputy Manager

Address 214, LSE Building,
Ferzoz Gandhi Market
Ludhiana 141001

Witness W
25/1/2018

Name: Ajaypal Singh

Address MRSPTU, Bathinda

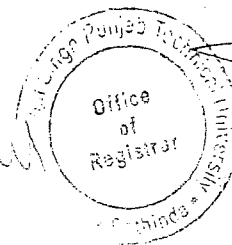
Place: Bathinda, Punjab

Date: 25-01-2018

Annexure A**

Various Heads of Charges

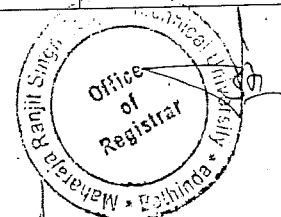
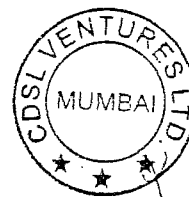
Schedule of User Charges			
Sr. No.	Charge head	Service Description	Charge Ceiling
Charges payable by first part			
1.1	Registration	Depository would receive the Registration form, Agreement and User Creation Forms as per details and data format approved by MHRD / UGC in physical / online manner. Depository would perform basic validations / checks with UGC database and other documentary checks, including on the status of recognition. Depository would register the AI on Depository System, Allocate a Unique AI Code, create access for Authorised Users of the AI and inform the AI of the same. Depository would also share the AI details with other Depositories of NAD.	Waived upto September 30, 2019.
1.2	Annual Maintenance Fee	Depository would maintain the details of AI, Courses operated by it, affiliated colleges, awards data lodged and details of mapping with the concerned students. It will facilitate the AI to perform and operate such services as described in agreement between the AI and the Depository and provide free access to awards lodged by the AI and reports on such awards and their usage.	Waived upto September 30, 2019.
1.3	Initial Training	Depository will provide digital training* collaterals, support and conduct one training program to facilitate the officials of the AI to understand and operate Depository system.	Waived upto September 30, 2019. *In case of Training-Trainer's Boarding, Lodging & Travel (at actuals) will be arranged by the AI.
1.4	Upload of awards data in specified format	Depository will provide access to the AI to lodge the authenticated, verified and authorised data of academic awards in Depository system under a system of digital signatures and make-checker verification. The AI need to prepare the data in data format as prescribed by Depository and so as to be compatible with Depository System and Digital Locker System and need to contain verified details of the Aadhaar or NAD ID of each student. Depository system will validate the data as per its internal validations, format validations and master data validations. Depository system will generate academic awards, create unique NAD Certificate ID, provide response file to AI, map the awards with students registered in NAD. Depository will share the awards data with other depositories of NAD. It will enable the students and verifiers to access award details and copy/download the same. NAD award data will be the final data of award details and will be kept updated by AI.	Waived upto September 30, 2019.



1.5	Mapping of award to the student's registered NAD Account based on Aadhaar / NAD ID - as provided by AI / Govt. Deptt / Statutory Bodies	Depository system will have Aadhaar / NAD ID of the Students based on the registered NAD account of the student. AI will provide student identity details for each award being lodged including Aadhaar /existing NAD ID as part of awards data. Depository will match the student identity in NAD account details with Award details and map the awards to the students. This will enable the rightful students to gain access to their awards. AI can also update the Student Identity details.	NIL.
1.6	Standard MIS	MHRD / UGC/AI will identify the important reports that may be needed by AI to operate and use the system. Such reports will be made available by the Depository as Standardised reports. AI can draw these reports from the Depository and use the same.	NIL.
1.7	Verification of Awards issued by other Academic Institutions / Govt. Departments / Statutory Bodies	If the AI needs to verify the academic awards lodged by any other participating AI in the system for a purpose which is consistent with NAD Objectives, it can apply through the Depository system to verify such awards. Depository will generate a unique transaction ID and present the verification request to the concerned student. Student can view the request, reasons for requesting verification and also the details of the Verification entity. If student approves the verification request, the award details would be made available to the verifying entity for its use. This may be available for access for the period as may be limited by the student or Depository policy.	10% of AI Charges subject to minimum of Rs. 25/-

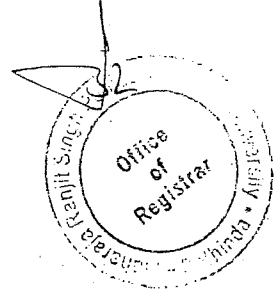
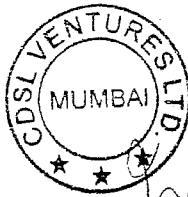
Charges payable by Students / Award Holders

2.1	Registration	Depository system will provide facility to the Students / Award Holders to register on Depository system and create an online account to access and store their digital academic awards. This facility would use such registration and KYC processes as may be considered appropriate from time to time. Presently the registration is enabled on two methods 1) Aadhaar based online KYC or 2) Declaration of the details by the student and Verification by the Academic Institution.	NIL.
2.2	Viewing of Academic Awards	Depository would enable the student with whom a particular NAD Certificate ID is mapped to view the academic award online.	Currently waived for all Students.
2.3	Annual Usage Fee	Depository would maintain the details of student profile, awards data lodged and mapped, transactions effected and audit trail. Depository will provide important communications and alerts to concerned students. It will facilitate the Student to perform and operate all services as NAD framework and reports.	
2.4	Downloading of Academic Awards	Depository would enable the student with whom a particular NAD Certificate ID is mapped to download the academic award online.	



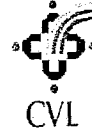
Note:

1. Payment Gateway Charges, Charges levied by UIDAI, Taxes, Printing & Despatch Costs would be charged extra.
2. Verification request can be initiated by the Verifying Entity or by the Student / Award Holder to whom the NAD Certificate is mapped. Both the Users are able to decide whether Verifying Entity should pay the verification fee or the concerned Student / Award Holder.
3. Student consent is mandatory for all Verifications.
4. The Verification Charges will be over & above the AI Charges.
5. Any service not listed here would be provided based on need and mutual scope and commercial agreement between the Depository.
6. The Commercials may be revised from time to time subject to mutual consent.
7. Condition of Charges is subject to MHRD/UGC guidelines.





Academic Institution (AI) Officials' details



1	Name of the Academic Institution (AI):	MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA
2	Details of Authorized AI Contact:	
a.	Name:	PROF (DR.) JASBIR SINGH HUNDAL
b.	Designation:	REGISTRAR
c.	Contact Number:	0164-2284297 (O) 88725 80251 (M)
d.	Mobile:	REG@MRSPTU.AC.IN
e.	Email ID:	
3	Details of Nodal Officer:	
a.	Name:	AGYAPAL SINGH
b.	Designation:	DEPUTY REGISTRAR (EXAMS)
c.	Contact Number:	87250-72330 (M)
d.	Mobile:	
e.	Email ID:	DREXAMS@MRSPTU.AC.IN

Registrar
Maharaja Ranjit Singh
Punjab Technical University, Bathinda

Authorised Signatory
(Name and Signature with stamp)



उत्तर प्रदेश UTTAR PRADESH

DZ 616481

MEMORANDUM OF UNDERSTANDING (MOU)

Between

NCCF

&

MRSPTU

This document constitutes an agreement between **Maharaja Ranjit Singh Punjab Technical University, Bathinda (MRSPTU)** and **National Cooperative Consumers Federation of India Ltd (NCCF)**, head office at **Noida**.

Maharaja Ranjit Singh Punjab Technical University, Bathinda hereinafter referred to as 'MRSPTU' is established by Govt. of Punjab vide Punjab Act No. 5 of 2015 notified through Punjab Government Gazette-Extraordinary (Regd. No. CHD1009212015-2011) notification No. 5-Leg./2015 dated 12th February 2015 and registered with UGC u/s 2.0. The major objectives of this University are advancement of education, development and research in the subjects of Engineering Technologies, Sciences, Management, Humanities, Pharmacy, Social Sciences and Architecture in the State of Punjab, particularly in the districts of Bathinda, Barnala, Faridkot, Fatehgarh Sahib, Fazllka, Ferozepur, Mansa, Moga, Sri Muktsar Sahib, Patiala and Sangrur.

National Cooperative Consumers Federation of India Ltd Noida, hereinafter referred to as 'NCCF', established on 16 th October, 1965 to function as the apex body of consumer cooperatives in the country. It is registered under the Multi-State Co-operative Societies Act, 2002.

This MEMORANDUM OF UNDERSTANDING (MoU) is entered into on **28-03-2018**.

Registrar
Maharaja Ranjit Singh
Punjab Technical University, Bathinda

Manager
National Co-operative Consumers'
Federation of India Ltd.
NCUI Complex, 3, Siri Institutional Area
August Kranti Marg,
New Delhi-110016

BETWEEN

MRSPTU, a State Technical University of Punjab engaged in providing, upgrading and promoting Quality Education, Training and Research in the subjects of Engineering Technologies, Sciences, Management, Humanities, Pharmacy, Social Sciences and Architecture and to create Entrepreneurship and a conducive environment for the pursuit of Technical Education in close cooperation with industry.

And

NCCF, Noida was established to function as the apex body of consumer cooperative societies in the country, it is registered under the Multi-State Co-operative Societies Act. NCCF operates through a network of 28 Regional offices located in different parts of the country and head office at New Delhi. The main objectives of the NCCF is to provide supply support to the consumer cooperatives and other distributing agencies for distribution of consumer goods at reasonable and affordable rates besides rendering technical guidance and assistance to the consumer cooperatives. NCCF is the spokesman of the consumer cooperative movement in the country. as per following details :

(Space Cancelled)

1 Objective

The objective of this MOU is to express the willingness of both parties to engage in an effort to promote the competitiveness of MRSPTU as well as its activities to develop and expand relationships by helping in developing the e-GovS System of MRSPTU.

Specific activities under this MOU will be identified through consultation between the two parties.

2 Roles of NCCF: -

2.1 NCCF agrees to provide their skilled persons to the University. MRSPTU will pay the salary of in-house employees at MRSPTU, exactly equivalent to the salary which they are already drawing from the NCCF, to NCCF. In case of inclusion of task specific supervisory staff, whose services may not require any physical presence at MRSPTU, Bathinda, an amount of one-third of salary paid by NCCF to these employees shall be borne by MRSPTU. Rest 2/3rd of their salary shall be paid by NCCF. No extra remuneration or allowance will be paid to these employees.

2.2 NCCF will mutually collaborate in the development, smooth operations of the software along with selecting the cloud based servers and related items during the process.

2.3 NCCF will assist in Establishment of Data Centre at MRSPTU.

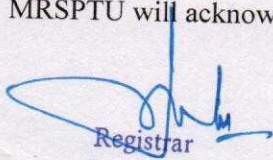
2.4 NCCF agrees to work with and coordinate with MRSPTU in the development of their initiatives to improve and expand support to the eGovS.

2.5 NCCF will provide on call free of cost Technical Support for at least 3 years after the duration of the project. In case of visit by NCCF official TA will be reimbursed as per the University Norms

2.6 NCCF will also provide training for coding to the employees of MRSPTU.

3 Roles of MRSPTU: -

3.1 MRSPTU will acknowledge the assistance provided by NCCF.


Registrar
Maharaja Ranjit Singh
Punjab Technical University, Bathinda


National Co-operative Consumers'
Federation of India Ltd.
NCUI Complex, 3, Siri Institutional Area
August Kranti Marg,
New Delhi-110016

3.2 In case of any other facility involving financial commitments, MRSPTU shall provide it as per the terms & conditions, laid down in Addendum signed by both parties in adherence to MRSPTU norms.

4 General Terms of MOU

4.1 **Duration of MOU:** This MOU shall be operational upon signing and will have an initial duration of one year. All activities conducted before this date within the vision of the joint collaboration will be deemed to fall under this MOU.

4.2 **Coordination:** In order to carry out and fulfil the aims of this agreement, each party will appoint an appropriate person(s) to represent its organization and to coordinate the implementation of activities. NCCF and MRSPTU staff will meet regularly to discuss progress and plan activities.

4.3 **Technical and Financial Support:** Addendums to this MOU will be developed for specific technical and financial support activities. These Addendums will provide a detailed description of the role, responsibility, and financial contribution of each party. Work plans and reporting requirements will be clearly outlined in the Addendums.

4.4 **Addendum:** Any Addendum to this MOU shall be in writing and signed by both parties

4.5 **Confidentiality:** Each party agrees that it shall not, at any time, after executing the activities of this MOU, disclose any information in relation to these activities or the affairs of business or method of carrying on the business of the other without consent of both parties.

4.6 **Termination of MOU:** The partnership covered by this MOU shall terminate upon completion of the agreed upon period. The agreement may also be terminated with a written one-month notice from either side. In the event of non-compliance or breach by one of the parties of the obligations binding upon it, the other party may terminate the agreement with immediate effect.

4.7 **Extension of Agreement:** The MOU may be extended provided the parties agree upon, and can provide the necessary resources.

4.8 **Communications:** All notice, demands and other communication under this agreement in connection herewith shall be written in English language and shall be sent to the last known address, e-mail, or fax of the concerned party. Any notice shall be effective from the date on which it reaches the other party.

5 Other Provisions

5.1 MRSPTU retains the right to withhold cost share payments for failure to comply with terms and conditions stipulated in this MOU and subsequent Addendums.

5.2 NCCF shall not use the name of MRSPTU in any promotional literature or information without the prior written approval of MRSPTU.

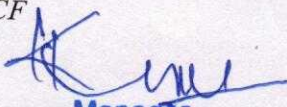
5.3 Both parties assume that this agreement does not go against the rules and regulations of the MRSPTU.

The terms and provisions in this MOU also apply to any subsequent Addendum to this agreement upon mutual decision.

IN WITNESS WHEREOF, the parties hereto have executed this MOU on the 28th day of March, 2018.

K.K. LENKA

NCCF

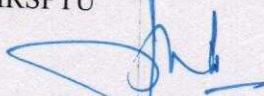


Signature and date:

Manager
National Co-operative Consumers'
Federation of India Ltd.
NCUI Complex, 3, Siri Institutional Area
August Kranti Marg,
New Delhi-110016

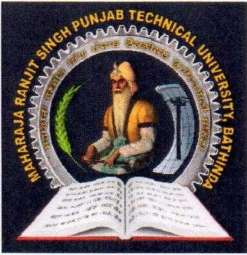
Dr. Jasbir Singh Hundal

MRSPTU



Signature and date:

Registrar
Maharaja Ranjit Singh
Punjab Technical University, Bathinda



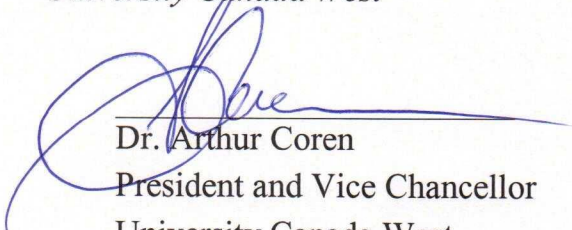
UNIVERSITY
CANADA^{WEST}

Maharaja Ranjit Singh Punjab Technical University, represented by its Vice Chancellor Prof.(Dr). M.P.S. Ishar and **University Canada West (UCW)** represented by its President and Vice Chancellor Dr. Arthur Coren agree to enter into this Memorandum of Understanding, which is a statement of our desire to promote academic and cultural learning, research, and global leadership in today's high-tech and multicultural society. This Memorandum is based on the foundation of mutual trust for the benefit and development of the two universities and the promotion of international understanding and goodwill.

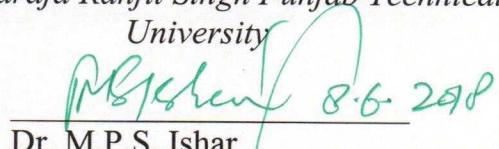
1. Exchange of Faculty and Administrators: Based on their respective academic and educational priorities, as well as their operational needs and constraints, the two universities will promote exchange of visiting scholars in the joint mechanism of teaching and /or cooperative research.
2. Exchange of Students: Based on their respective academic and educational priorities, as well as their operational needs and constraints, the two universities will promote student exchange programmes on a reciprocal basis, which will support the promotion of all-round development of students, particularly in the areas of global outlook and cultural appreciation.
3. Conduct of joint Research: The two universities will promote joint research studies in areas of mutual interest agreed by both parties.
4. Should the collaborative activities arising from this Memorandum result in any potential for intellectual property, both parties shall seek an equitable and fair understanding as to ownership and other property interests that may arise.
5. *Promotion of Joint Research Events:* The two universities will promote collaborative research events including conferences, lectures and seminars, which will be conducted when the staffs of each institution find these mutually beneficial.
6. The terms of specific areas of cooperation shall be agreed upon in writing by both parties prior to the initiation of any particular activity.

7. Any specific programme shall be subject to mutual consent, availability of funds, and a budget approved by both parties.
8. The two universities agree to uphold this Memorandum for an initial period of five years from the date of joint signing; it will be effective when the representatives of both universities have signed and dated it.
9. The agreement may be renewed provided that neither party gives a written notice of termination of this agreement to the other before the end of the term at least six months in advance.
10. This agreement may be revised with the mutual consent of both parties.
11. In the event doubts should arise in the interpretation of the provisions of this agreement or problems about matters not described therein, both parties shall consult with each other and settle them amicable in the spirit of this agreement.
12. This Memorandum may be terminated at any time during the period of its validity by either party upon provision of prior notice in writing to the other at least 6 (six) months before the proposed termination date.
13. The two universities agree that this Memorandum is not a formal legal agreement giving rise to any relationship, rights duties or consequences, but is only an expression of mutual respect and interest in academic collaboration.

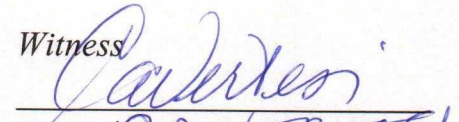
On behalf of
University Canada West

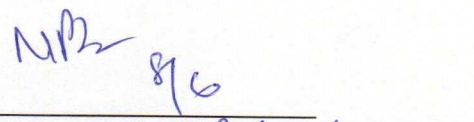

Dr. Arthur Coren
President and Vice Chancellor
University Canada West
Vancouver Canada

On behalf of
Maharaja Ranjit Singh Punjab Technical
University


Dr. M.P.S. Ishar
Vice Chancellor
Maharaja Ranjit Singh Punjab
Technical University
Punjab India

Witness

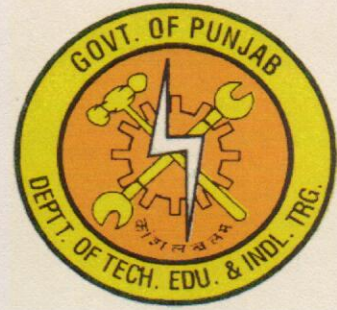

Name: C. A. VERTESI
Designation: B of S.
University Canada West
Vancouver Canada


Name : Dr. N.P. Singh
Designation: Dean, IKGPTU
Jalandhar.

June 8, 2018



**VANCOUVER ISLAND
UNIVERSITY**



Agreement of Cooperation
between
Vancouver Island University

and
M.R.S. Punjab State Technical Universities

This Agreement is signed by the official representatives of the Government of Punjab of Punjab, India and Vancouver Island University, Nanaimo, British Columbia, Canada with the objective of promoting and expanding international understanding by stimulating and supporting educational, professional and intercultural activities and projects among students and staff of the two institutions and the respective communities that support them.

The two universities may engage in the following areas of cooperation:

- Visits and exchange of members of the faculty, staff and students for the purpose of study, teaching and research;
- Collaborative research projects and joint initiatives such as seminars and lectures;
- Visiting scholars;
- Exchanging information, publications, and other material of common interest.

This Agreement is not intended to create any legally binding obligations on either party. Specific proposals for carrying out the above goals will be developed individually as will the financial arrangements under which those proposals are to be undertaken. If the parties agree to pursue a specific proposal, the terms of that proposal will be agreed to in a separate written agreement.

This Agreement will be effective from the date of signing by both parties for five years and will automatically extend for additional five-year periods unless terminated by either party. Either party may terminate this Agreement by giving ninety (90) days prior written notice to the other party by personal delivery or courier to the attention of the party's representative below.

This Agreement may be amended or modified by mutual agreement in writing signed by the parties.

11.06.2018
Date

11.06.2018
Date

Dr. Graham Pike, Dean
Faculty of International Education
Vancouver Island University

Prof. (Dr.) M.P.S. Isha, Vice Chancellor
M.R.S. Punjab Technical University



MEMORANDUM OF UNDERSTANDING

BETWEEN: MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY

Located in Dabwali Rd, Lal Singh Nagar, Bathinda, Punjab 151001, India

("MRSPTU")

AND: CONCORDIA UNIVERSITY OF EDMONTON

Located in Edmonton, Alberta, Canada –

7128 Ada Boulevard - Edmonton AB - T5B 4E4 - Canada

("Concordia")

WHEREAS Concordia is a University continued pursuant to the terms of the *Post-Secondary Learning Act* and desires to enter into a cooperative relationship with Acronym whereby there may be an exchange of ideas and /or people between the two parties;

WHEREAS MRSPTU is and desires to enter into a cooperative relationship with Concordia whereby there may be an exchange of ideas and /or people between the two parties;

WHEREAS MRSPTU and Concordia would like to cooperate with each other in areas including any program offered at either institution as felt desirable and feasible on either side and that both sides feel contribute to the fostering and development of the cooperative relationship between the two universities;

WHEREAS both institutions are autonomous, self-governing entities with the power to enter into agreements considered to be in their best interests and to advance their ability to achieve the requirements of their mission and mandate;

AND WHEREAS MRSPTU and Concordia have agreed to enter into this non-binding Memorandum of Understanding (the "MoU") that enables them to work together in the pursuit of the objectives set out herein;



NOW THEREFORE this MoU sets out the intent of the working relationship between the parties as follows:

1. NATURE OF THE MOU

- 1.1. This MoU establishes the framework by which the parties will work together in an effort to foster and develop a cooperative relationship between the two Universities through the activities listed below in a manner that is consistent with the mandates, policies, priorities, and resources of each party and which is in accordance with the *Post-Secondary Learning Act*.
- 1.2. Except for the provisions herein dealing with privacy and confidentiality, this MoU does not create any legally binding obligation on the part of the parties but contemplates further legally binding agreement(s) being considered.
- 1.3. Specific terms of collaborative activities shall be agreed to by the two Universities in a further legally binding agreement (the "Agreement") which shall be made pursuant to this MoU in the form of an appendix thereto for the limited purpose of the particular activity addressed in that Agreement. If the Agreement is expected to include collaborative research, issues such as confidential information, intellectual property and publication rights shall be addressed in the Agreement.

2. OBJECTIVES

- 2.1. The general intent of this MoU is to establish a framework through which the parties to this MoU can foster and develop a relationship between the Parties through such activities as:
 - a. Student mobility;
 - b. Mobility of faculty and/or staff;
 - c. Joint research activities and publications;
 - d. Participation in seminars and academic meetings;
 - e. Exchange of academic materials and other information; and
 - f. Special short-term academic programs.

3. COLLABORATIVE PROJECTS

All student programming agreements between the parties shall conform to this MoU and be approved by President of Concordia, or designate, and the President of MRSPTU, or designate.

4. COSTS AND EXPENSES

Each party shall bear its own costs and expenses arising from this MoU unless otherwise mutually arranged and agreed to.

5. TERM

- 5.1. This MoU shall come into force and effect from the date on which the document has been endorsed by both Universities, or from the date on which the last University endorses the MoU, and shall continue in effect for a period of five (5) years from the date of this MoU or until terminated by mutual agreement or pursuant to section. 5.2.
- 5.2. Either party may terminate this MoU on six (6) months written notice to the other party.



5.3. This MoU may be amended or extended by the mutual written consent of the two parties.

6. NOTICES

All notices to be given pursuant to this MoU shall be sent in writing to the following individuals:

	For MRSPTU	For Concordia
<i>Name</i>	Professor MPS Ishar	Dr. Tim Loreman
<i>Title</i>	Maharaja Ranjit Singh Punjab Technical University, Vice-Chancellor	Concordia University of Edmonton, President and Vice Chancellor
<i>Address</i>	Dabwali Road, Bathinda	7128 Ada Boulevard - Edmonton AB T5B 4E4 – Canada
<i>Telephone</i>		+1-780-479-9329 (office) +1-780-491-5008 (cell)
<i>Fax</i>		+1-780-469-8419
<i>e-mail</i>		manfred.zeuch@concordia.ab.ca

Notice shall be deemed to be received on the date of delivery if delivered by hand or transmitted by facsimile.

7. ACCESS TO INFORMATION AND PRIVACY LEGISLATION

The parties acknowledge that Concordia is a public body subject to the *Personal Information Privacy Act* (PIPA) as amended, which governs its own *Personal Information Privacy Policy* (PIPP). For further information, contact Concordia's privacy officer, Mrs. Judy Kruse: judy.kruse@concordia.ab.ca.

8. CONFIDENTIALITY

Each party acknowledges that it may come into possession of confidential information of the other party. Accordingly, each party agrees that it will only use such confidential information for the purposes contemplated in this MoU and that it will not, without the prior, written consent of the other party, disclose to any third party such confidential information. For the purposes of this MoU, "confidential information" shall not include information that was already in the public domain, information that comes into the public domain through no act of the receiving

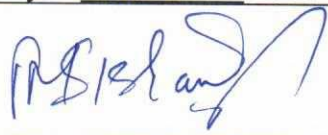
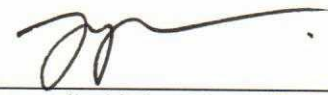


party or information that is required to be disclosed under any applicable law or by order of a court.

In WITNESS WHEREOF the parties have caused this MoU to be executed on the dates indicated below.

Signed for and on behalf of

Signed for and on behalf of

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY	CONCORDIA UNIVERSITY OF EDMONTON
by its duly authorized officer on	by its duly authorized officer on
the <u>12</u> day of <u>June</u> 2018	the <u>12</u> day of <u>June</u> 2018
	
Maharaja Ranjit Singh Punjab Technical University, Professor MPS Ishar, Vice-Chancellor	Concordia University of Edmonton, President and Vice-Chancellor, Dr. Tim Loreman

AWS Educate Collaboration Arrangement

This Collaboration Arrangement (this “**Arrangement**”) is made and entered into by and between Amazon Internet Services Private Limited (“**Amazon Affiliate**”) and Maharaja Ranjit Singh Punjab Technical University, Bhatinda (“**Institution**”). Amazon Affiliate and Institution are sometimes each referred to as a “**Party**” and collectively as “**the Parties**”. The Arrangement will commence and become effective as of the date the last Party signs this Arrangement (the “**Arrangement Effective Date**”). The Parties reserve the right to implement the proposed Areas of Collaboration (as defined in Section 1 below) through one or more of their respective affiliates, and such affiliate may enter into the Definitive Agreements (as defined in Section 6 below). Unless otherwise defined in this Arrangement or the relevant terms for the AWS program(s) in Exhibit B, all capitalized terms used in this Arrangement will have the meanings ascribed to them in the AISPL Customer Agreement, available at <https://aws.amazon.com/aispl/agreement/> or other agreement governing your use of Services (the “**Agreement**”).

- 1. Scope and Aims of Arrangement.** This Arrangement is to confirm the Parties intent to collaborate on several initiatives and activities described in the areas of collaboration (“**Areas of Collaboration**”) attached hereto (“**Exhibit A**”). The Parties acknowledge that the Areas of Collaboration are not exhaustive in nature and the Parties may, in good faith, jointly amend or elaborate upon the Areas of Collaboration from time to time. For the avoidance of doubt, reference to the term “**Arrangement**” will include Exhibit A. Nothing in this Arrangement obligates either Party to enter any other agreement with the other, nor excludes similar agreements with other entities. Save for the provisions on confidentiality and publicity, the Parties agree that this Arrangement is intended to be a non-legally binding statement of the Party’s intent to collaborate only, and shall not impose any legal obligations on either Party. The Parties acknowledge the discussions in relation to the Areas of Collaboration are being undertaken on a non-exclusive basis and either Party shall be free to enter into transactions similar to the Areas of Collaboration with any other party in India or elsewhere.
- 2. Fees and Expenses.** With the exception of Institution’s actual use of the AWS Service Offerings that may relate to the activities described in Exhibit A arising from this Arrangement, neither of the Parties hereto will have any obligation to the other Party to pay any fees and expenses incident to or resulting from the negotiation, preparation, or execution of this Arrangement. Each Party will be responsible for its own costs associated with the exploratory activities contemplated by this Arrangement. Amazon Affiliate may within its sole discretion contribute AWS Promotional Credits as Program Credits to the AWS Educate Program contemplated under this Arrangement. Usage of Program Credits is subject to the AWS Promotional Terms & Conditions.
- 3. Term and Termination.** The term of this Arrangement will commence on the Arrangement Effective Date and will remain in effect for two (2) years unless earlier terminated by either Party. Either Party may terminate this Arrangement immediately for any reason upon written notice to the other Party. The termination of this Arrangement shall not affect any prior or subsequent Definitive Agreement entered into between the Parties. The Parties shall work together to ensure that all outstanding work or issues are completed or brought to a mutually agreeable conclusion in an orderly and timely manner.
- 4. Publicity.** All materials intended to publicize the initiatives and activities resulting from the Parties discussions will be approved by both Parties prior to release. Upon the other Party’s prior written consent (which may be via email), either Party may use the other Party’s trade names, trademarks, service marks, logos, domain names and other distinctive brand features in presentations, marketing materials, and website listings for the purpose of publicizing the initiatives and activities resulting from this Arrangement. No Party may acquire any right, title or interest in any other Party’s trademarks under this Arrangement, and no Party shall use the trademarks of the other Party without the other Party’s express written consent. Institution may only use the Marks in connection with this Arrangement in accordance with the Agreement.
- 5. Relationship between the Parties.** The relationship of the Parties hereto shall at all times be one of independent contractors, and neither Party shall be, nor represent to be, an employee, agent, representative, partner, association of persons or joint venture of the other, nor shall either Party have the right or authority to share in the revenues or profits of the other Party, to assume any risk or create any liability, obligation or expense jointly or on behalf of or in the name of the other Party, to direct or control the operations of the other Party, or to otherwise act on behalf of the other Party.
- 6. Definitive Agreement.** To the extent necessary, any engagement requiring a formal agreement, including



Institution's use of Service Offerings shall be negotiated between the relevant Parties in one or more separate, specific agreement(s) independent of this Arrangement ("Definitive Agreements"). This Arrangement creates no obligation on behalf of either Party to enter into any specific Definitive Agreement or other agreement subsequent to the execution of this Arrangement. Nothing in this Arrangement shall be construed as superseding or interfering in any way with other agreements or contracts entered into either prior to or subsequent to the signing of this Arrangement.

7. Implementation. The responsibility for the implementation of activities pursuant to the framework established by this Arrangement shall lie with the Parties, each of which has designated a representative below. By written notice or e-mail to the other Party, each Party may designate different or additional persons as its representatives.

For Institution
Dr. Anju Sharma
Asst. Professor
+91 9888997297
phdanju@gmail.com

For Amazon Affiliate:
Amit Nevatia
Educate Program Lead
+91 9899110922
anevati@amazon.com

8. Confidential Information. "Confidential Information" means all nonpublic information disclosed by either Party to the other Party that is designated as confidential or that, given the nature of the information or the circumstances surrounding its disclosure, reasonably should be considered as confidential. In the event that either Party needs to disclose its Confidential Information to the other Party, the Parties shall enter into a separate confidentiality agreement on terms and conditions to be agreed. For the avoidance of doubt, all Confidential Information shall remain the sole property of the Party disclosing such Confidential Information. Except for the disclosure of this Arrangement, including the title and the identification of the Parties, which information shall not be deemed confidential, neither Party shall disclose the specific terms and conditions of this Arrangement without the express written consent of the Party, such consent not to be unreasonably withheld.

9. Ownership of Materials/Intellectual Property. Each Party acknowledges and agrees that the other Party owns the intellectual property rights that it owned or controlled prior to or created separately during but unrelated to this Arrangement, including any modifications thereto. Any work by the Parties resulting in the creation of new intellectual property will be governed by the applicable Definitive Agreement(s) that addresses intellectual property ownership. No jointly owned intellectual property is intended to be created by the Parties under this Arrangement. No right or license is granted to either Party or its affiliates under this Arrangement to any Confidential Information, know-how, or other intellectual property right owned or controlled by the other Party or such other Party's affiliates.

10. Liability. Neither Party will be liable to the other for any damages for any actions under this Arrangement.

11. Limits to Arrangement. Nothing in this Arrangement is intended to be, or should be construed as a waiver of the privileges and immunities of either Party or its officers and employees, which privileges and immunities are hereby specifically reserved. Nothing in this Arrangement constitutes or implies a transfer of funds between the Parties, nor a procurement action on the part of Institution. The Parties agree that Institution's use of the Service Offerings, if any, shall be governed by the terms and conditions in the Agreement.

12. Assignment; Third Parties. Neither Party will assign any part of this Arrangement to another party without the prior written approval and consent of the other Party. This Arrangement does not create any third party beneficiary rights in any individual or entity that is not a party to this Arrangement.



13. Counterparts and Facsimile Delivery. This Arrangement may be executed in two or more counterparts, each of which will be deemed an original and all of which taken together will be deemed to constitute one and the same document. The Parties may sign and deliver this Arrangement and any notices under it by facsimile or email transmission.

14. Entire Understanding. This Arrangement and any documents incorporated by reference constitute the entire understanding between the Parties hereto with respect to the subject matter hereof (with the exception of Institution's use of the Service Offerings, which will be governed by the Agreement or a Definitive Agreement as agreed separately by the Parties). No representation, warranty, promise or statement of intention has been made by either Party which is not embodied in this Arrangement, Exhibit A, or such other documents, and neither Party shall be bound by, or be liable for, any alleged representation, warranty, promise inducements or statement of intention not embodied herein or therein. This Arrangement may be amended or supplemented only by the mutual written consent of the Parties specifically referring to this Arrangement.

15. Disputes. In case of a dispute between the Parties arising out of or relating to this Arrangement, the Parties will attempt to reach an amicable resolution in good faith.

16. Governing Law. The laws of India, without reference to conflict of law rules, govern this Arrangement and any dispute of any sort that might arise between the Parties. The United Nations Convention for the International Sale of Goods does not apply to this Arrangement.

IN WITNESS WHEREOF, Amazon Affiliate and Institution have executed this Arrangement as of the Arrangement Effective Date.

<p>AMAZON INTERNET SERVICES PRIVATE LIMITED</p> <p>By: <u>[Signature]</u> Name: <u>RAHUL SHARMA</u> Title: <u>AUTHORIZED SIGNATORY</u> Signature Date: <u>31 AUG 2018</u></p> <p>Address: Ground Floor, Eros Corporate Towers, Nehru Place, New Delhi - 110 019, India</p>	<p>Maharaja Ranjit Singh Punjab Technical University, Bhatinda</p> <p>By: <u>[Signature]</u> Name: <u>Dr. MPS Iyer</u> Title: <u>VICE CHANCELLOR</u> Signature Date: <u>31 Aug 2018</u></p> <p>Address: Dabwali Road, Lal Singh Nagar Bhatinda, Punjab 151001</p>
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Exhibit A
Areas of Collaboration

Vision for the Collaboration

The vision of this collaboration is to develop cloud-ready job skills by deploying a range of education, training, and certification programs to accelerate cloud-related learning and development.

Objectives the Collaboration

Amazon Affiliate and Institution will collaborate to identify opportunities to provide trainees access to the AWS Educate program. The adoption of AWS Educate will give trainees access to resources needed to accelerate cloud-related learning endeavors, including AWS Promotional Credits for hands-on experience with AWS technology, training, content, career pathways, and job board.

Approach and Targeted Outcome

Institution and Amazon Affiliate will come together for the strategic relationship to provide multifaceted, collaborative, strategic initiatives that are based on mutual benefit, trust, and are focused on achieving shared goals. Both Parties commit their best efforts for the realization and implementation of what is agreed on in conjunction with this Arrangement. To meet these strategic objectives and subject to the terms of this Arrangement,

- i) Amazon Affiliate intends to,
 - 1. provide Institution and its trainees who enroll as members of the AWS Educate program with free AWS Promotional Credits to access AWS Services, labs and training on cloud topics and AWS Services, shared open course content by leading professors and us, best practice communities, AWS Educate Job Board, and training materials to help the Institution instructors and trainees enhance their skills on AWS,
 - 2. provide tracking statistics and reports to Institution on the online progress of trainees,
 - 3. provide access to instructor led classes, on-demand training, self-paced labs, and training at Amazon Affiliate events to facilitate adoption,
 - 4. support Institution with execution of mutually agreed events, workshops and seminars.
- ii) Institution intends to,
 - 1. promote the AWS Educate program through email and newsletters,
 - 2. form a working committee to deliver the AWS Educate program and report progress to Amazon Affiliate,
 - 3. target to sign up an estimate of 3000 trainees to the AWS Educate program,
 - 4. leverage the AWS Educate Job Board as an additional avenue for trainees to find a job in country or globally.
- iii) Other
 - 1. A 4 day workshop to be conducted for all faculty/educators of the university on the AWS Educate onboarding process and AWS Tech Essentials, at a centralized location in discussion with University & Amazon affiliate. A follow-up training for faculty / educators for a maximum of 2 additional days would be organized based on mutual discussion
 - 2. University to broadcast the information about collaboration with the AWS Educate program to all higher education institutes under its umbrella
 - 3. Each institute to nominate 2 members from their institute to act as the central point of contact (CPOC) for the AWS Educate program roll-out
 - 4. The faculty/educators to conduct 1 hr. workshop for educators and students at each college, facilitating their enrolment in to the program
 - 5. Students successfully completing the AWS Educate career pathways would be provided with digital certificate of completion.



Exhibit B
Terms and Conditions for AWS Programs (For Reference Only)

AWS Educate <https://aws.amazon.com/education/awseducate/>

With the increasing demand for cloud employees, AWS Educate provides an academic gateway for the next generation of IT and cloud professionals. AWS Educate is Amazon's global initiative to provide students and educators with the resources needed to accelerate cloud-related learning endeavors.

Terms and Conditions

- https://www.awseducate.com/DisplayDocument?docname=Institution_Application_en&showLogo=1

AWS Promotional Credit <https://aws.amazon.com/awscredits/>

Terms & Conditions - <https://aws.amazon.com/awscredits/>



ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ
MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

(Estb. under Act 5 (2015) of Punjab Govt. & under section 2(f) & 12(b) of the UGC Act 1956)

Dabwali Road, Bathinda (Punjab) -151 001

DRD/MRSPTU.702.....

Dated:..16.10.18...

PhD ENROLLMENT CUM ADMISSION CANCELLATION ORDER

As per the request made by the candidate and subsequent recommendation of the Supervisor vide HCSD/987 dt 9.10.2018 received in this office vide CD/3277 dt 11.10.2018 and approval granted by the competent authority vide VC/2927 dt 15.10.2018, the provisional PhD enrollment cum admission of the following PhD student stands cancelled as per the details given below-

S. No.	Name	Enrollment no.	Department	Faculty	Supervisor	Date of admission cancellation
1.	Galaxy Bansal	16117FPE01	CSE	Engg & Tech	Dr. Naresh Kumar Garg, GZSCCET, MRSPTU, Bathinda	09.10.2018

The student is directed to get her "No Dues" (up to the date of cancellation of admission) completed with immediate effect. In case of any objection, student may correspond with this office up to 25.10.2018.


Dean (R&D)
(Dr. Savina Bansal)
R41

Endst No. DRD/MRSPTU/.....

Dated.....

Cc: For information, records and fna, as applicable. (Discrepancy, if any, be intimated immediately for rectification)

1. PA to Vice-Chancellor for kind information of Hon'ble VC
2. Dean Academic Affair, MRSPTU, Bathinda
3. Campus Director, GZSCCET, Bathinda
4. Registrar, MRSPTU, Bathinda
5. Dean Student welfare, MRSPTU
6. CoE, MRSPTU Bathinda
7. HoD (CSE) GZSCCET, Bathinda
8. Supervisors (Dr Naresh Kumar Garg)
9. Candidates (Ms Galaxy Bansal) (through mail & Regd. post)
10. AR(Accounts), MRSPTU
11. Librarian, GZSCCET, Bathinda
12. Candidates' Master File

Dean (R&D)
MRSPTU, Bathinda

ਪ੍ਰੋ. (ਡਾ.) ਸਵੀਨਾ ਬਾਂਸਲ

ਡੀਨ (ਖੋਜ ਅਤੇ ਵਿਕਾਸ)

Prof. (Dr) SAVINA BANSAL

PhD (Engg) FIE, FIETE, SMCSI

DEAN (Research & Development)

DRD/MRSPTU/...691.....

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) & 12(b) of UGC)

ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ (ਪੰਜਾਬ) - 151001

Dabwali Road, Bathinda (Punjab) -151001

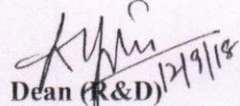
Date:-...12-9-18.....

PhD Enrollment Cancellation Order

Subsequent upon the comments received from ECE Deptt. vide HECD/4075 Dated 06-09-2018 , and request made by the candidate dated 06-09-2018 to cancel his candidature due to some personal reasons, and recommendations made by the Supervisor, accepted by the competent authority, the provisional PhD enrollment/admission of the following student stands cancelled as per the details given below-

S. No.	Name	Enrollment no.	Department	Faculty	Supervisor	Date of admission cancellation
1.	Anuj Goel	1710AMPE01	ECE	Engg & Tech	Dr. Amit Kumar Manocha PIT Moga/MRSPTU	06-09-2018

The student is directed to get his "No Dues" (upto the date of cancellation of admission) completed with immediate effect. In case of any discrepancy, student may correspond with this office upto 25-09-2018.


Dean (R&D) 12/9/18
(Dr. Savina Bansal)
R&D

Endst No. DRD/MRSPTU/.....

Dated.....

Cc: For information, records and fna, as applicable. (Discrepancy, if any, be intimated immediately for rectification)

1. PA to Vice-Chancellor for kind information of Hon'ble VC
2. Dean Academic Affair, MRSPTU, Bathinda
3. Campus Director, GZSCCET, MRSPTU
4. Registrar, MRSPTU, Bathinda
5. Dean Student welfare, MRSPTU
6. CoE, MRSPTU Bathinda
7. HoD (ECE) GZSCCET, MRSPTU
8. Supervisors (Dr Amit Kumar Manocha)
9. Candidates (Mr Anuj Goel) (through mail & Regd. post)
10. AR(Accounts), MRSPTU
11. Librarian, GZSCCET, MRSPTU
12. Candidates' Master File

Dean (R&D)
MRSPTU, Bathinda
R&D

ਪ੍ਰੋ. (ਡਾ.) ਸਵੀਨਾ ਬਾਂਸਲ
ਡੀਨ (ਖੋਜ ਅਤੇ ਵਿਕਾਸ)

Prof. (Dr) SAVINA BANSAL
PhD (Engg) FIE, FIETE, SMCSI
DEAN (Research & 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) & 12(b) of UGC)
ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ (ਪੰਜਾਬ) - 151001
Dabwali Road, Bathinda (Punjab) -151001

DRD/MRSPTU/...577.....


Date: ...5-4-18.....

PhD Admission Cancellation Order

Subsequent upon the recommendations of the Supervisors and in the light of MRSPTU PhD Regulations sub-clause 8.1(iv) and approval granted by the competent authority, the provisional PhD enrollment/admission of the following students stand cancelled as per the details given below-

S. No.	Name	Enrollment no.	Department	Faculty	Supervisor	Date of admission cancellation
1.	Angrej Kumar	16405MPE01	Mathematics	Sciences	Dr H S Bhatti, BBSBEC, Fatehgarh Sahib	05-03-2018
2.	Mukta	16311FPE04	Humanities & Management	Commerce & Mgt	Dr Rajinder Kaur, MIMIT, Malout	05-03-2018
3.	Karamjot Kaur	16404FPE01	Computer Applications	Sciences	Dr Naresh Garg, GZSCCET, Bathinda	12-02-2018

These students are directed to get their "No Dues (upto the date of cancellation of admission)" completed with immediate effect. In case of any objection, students may correspond with this office upto 30-04-2018.


Dean (R&D)
(Dr. Savina Bansal)

Encl No. DRD/MRSPTU/.....

Dated.....

Cc: For information, records and fna, as applicable. (Discrepancy, if any, be intimated immediately for rectification)

1. PA to Vice-Chancellor for kind information of Hon'ble VC
2. Dean Academic Affair, MRSPTU, Bathinda
3. Campus Director, GZSCCET, Bathinda
4. Registrar, MRSPTU, Bathinda
5. Dean Student welfare, MRSPTU
6. CoE, MRSPTU Bathinda
7. HoD (Comp App.), HoD(Mathematics), HoD(Humanities &Mgt) GZSCCET, Bathinda
8. Supervisors (Dr. Naresh Garg, Dr H S Bhatti, Dr Rajinder Kaur)
9. Candidates (Ms Karamjot Kaur, Mr Angrej Kumar, Ms Mukta) (through mail & Regd. post)
10. AR(Accounts), MRSPTU
11. Librarian, GZSCCET, Bathinda
12. Candidates' Master File

Dean (R&D)
MRSPTU, Bathinda

ਪ੍ਰੋ. (ਡਾ.) ਸਵੀਨਾ ਬਾਂਸਲ
ਡੀਨ (ਖੋਜ ਅਤੇ ਵਿਕਾਸ)

Prof. (Dr) SAVINA BANSAL
PhD (Engg) FIE, FIETE, SMCSI
DEAN (Research & 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) & 12(b) of UGC)
ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ (ਪੰਜਾਬ) - 151001
Dabwali Road, Bathinda (Punjab) -151001

DRD/MRSPTU/...5.8.2.....

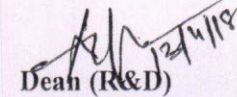
Date:.....13.4.18.....

PhD Admission Cancellation Order

Subsequent upon the recommendations of the Supervisor and in the light of MRSPTU PhD Regulations sub-clause 8.1(iv) and approval granted by the competent authority, the provisional PhD enrollment/admission of the following student stands cancelled as per the details given below-

S. No.	Name	Enrollment no.	Department	Faculty	Supervisor	Date of admission cancellation
1.	Manik Goyal	17106MPE01	Civil Engg	Engg & Tech	Dr Sanjiv Kumar Aggarwal, GZSCCET, Bathinda	15-03-2018

The student is directed to get his "No Dues" (upto the date of cancellation of admission) completed with immediate effect. In case of any objection, student may correspond with this office upto 30-04-2018.


Dean (R&D)
(Dr. Savina Bansal)

Endst No. DRD/MRSPTU/.....

Dated.....

Cc: For information, records and fina, as applicable. (Discrepancy, if any, be intimated immediately for rectification)

1. PA to Vice-Chancellor for kind information of Hon'ble VC
2. Dean Academic Affair, MRSPTU, Bathinda
3. Campus Director, GZSCCET, Bathinda
4. Registrar, MRSPTU, Bathinda
5. Dean Student welfare, MRSPTU
6. CoE, MRSPTU Bathinda
7. HoD (Civil Engg) GZSCCET, Bathinda
8. Supervisors (Dr Sanjiv Kumar Aggarwal)
9. Candidate (Mr Manik Goyal) (through mail & Regd. post)
10. AR(Accounts), MRSPTU
11. Librarian, GZSCCET, Bathinda
12. Candidates' Master File

Dean (R&D)
MRSPTU, Bathinda

6-4/6

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ
MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

(Estb. under Act 5 (2015) of Punjab Govt. & under section 2(f) & 12(B) of the UGC Act, 1956)

Dabwali Road, Bathinda (Punjab) -151 001

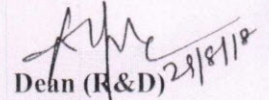
DRD/MRSPTU. 623.....

Dated: 29.8.18.

PROVISIONAL Ph.D. REGISTRATION ORDER

On successful completion of allocated Ph.D. course work and subsequent acceptance of presented Research Proposal and recommendations by DDRC, in its meeting held on 14-08-2018, **Mr Sukhjinder Singh**, enrolled w.e.f. 18-09-2016 vide DRD/MRSPTU/179 dt 22-08-2016, stands provisionally Registered to Part-Time Ph.D. program of MRSPTU, Bathinda under the **FACULTY of ENGINEERING & TECHNOLOGY** in the **DISCIPLINE ELECTRONICS & COMMUNICATION ENGINEERING** w.e.f. 29-08-2018. The Ph.D. registration number allocated to the candidate is **1610AMPE01**. His research work shall be focused on - **“A FRAMEWORK FOR OFFLINE HANDWRITTEN DEVANAGARI WORD RECOGNITION”** under the supervision of Dr Naresh Kumar Garg (S107M72006), Professor (CSE), GZSCCET, MRSPTU, Bathinda. The candidate shall be governed by the MRSPTU PhD Regulations-2016

This order is issued with the approval of competent authority.



Dean (R&D) 29/8/18
(Dr Savina Bansal)
R.K.

Endst No: DRD/MRSPTU/.....

Dated:.....

cc: For information, records and further necessary action, as applicable. (Discrepancy, if any, be intimated immediately for rectification)

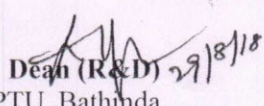
1. PA to VC for kind information of the Hon'ble Vice-Chancellor
2. Dean Academic Affair, MRSPTU, Bathinda
3. Registrar, MRSPTU, Bathinda
4. CoE, MRSPTU Bathinda
5. Dean (Student Welfare), MRSPTU, Bathinda
6. HoD (ECE), GZSCCET, MRSPTU (Approved Title / Objective/ Supervisor attached under signature)
7. Librarian, GZSCCET, MRSPTU
8. Supervisor (Dr. Naresh Kumar Garg) (Approved Title / Objective/ Supervisor attached under signature)
9. Candidate (Mr Sukhjinder Singh) (Approved Title / Objective/ Supervisor attached under signature)
10. AR(Accounts), MRSPTU
11. Candidate's Master File


Dean (R&D)
MRSPTU, Bathinda
(Dr Savina Bansal)

Enclosure

APPROVED PhD SUPERVISOR/TITLE/OBJECTIVE OF PhD RESEARCH WORK

NAME OF THE CANDIDATE	Mr Sukhjinder Singh
REGISTRATION NO.	1610AMPE01
FACULTY/DISCIPLINE	Engineering & Technology/ Electronics & Communication Engineering
DATE OF REGISTRATION	29.08.2018
SUPERVISOR	Dr Naresh Garg (S107M72006), Professor (CSE), GZSCCET, MRSPTU, Bathinda
CO-SUPERVISOR	-Not permitted / Nil-
TITLE OF THESIS	A FRAMEWORK FOR OFFLINE HANDWRITTEN DEVANAGARI WORD RECOGNITION
RESEARCH OBJECTIVES	<ol style="list-style-type: none">1. To generate a corpus of handwritten Devanagari words for experimental work.2. To explore existing features (structural and statistical) for offline handwritten Devanagari word recognition.3. To propose and implement innovative features for offline handwritten Devanagari word recognition.4. To explore various classifiers for offline handwritten Devanagari word recognition.5. To calculate, compare and analyze recognition accuracy by combining various features and classifiers.


Dean (R&D) 29/8/18
MRSPTU, Bathinda
(Dr Savina Bansal)
R49

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ
MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

(Estb. under Act 5 (2015) of Punjab Govt. & under section 2(f) & 12(b) of the UGC Act at SNo 428)

Dabwali Road, Bathinda (Punjab) -151 001

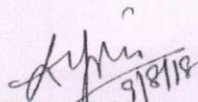
DRD/MRSPTU. 665.....

Dated: 9-8-18.....

PROVISIONAL Ph.D. REGISTRATION ORDER

On successful completion of allocated Ph.D. course work and subsequent acceptance of presented Research Proposal and recommendations by DDRC, in its meeting held on 30-07-2018, **Ms Harmandeep Kaur**, enrolled w.e.f. 24-07-2017 vide DRD/MRSPTU/413 dt 02-08-2017, stands provisionally Registered to Part-Time Ph.D. program of MRSPTU, Bathinda under the **FACULTY OF SCEINCES** in the **DISCIPLINE COMPUTER APPLICATIONS** w.e.f. 06-08-2018. The Ph.D. registration number allocated to the candidate is **17404FPE01**. Her research work shall be focused on **“DEVELOPMENT OF OFFLINE HANDWRITTEN GURUMUKHI PLACE NAMES RECOGNITION SYSTEM FOR POSTAL AUTOMATION”** under the supervision of Dr Munish Kumar (S404M84002), Assistant Professor (Computer Applications), MRSPTU, Bathinda. The candidate shall be governed by the MRSPTU PhD regulations-2016

This order is issued with the approval of competent authority.



Dean (R&D)
(Dr Savina Bansal)
R&D

Endst No: DRD/MRSPTU/.....

Dated:.....

Cc: For information, records and further necessary action, as applicable. (Discrepancy, if any, be intimated immediately for rectification)

1. PA to VC for kind information of the Hon'ble Vice-Chancellor
2. Dean Academic Affair, MRSPTU, Bathinda
3. Registrar, MRSPTU, Bathinda
4. CoE, MRSPTU Bathinda
5. Dean (Student Welfare), MRSPTU, Bathinda
6. HoD (Computational Sciences), MRSPTU, Bathinda
7. Librarian, GZSCCET, MRSPTU
8. Supervisor (Dr. Munish Kumar)
9. Candidate (Ms Harmandeep Kaur)
10. AR(Accounts), MRSPTU
11. Candidate's Master File


Dean (R&D)
MRSPTU, Bathinda
(Dr Savina Bansal)

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ
MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

(Estb. under Act 5 (2015) of Punjab Govt. & under section 2(f) & 12(b) of the UGC Act at SNo 428)

Dabwali Road, Bathinda (Punjab) -151 001

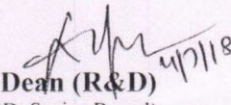
DRD/MRSPTU. 629.....

Dated: 14.7.18.....

PROVISIONAL Ph.D. REGISTRATION ORDER

On successful completion of allocated Ph.D. course work and subsequent acceptance of presented Research Proposal and recommendations by DDRC, in its meeting held on 07.06.2018, **Ms Ashish Kumari**, enrolled w.e.f. 31.08.2016 vide DRD/MRSPTU/188 dt 12.09.2016, stands provisionally Registered to Part-Time Ph.D. program of MRSPTU, Bathinda under the **FACULTY OF PHARMACY** w.e.f. 25.06.2018. The Ph.D. registration number allocated to the candidate is **16201FPE03**. Her research work shall be focused on **“DRUG UTILIZATION STUDY IN DIABETES MELLITUS PATIENTS WITH DIFFERENT COMORBIDITIES IN VARIOUS HOSPITALS OF PUNJAB”** under the supervision of Dr Puneet Kumar (S202M79003), Associate Professor (Pharmacy), MRSPTU, Bathinda.

This order is issued with the approval of competent authority.



Dean (R&D) 4/7/18
(Dr Savina Bansal)
RS

Endst No: DRD/MRSPTU/.....

Dated:.....

Cc: For information, records and further necessary action, as applicable. (Discrepancy, if any, be intimated immediately for rectification)

1. PA to Vice-Chancellor for kind information of the VC
2. Dean Academic Affair, MRSPTU, Bathinda
3. Registrar, MRSPTU, Bathinda
4. CoE, MRSPTU Bathinda
5. Dean (Student Welfare), MRSPTU, Bathinda
6. HoD (Pharmacy), MRSPTU, Bathinda
7. Librarian, GZSCCET, MRSPTU
8. Supervisor (Dr. Puneet Kumar)
9. Candidate (Ms Ashish Kumari)
10. Candidate`s Master File
11. AR(Accounts), MRSPTU


Dean (R&D)
MRSPTU, Bathinda
(Dr Savina Bansal)

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ
MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

(Estb. under Act 5 (2015) of Punjab Govt. & under section 2(f) & 12(b) of the UGC Act 1956)

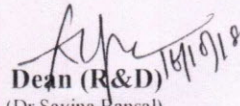
Dabwali Road, Bathinda (Punjab) -151 001

DRD/MRSPTU. ...703.....

Dated: ...16-10-18..

PROVISIONAL Ph.D. REGISTRATION ORDER

On successful completion of allocated Ph.D. course work and subsequent acceptance of presented Research Proposal and recommendations by DDRC, in its meeting held on 27-09-2018, Mr **SHEKHAR DWIVEDI**, enrolled w.e.f. 10-08-2016 vide DRD/MRSPTU/195 dt 29-09-2016, stands provisionally Registered to Part-Time Ph.D. program of MRSPTU, Bathinda under the **FACULTY OF SCEINCES** in the **DISCIPLINE PHYSICS** w.e.f. 16-10-2018. The Ph.D. registration number allocated to the candidate is **16406MPE01**. His research work shall be focused on “**INVESTIGATION OF TREATMENT PLANNING AND DOSE VERIFICATION PROCEDURES USING UNFLAT LINAC PHOTON BEAMS**” under the supervision of Dr. Sandeep Kansal (S406M72004), Professor (Physics), MRSPTU, Bathinda, and Co-supervision of Dr Vinod Kr. Dangwal, Associate Professor (Medical Physics), GMC, Patiala. The candidate shall be governed by the MRSPTU PhD Regulations-2016. This order is issued with the approval of competent authority.



Dean (R&D)
(Dr Savina Bansal)

Endst No: DRD/MRSPTU/.....

Dated:.....

Cc: For information, records and further necessary action, as applicable. (Discrepancy, if any, be intimated immediately for rectification)

1. PA to VC for kind information of Hon'ble Vice-Chancellor
2. Dean Academic Affair, MRSPTU, Bathinda
3. Registrar, MRSPTU, Bathinda
4. CoE, MRSPTU Bathinda
5. Dean (Student Welfare), MRSPTU, Bathinda
6. HoD (Physics), MRSPTU, Bathinda
7. Librarian, GZSCCET, MRSPTU
8. Supervisor (Dr. Sandeep Kansal) (Copy of approved research title and objectives enclosed)
9. Co-Supervisor (Dr V. K. Dangwal, Associate Professor (Medical Physics), GMC, Patiala)
10. Candidate (Mr Shekhar Dwivedi) (Copy of approved research title and objectives enclosed)
11. AR(Accounts), MRSPTU
12. Candidate's Master File


Dean (R&D)
MRSPTU, Bathinda
(Dr Savina Bansal)

Sub: Enrolled MRSPTU PhD scholars, working with the Supervisors, whose colleges have changed affiliation with MRSPTU w.e.f. 2018-19 onwards- in regards

Ref: Requests from PhD scholars to continue PhD with existing supervisors under MRSPTU/ VC/2809-2814 dt 7.9.2018, & VC/2819 dt 11.9.18

MRSPTU has admitted PhD candidates since its inception in 2015 as per the applicable UGC norms with supervisors from MRSPTU Main campus and its affiliated colleges. However, owing to administrative decisions, some of the colleges have changed their affiliation to IKGPTU, Jalandhar (other State Technical University in Punjab) w.e.f. 2018-19. Accordingly, the PhD scholars working with Supervisors serving in these Institutes were asked to change their Supervisors in the light of- UGC PhD Regulations-2016 (clause 6.2) as-

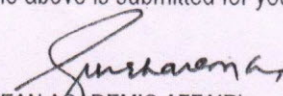
6. Allocation of Research Supervisor: Eligibility criteria to be a Research Supervisor, Co-Supervisor, Number of M.Phil./Ph.D. scholars permissible per Supervisor, etc.

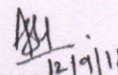
6.2 Only a full time regular teacher of the concerned University/Institution Deemed to be a University/College can act as a supervisor. The external supervisors are not allowed. However, Co-Supervisor can be allowed in interdisciplinary areas from other departments of the same institute or from other related institutions with the approval of the Research Advisory Committee.

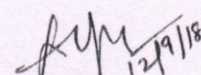
Requests have been received from these PhD scholars, as referred above, to continue with MRSPTU without change of supervisor, so that their identified field of research remains unperturbed. The matter was deliberated upon thoroughly and meticulously by the committee constituted for the purpose by Hon'ble Vice Chancellor. Keeping in view, the larger interest of students and their research work, it is proposed -

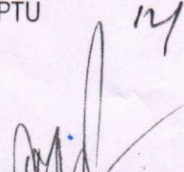
- A. That students be asked to change supervisor from MRSPTU affiliated Institute, retaining the existing supervisor as co-supervisor, wherever possible and feasible, as desired under UGC clause 6.2. / or
- B. That, as the earlier MRSPTU affiliated colleges BBSBEC- Fatehgarh Sahib, SSBSTC- Ferozepur, and ISFCP- Moga, **shall be teaching the ongoing MRSPTU affiliated UG/PG courses, which shall continue upto 2020-21; so, till then their regular faculty members may be notionally treated as academically affiliated to MRSPTU** as well, & That, the students in the transitional phase, registered/enrolled before 2018-19 under the supervision of faculty of these colleges, may be continued with allocated supervisors with the condition to submit their Thesis with MRSPTU upto the end of academic year 2020-2021. / or
- C. In case any scholar doesn't want to continue with MRSPTU, he/she may be given course-work completion record/ and NOC after no-due completion for starting their PhD afresh at the place of their choice after cancelling their enrollment/registration at MRSPTU.

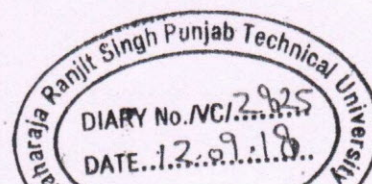
The above is submitted for your perusal, and needful directions pl.


(DEAN ACADEMIC AFFAIR)
MRSPTU

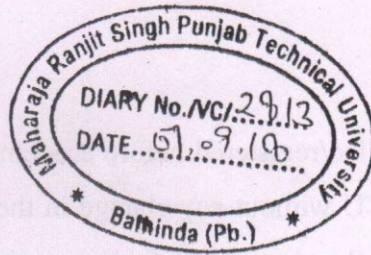

(DEAN FACULTY OF PHARMACY)
MRSPTU


(DEAN R&D)
MRSPTU


HON'BLE VICE-CHANCELLOR



September
August 6, 2018



The Vice Chancellor

Maharaja Ranjit Singh Punjab Technical University

Bathinda

Subject: Request to allow for continuation of my Ph.D. degree in the MRSPTU under my existing supervisor.

Respected Sir,

I, Geeta Kocher, have enrolled for Ph.D.(Part Time) under the supervisor, Dr. Gulshan Kumar (Supervisor ID: S404M76001), Assistant Professor (Computer Applications), Shaheed Bhagat Singh State Technical Campus, Ferozepur, with Provisional Enrollment No. 17404FPE02, in the discipline of Computer Application on July 27, 2017 at Maharaja Ranjit Singh Punjab Technical University (MRSPTU), Bathinda and have successfully completed my PhD Course Work as per the guidelines of the university during Academic Session July-Dec, 2017.

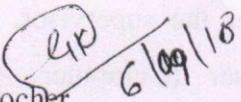
As per letter no. DRD/MRSPTU/641 dated 11-07-2018 received through email on July 12, 2018 to all the enrolled/registered Ph.D. students with MRSPTU, Bathinda and their supervisors, the students have been asked that the Ph.D. supervisors must be from Institute affiliated to MRSPTU, to update the affiliation of their supervisors, if changed and subsequently apply for the change of Supervisor. My supervisor received an email from the office of Dean R&D, dated July 20, 2018, where it is mentioned that the enrolled students of Ph.D. cannot be allowed to register their Ph.D. under their existing supervisors because clause 6.2 of Ph.D. regulation-2016 does not permit to do so.

It is requested that my case does not come under the said clause because I enrolled my Ph.D. in MRSPTU, on August 2017, that is, before the shift of affiliation of the employer college of my supervisor. It is worth noting that the employer college, that is, Shaheed Bhagat Singh State Technical Campus, Ferozepur, of my supervisor is currently running its undergraduate and post-graduate courses of Batch 2016-17 and 2017-18 which are, even currently, affiliated to MRSPTU, Bathinda and, hence, he may also be considered as one of the regular faculty of MRSPTU, Bathinda for the Ph.D. enrolled students for the said sessions.

I request that the students enrolled/registered before academic session 2018-19 be allowed to continue their study at MRSPTU without any change in their supervisors so that there is no change in the field of work that they have identified.

Thanking you in anticipation.

Yours sincerely


Geeta Kocher
Student of Ph.D. (Part Time)
Enrollment No.: 17404FPE02
Faculty of Sciences
Discipline of Computer Applications
Academic Session: 2017-18
Email Id: kocher_geeta@yahoo.com
Mobile No.: +91-8059100105

4-3/5

September
August 6, 2018



Dean (R&D)

The Vice Chancellor

Maharaja Ranjit Singh Punjab Technical University

Bathinda

Subject: Request to allow for continuation of my Ph.D. degree in the MRSPTU under my exiting supervisor.

Respected Sir,

I, Bikramjit Singh, have enrolled for Ph.D.(Part Time) under the supervisor, Dr. Amarinder Singh (Supervisor ID: S405M77003), Assistant Professor (Mathematics), Baba Banda Singh Bahadur Engineering College (BBSBEC), Fatehgarh Sahib, with Provisional Enrollment No. 17405MPE01, in the discipline of Mathematics on July 25, 2017 at Maharaja Ranjit Singh Punjab Technical University (MRSPTU), Bathinda and have successfully completed my PhD Course Work as per the guidelines of the university during Academic Session July-Dec, 2017.

As per letter no. DRD/MRSPTU/641 dated 11-07-2018 received through email on July 12, 2018 to all the enrolled/registered Ph.D. students with MRSPTU, Bathinda and their supervisors, the students have been asked that the Ph.D. supervisors must be from Institute affiliated to MRSPTU, to update the affiliation of their supervisors, if changed and subsequently apply for the change of Supervisor. In response to my further request to Hon'ble VC, MRSPTU, I received an email from the office of Dean R&D, dated July 20, 2018, where it is mentioned that the enrolled students of Ph.D. cannot be allowed to register their Ph.D. under their existing supervisors because clause 6.2 of Ph.D. regulation does not permit to do so.

It is requested that my case does not come under the said clause because I enrolled my Ph.D. in MRSPTU, on August 2017, that is, before the shift of affiliation of the employer college of my supervisor. It is worth noting that the employer college, that is, Baba Banda Singh Bahadur Engineering College, Fatehgarh Sahib, of my supervisor is currently running its undergraduate and post-graduate courses of Batch 2016-17 and 2017-18 and he may be considered as one of the regular faculty of MRSPTU, Bathinda for the students enrolled in said sessions.

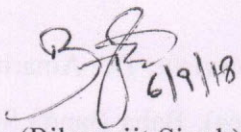
Bikramjit Singh
21/9/18

4-4/5

I request that the students enrolled/registered before academic session 2018-19 be allowed to continue their study at MRSPTU without any change in their supervisors so that there is no change in the field of work that they have identified.

Thanking you in anticipation.

Yours sincerely



(Bikramjit Singh)

Bikramjit Singh
Student of Ph.D. (Part Time)
Enrollment No.: 17405MPE01
Faculty of Sciences
Discipline of Mathematics
Academic Session: 2017-18
Email Id: biks.asr@gmail.com
Mobile No.: +91-9914314222

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, DABWALI ROAD, BATHINDA-151001


(STATE UNIVERSITY ESTB BY GOVT OF PUNJAB VIDE ACT No.5(2015) & APPROVED U/s 2(F) & 12(B) OF THE UGC ACT, 1956)

DETAILS OF PHD STUDENTS ENROLLED/REGISTERED UPTO AUGUST 2018






DRD/MRSPTU/688

Dated : 6-9-18

ACADEMIC YEAR 2015-16










Sr. No.	Faculty	Discipline	Name of the Supervisor	Name of Ph.D Scholar	Mode of Ph.D (Full Time/Part Time)	Enrolment/Admission Number	Date of Admission (DD-MM-YYYY)	Date of Registration (DD-MM-YYYY)	Broad Research Topic	Likely Date of completion of Ph.D	Availing Fellowship Yes/No	Funding Agency of Fellowship	Photo
1	Engg & Tech	CSE	Dr. Shaveta Rani, GZSCCET, Bathinda (S107F76005)	Vidhu Kiran	Full Time	15107FFQ01	16-09-2015	06-03-2017	TRUST BASED SECURED ROUTING MECHANISM IN INTERNET OF THINGS	2019	Yes	QIP	


ACADEMIC YEAR 2016-17

Sr. No.	Faculty	Discipline	Name of the Supervisor	Name of Ph.D Scholar	Mode of Ph.D (Full Time/Part Time)	Enrolment/Admission Number	Date of Admission (DD-MM-YYYY)	Date of Registration (DD-MM-YYYY)	Broad Research Topic	Likely Date of completion of Ph.D	Availing Fellowship Yes/No	Funding Agency of Fellowship	Photo
1	Sciences	Mathematics	Dr. H.S Bhatti BBSBEC, Sri Fathegarh Sahib (S405M67004)	Angrej Kumar	Part Time	16405MPE01	18.07.2016	-	-	CANDIDATURE WITHDRAWN	No	-	
2	Sciences	Computer Application	Dr. Naresh Kumar Garg GZSCCET, Bathinda (S107M72006)	Karamjot Kaur	Part Time	16404FPE01	01.07.2016	-	-	CANDIDATURE WITHDRAWN	No	-	
3	Sciences	Computer Application	Dr. Gulshan Kumar, SBSSTC, Ferozpur (S404M76001)	Harmandeep Singh Brar	Part Time	16404MPE02	19.07.2016	-	-	2019	No	-	
4	Comm. & Mgt.	Comm. & Mgt.	Dr. Veerpaul Kaur, GZSCCET, Bathinda (S303F73009)	Manpreet Kaur Dhaliwal	Part Time	16301FPE01	19.07.2016	-	-	2019	No	-	
5	Engg & Tech	Electrical Engg	Dr. Lakhwinder Singh, BBSBEC, Fathegarh Sahib (S109M67002)	Balkar Singh Brar	Part Time	16109MPE01	01.08.2016	-	-	2019	No	-	








RHS
6-9-18

3-1/2











6	Engg & Tech	ECE	Dr. Naresh K. Garg, GZSCCET, Bathinda (S107M72006)	Sukhjinder Singh	Part Time	1610AMPE01	18.09.2016	14-08-2018	A FRAMEWORK FOR OFFLINE HANDWRITTEN DEVANAGARI WORD RECOGNITION	2019	No	-	
7	Sciences	Physics	Dr. Sandeep Kansal GZSCCET, Bathinda (S406M72004)	Shekhar Dwivedi	Part Time	16406MPE01	18.08.2016	-	-	2019	No	-	
8	Commerce & Mgt	Comm. & Mgt.	Dr. Manoj Kumar Kulshreshtha GGSCMT, Gidderbaha (S303M71005)	Neeraj Kumar	Part Time	16301MPE02	29.08.2016	-	-	2019	No	-	
9	Pharmacy	Pharmacy	Dr. Ravindra K Rawal I.S.F. College of Pharmacy, Moga (S202M76004)	Rohit Bhatia	Part Time	16201MPE01	31.08.2016	25.1.2018	DESIGN SYNTHESIS AND EVALUATION OF COUMARIN FUSED/TETHERED NITROGEN CONTAINING HETEROCYCLES AS ANTICANCER AGENTS	2019	No	-	
10	Pharmacy	Pharmacy	Dr. Raj K Narang I.S.F. College of Pharmacy, Moga (S202M73005)	Bharat Khurana	Part Time	16201MPE02	31.08.2016	25.1.2018	DESIGN AND DEVELOPMENT OF NOVEL DRUG DELIVERY SYSTEMS OF RESVERATROL FOR TREATMENT OF PSORIASIS	2019	No	-	
11	Pharmacy	Pharmacy	Dr. Puneet Kumar , MRSPTU, Bathinda (S202M79003)	Ashish Kumari	Part Time	16201FPE03	31.08.2016	07-06-2018	DRUG UTILIZATION STUDY IN DIABETES MELLITUS PATIENTS WITH DIFFERENT COMORBIDITIES IN VARIOUS HOSPITALS OF PUNJAB	2019	No	-	
12	Comm. & Mgt.	Comm. & Mgt.	Dr. Manoj Kumar Kulshreshtha GGSCMT, Gidderbaha (S303M71005)	Sugandha	Part Time	16311FPE03	23-01-2017	-	-	2020	No	-	
13	Engg & Tech	CSE	Dr. Naresh Kumar Garg, GZSCCET, Bathinda (S107M72006)	Galaxy Bansal	Part Time	16117FPE01	24-01-2017	-	-	2020	No	-	
14	Comm. & Mgt.	Comm. & Mgt.	Dr. Rajinder Kaur, MIMIT, Malout (S303F75004)	Mukta	Part Time	16311FPE04	24-01-2017	-	-	CANDIDATURE WITHDRAWN	No	-	

15	Pharmacy	Pharmacy	Dr. Ashish Baldi, GZSCCET, Bathinda, (S202M78001)	Neha Rawat	Part Time	16211FPE04	14-02-2017	-	-	2020	No	-	
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SESSION 2017-18 (JULY-DEC 2017)




Sr. No.	Faculty	Discipline	Name of the Supervisor	Name of Ph.D Scholar	Mode of Ph.D (Full Time/Part Time)	Enrolment/ Admission Number	Date of Admission (DD-MM-YYYY)	Date of Registration (DD-MM-YYYY)	Broad Research Topic	Likely Date of completion of Ph.D	Availing Fellowship Yes/No	Funding Agency of Fellowship	Photo
1	Engg & Tech	Civil Engg.	Dr. Sanjiv K. Aggarwal, GZSCCET, Bathinda (S106M70002)	Manik Goyal	Part Time	17106MPE01	27-07-2017	-	-	CANDIDATURE WITHDRAWN	No	-	
2	Engg & Tech	ECE	Dr. Amit K. Manocha PIT Moga/MRSPTU, (S109M83007)	Anuj Goel	Part Time	1710AMPE01	27-07-2017	-	-	CANDIDATURE WITHDRAWN	No	-	
3	Engg & Tech	ECE	Dr. Shweta Rani, GZSCCET, Bathinda (S110F80005)	Nisha Raheja	Part Time	1710AFPE02	28-07-2017	-	-	2020	No	-	
4	Engg & Tech	CSE	Dr. RK Bansal, GZSCCET, Bathinda (S107M65009)	Navkiran Kaur	Part Time	17107FPE01	08-08-2017	-	-	2020	No	-	
5	Sciences	Computer Application	Dr. Munish Kumar, GZSCCET, Bathinda (S404M84002)	Harmandeep Kaur	Part Time	17404FPE01	24-07-2017	30-07-2018	DEVELOPMENT OF OFFLINE HANDWRITTEN GURUMUKHI PLACE NAMES RECOGNITION SYSTEM FOR POSTAL AUTOMATION	2020	No	-	
6	Sciences	Computer Application	Dr. Gulshan Kumar, SBSSTC, Ferozpur (S404M76001)	Geeta Kocher	Part Time	17404FPE02	27-07-2017	-	-	2020	No	-	
7	Sciences	Mathematics	Dr. Amarinder Singh, BBSBEC, Sri Fatehgarh Sahib (S405M77003)	Bikramjit Singh	Part Time	17405MPE01	25-07-2017	-	-	2020	No	-	





RH/6-9-19

8	Sciences	Mathematics	Dr. Ajay Kumar Mittal, AGI, Barnala (S405M78006)	Satinder Pal Kaur	Part Time	17405FPE02	02-08-2017	-	-	2020	No	-	
9	Pharmacy	Pharmacy	Dr. Rahul Deshmukh, ISF College, Moga (S202M78002)	Darshpreet Kaur	Part Time	17201FPE01	18-08-2017	-	-	2020	No	-	
10	Pharmacy	Pharmacy	Dr. Neeraj Mishra, ISF College, Moga (S202M77008)	Amandeep Singh	Part Time	17201MPE02	21-08-2017	-	-	2020	No	-	
11	Pharmacy	Pharmacy	Dr. Ravindra K Rawal ISF College, Moga (S202M76004)	Shelly Pathania	Part Time	17201FPE03	21-08-2017	-	-	2020	No	-	
12	Pharmacy	Pharmacy	Dr. Raj K Narang ISF College, Moga (S202M73005)	Ankita Dadwal	Part Time	17201FPE04	21-08-2017	-	-	2020	No	-	
13	Pharmacy	Pharmacy	Dr. Ashish Baldi, GZSCCET, Bathinda, (S202M78001)	Preet Amol Singh	Part Time	17201MPE05	18-08-2017	-	-	2020	No	-	
14	Engg & Tech	Civil Engg.	Dr. Sanjiv K. Aggarwal, GZSCCET, Bathinda (S106M70002)	Pankaj Mittal	Part Time	17116MPE02	23-01-2018	-	-	2021	No	-	
15	Engg & Tech	ECE	Dr. Amit K. Manocha PIT Moga/MRSPTU, (S109M83007)	Ankur Gupta	Part Time	17111AMPE03	22-01-2018	-	-	2021	No	-	
16	Engg & Tech	ECE	Dr. Naresh Kumar Garg GZSCCET, Bathinda (S107M72006)	Sahil Gupta	Part Time	17111AMPE04	29-01-2018	-	-	2021	No	-	
17	Engg & Tech	ECE	Dr. Savina Bansal GZSCCET, Bathinda (S110F66002)	Ravi Verma	Full Time	17111AMFT05	30-01-2018	-	-	2021	No	-	

18	Sciences	Computer Application	Dr. Munish Kumar, GZSCCET, Bathinda (S404M84002)	Shaveta Dargan	Part Time	17414FPE03	29-01-2018	-	-	2021	No	-	
19	Sciences	Computer Application	Dr. Amitoj Singh GZSCCET, Bathinda (S404M80004)	Jaspreet Kaur Saddhu	Part Time	17414FPE04	20-02-2018	-	-	2021	No	-	
20	Comm. & Mgt.	Comm. & Mgt.	Dr. Suman Kathuria GZSCCET, Bathinda (S303F67008)	Priya	Part Time	17311FPE01	25-01-2018	-	-	2021	No	-	
21	Comm. & Mgt.	Comm. & Mgt.	Dr. Pritpal Bhullar GZSCCET, Bathinda (S303M83010)	Krishan Lal	Part Time	17311MPE02	25-01-2018	-	-	2021	No	-	
22	Comm. & Mgt.	Comm. & Mgt.	Dr. Pritpal Bhullar GZSCCET, Bathinda (S303M83010)	Monika Bhatia	Part Time	17311FPE03	30-01-2018	-	-	2021	No	-	
23	Pharmacy	Pharmacy	Dr. Ashish Baldi, GZSCCET, Bathinda, (S202M78001)	Neha	Part Time	17211FPE06	22-01-2018	-	-	2021	No	-	

SESSION 2018-19 (JULY-DEC 2018)

Sr. No.	Faculty	Discipline	Name of the Supervisor	Name of Ph.D Scholar	Mode of Ph.D (Full Time/ Part Time)	Enrolment/ Admission Number	Date of Admission (DD-MM-YYYY)	Date of Registration (DD-MM-YYYY)	Broad Research Topic	Likely Date of completion of Ph.D	Availing Fellowship Yes/No	Funding Agency of Fellowship	Photo
1	Sciences	Physics	Dr. Sandeep Kansal GZSCCET, Bathinda (S406M72004)	Supriya Rani	Part Time	18406FPE01	19-07-2018	-	-	2021	No	-	
2	Comm. & Mgt.	Comm. & Mgt.	Dr. Pritpal Bhullar GZSCCET, Bathinda (S303M83010)	Shilpa	Part Time	18301FPE01	25-07-2018	-	-	2021	No	-	
3	Comm. & Mgt.	Comm. & Mgt.	Dr. Veerpaul Kaur , GZSCCET, Bathinda (S303F73009)	Jyoti Singla	Part Time	18301FPE02	25-07-2018	-	-	2021	No	-	

4	Comm. & Mgt.	Comm. & Mgt.	Dr. Suman Kathuria GZSCCET, Bathinda (S303F67008)	Neha Garg	Part Time	18301FPE03	25-07-2018	-	-	2021	No	-	
5	Engg & Tech	ECE	Dr. Savina Bansal GZSCCET, Bathinda (S110F66002)	Nikita Sehgal	Part Time	1810AFPE01	09-08-2018	-	-	2021	No	-	
6	Engg & Tech	Electrical Engg	Dr. Amit K. Manocha PIT Moga/MRSPTU, (S109M83007)	Gurcharan Singh	Part Time	18109MPE01	16-08-2018	-	-	2021	No	-	
7	Pharmacy	Pharmacy	Dr. Puneet Kumar, MRSPTU, Bathinda (S202M79003)	Shiv Kumar Kushawaha	Part Time	18201MPE01	21-08-2018	-	-	2021	No	-	
8	Sciences	Computer Application	Dr. Ajay Kumar Mittal, AGI, Barnala (S405M78006)	Nisha Gupta	Part Time	18404FPE01	28-08-2018	-	-	2021	No	-	

Discrepancy noticed, if any, be intimated to the office of Dean(R&D) for immediate rectification in records

Rel/6-9-18

Dean (R&D)
(Dr. Savina Bansal)

o/c

Cc: PA to VC for kind information to Hon'ble VC

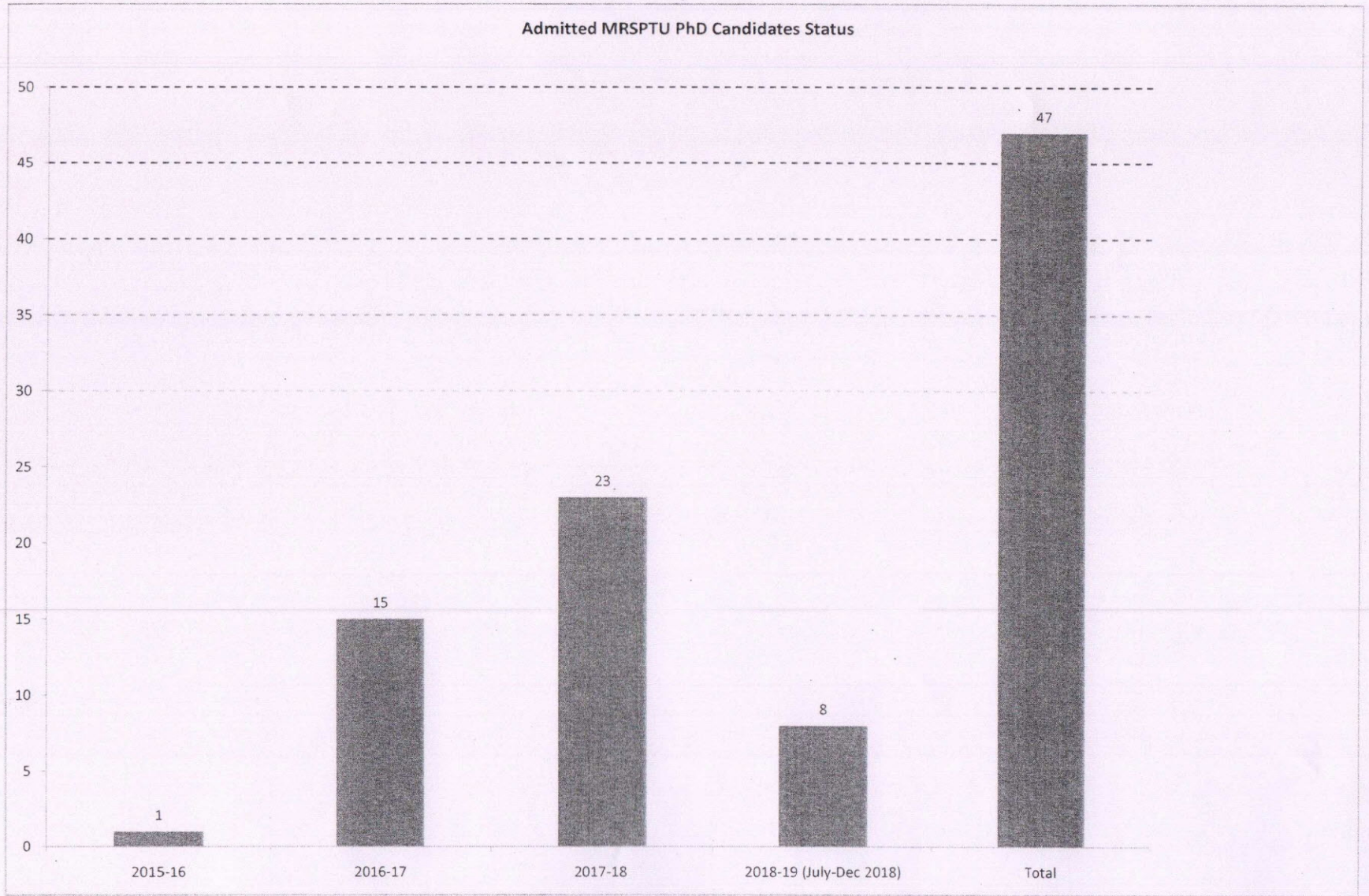
- Director IT enable services for uploading on University web-site
- UGC through Mail in response to D.O. No.F.1-2/2009(EC/PS)(Vol.II) dated 28th April, 2017.
- Master file

- DAA, MRSPTU

sent through email

for fine pt.
AS
Alok

Admitted MRSPTU PhD Candidates Status



RAJ/6-19

3-2

(ਸਵੀਨਾ ਬਾਂਸਲ)

ਡਾ. (ਸਵੀਨਾ ਬਾਂਸਲ)

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



ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ

(ਯੂ.ਜੀ.ਸੀ. ਵਲੋਂ 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) -151 001

RefNo: DRD/MRSPTU/

ਪੱਤਰ ਨੰ: ਡ.ਖ.ਵ/ਮਰਸਪਟਯ

Dated:

ਮਿਤੀ

Sub: Minutes of DDRC Meeting of Faculty of Pharmacy held on 13-08-2018

The DDRC meeting of Faculty of Pharmacy, MRSPTU, Bathinda was held on 13-08-2018 at Department of Pharmaceutical Sciences & Technology, MRSPTU, Bathinda. Following candidates presented themselves before the committee for Ph.D. admission July-Dec. 2018 in the discipline of Pharmaceutical Sciences under the faculty of Pharmacy.

- Shiv Kumar Kushawaha
- Mahesh Prasad Singh

The committee recommend the provisional admission of both the above candidate subjected to fulfillment/submission of following documents, as applicable.

- Supervisor Consent Form
- NOC From Employer for pursuing Regular Course Work.
- Migration Certificate.

After successful submission of these documents and admission fee deposition, pre-Ph.D. course work and supervisor are recommended as follow:

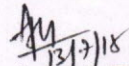
Name of Candidate	Course Allocated with Sub-Code	L-T-P-C	Supervisor Allocated
Shiv Kumar Kushawaha	Research Methodology (MREM0-101)	4-0-0-4	Dr. Puneet Kumar
	Elements of Pharmaceutical Research (PPHD0-101)	3-1-0-4	
Mahesh Prasad Singh	Journal Club and Report Writing (PPHD 0-102)	0-0-3-2	To be submitted by the candidate soon
	Seminar (PPHD 0-103)	0-0-2-1	

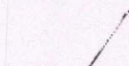
Further, it was proposed that before the Ph.D. registration 6-monthly performance report of Ph.D. candidates (during course work and research proposal preparation) enrolled with a Dept. may be presented before the faculty of concerned Dept. in the presence of Supervisor and certificate of satisfactory progress be submitted to O/o Dean (R&D) for records.

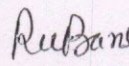
In the wake of change of affiliation of a Supervisor, candidate be asked to change his supervisor having MRSPTU affiliation from concerned FACULTY. The performa proposed by the O/o Dean (R&D), MRSPTU was approved for the purpose.

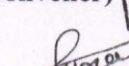
In case, a candidate remain absent before the Department Committee for evaluation of the 6 monthly Ph.D. progress report, his/her performance be treated as 'Unsatisfactory'. In the subsequent semester late fee fine @ Rs. 500/-month (as already notified in Ph.D. fee structure) be charged w.e.f. the due date. Further, two consecutive absents be treated as per MRSPTU Ph.D regulation 2016 Clause 8.1 (iii).

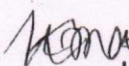
Meeting ended with vote of thanks to the Chairman.

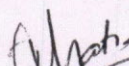

13/7/18
Prof. Ashish Baldi
(Chairman DDRC & Convener)


13/7/18
Prof. Gursharan Singh
(Nominee of VC)


13/7/18
Prof. R.K. Bansal
(Nominee of Dean R&D)


13/7/18
Dr. Puneet Kumar
(Dean Ph.D. Faculty)


13/7/18
Dr. Uttam Kumar Mandal
(Dept. Ph.D. Faculty)


13/7/18
Dr. Amit Bhatia
(Dept. Ph.D. Faculty)



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

Maharaja Ranjit Singh Punjab Technical University
(Act 5(2015) of Pb & 2(f) & 12(b) of UGC)
ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ (ਪੰਜਾਬ) - 151001
Dabwali Road, Bathinda (Punjab) - 151001

DRD/MRSPTU/.....

Date:.....

Subject : Mintues of DDRC Meetings of Deptt. of Computer Applications held on 12-07-2018

The DDRC Meeting of Deptt. of Computer Applications, GZSCCET, MRSPTU, Bathinda was held on 12-07-2018 at MRSPTU, Bathinda. Following candidates presented themselves before the committee for MRSPTU, PhD Admission July-2018.

1. Nisha Gupta
2. Ravinder Singh

Keeping in view the one slot availability, the committee recommends candidate at S No 1 for provisional admission subjected to fulfilment/submission of following documents, as applicable, within two weeks.

- a) Supervisor Consent Form
- b) NOC cum Relieving from Employer for pursuing Regular Course Work (July-Dec 2018)
- c) Migration Certificate

After successful submission of these documents and admission fee deposition, Dean (R&D) is authorized to allocate Supervisor in consultation with Deptt and Supervisor. The pre-PhD course work is recommended as follows-

Name of Candidate	Course Allocated with Sub-Code	L-T-P-C	Credit
1. Nisha Gupta	1. Research Methodology (MREM0-101)	4-0-0-4	4
	2. Soft Computing (MCAP1-673)	3-1-0-4	4
	3. Research Lab (MCAP1-678)	0-0-4-2	2
	4. Seminar	0-0-2-1	1
	5. Digital Image Processing (MCSE1-375)	3-1-0-4	4

The Candidate at S No 2 is recommended as a waiting candidate, keeping in view his concurrently ongoing MPhil and non-availability of slots. He will be intimated of the availability of slots as and when available. Further, it is proposed that-

1. In the wake of change of affiliation of a Supervisor from MRSPTU, candidates be asked to change their supervisor having MRSPTU affiliation from concerned FACULTY. Performa proposed by the O/O Dean (R&D), MRSPTU was approved for the purpose.
2. In case, a candidate remain absent before the Deptt Committee for evaluation of the 6-monthly PhD progress report, his/her performance be treated as 'Unsatisfactory'. In the subsequent semester, late fee fine @ Rs 500/month (as already notified in PhD fee structure) be charged w.e.f. the due date. Further, two consecutive absents be treated as per MRSPTU PhD Regulation-2016 Clause 8.1(iii).

(Chairperson)

Member
12/7/18

Member
12/7/18

Member
Prof. Sarvjit Bhatnagar

Member
12/7/18
(Dr. R.K. Bansal)
Dean (R&D) MRSPTU

Member
(Dr. Nareesh Garg)

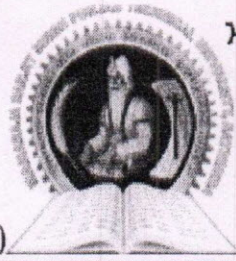
ਪ੍ਰੋ. (ਡਾ.) ਸਵੀਨਾ ਬਾਂਸਲ

ਡੀਨ (ਖੋਜ ਅਤੇ ਵਿਕਾਸ)

Prof. (Dr) SAVINA BANSAL

PhD (Engg) FIE, FIETE, SMCSI

DEAN (Research & 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) -151 001

Ref No: DRD/MRSPTU/_____ ਪੱਤਰ ਨੰ: ਡ.ਖ.ਵ/ਮਰਸਪਟਯ

Dated: _____ ਮਿਤੀ

Subject : Minutes of DDRC Meetings of Deptt. of Electrical Engg held on 10-07-2018

The DDRC Meeting of Deptt. of Electrical Engg, GZSCCET, Bathinda was held on 10-07-2018 at MRSPTU, Bathinda. Following candidates presented themselves before the committee for MRSPTU, PhD Admission July-2018.

1. Gurcharan Singh
2. Vikram Singh

The committee recommends provisional admission of candidates subjected to fulfilment/submission of following documents, as applicable, within two weeks.

- a) Supervisor Consent Form
- b) NOC From Employer for pursuing Regular Course Work
- c) Migration Certificate
- d) Qualifying Degree Certificate Clarification, as applicable

After successful submission of these documents and admission fee deposition, pre-PhD course work and supervisor are recommended as follows-

Name of Candidate	Course Allocated with Sub-Code	L-T-P-C	Supervisor Allocated
1. Gurcharan Singh	1. Research Methodology (MREM0-101)	4-0-0-4	Dr Amit Manocha
2. Vikram Singh	2. Engineering Optimization (MELE3-371)	4-0-0-4	Dr Ved Parkash
	3. Research lab	0-0-4-2	
	4. Seminar	0-0-2-1	

Further, it was proposed that-

1. In the wake of change of affiliation of a Supervisor, due to any reason, candidate be asked to change his supervisor having MRSPTU affiliation. The Performa proposed by the O/O Dean(R&D), MRSPTU was approved for the purpose.
2. In case, a candidate remain absent before the Deptt Committee for evaluation of the 6-monthly PhD progress report, his/her performance be treated as 'Unsatisfactory'. In the subsequent semester late fee fine @ Rs 500/month (as already notified in PhD fee structure) be charged w.e.f. the due date. Further, two consecutive absents be treated as per MRSPTU PhD Reeregulation-2016 Clause 8.1(iii).
3. The meeting ended with vote of thanks to the Chairman

Ranjit Singh
(Chairperson) 10.7.18

Member

[Signature]
Member 10/7/18

Member 10/7/18

Ru Bansal
Member 10.7.2018

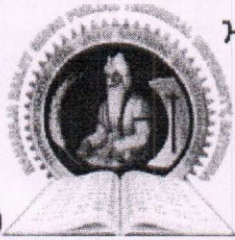
[Signature]
Member 10.7.18

After your kind approval pl. ee.

ਪ੍ਰੋ. (ਡਾ.) ਸਵੀਨਾ ਬਾਂਸਲ

ਡੀਨ (ਖੋਜ ਅਤੇ ਵਿਕਾਸ)

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



ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ

(ਯੂ.ਜੀ.ਸੀ. ਵਲੋਂ 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) -151 001

Ref No: DRD/MRSPTU/ _____ ਪੱਤਰ ਨੰ: ਡ.ਖ.ਵ/ਮਰਸਪਟਯ

Dated: _____ ਮਿਤੀ

Sub: Minutes of DDRC Meeting of Deptt of Humanities & Management, held on 09.07.2018

DDRC meeting of Deptt of **Humanities & Management**, MRSPTU, Bathinda was held on 9th JULY 2018 at MRSPTU, Bathinda. Following candidates presented themselves before the committee for MRSPTU PhD admission July-2018.

1. Jyoti Singla 2. Shilpa Manocha 3. Neha Garg

The committee recommends provisional admission of candidates subjected to fulfillment/submission of following documents, as applicable, within 2 weeks.

- a) Supervisor consent form
b) NOC from employer for pursuing REGULAR course work
c) Migration certificate & d) Qualifying Degree Certificate

After successful submission of these documents and admission fee deposition, pre-PhD course work and supervisor are recommended as follows-

Name of candidate	Course allocated with sub code	L-T-P-C	Supervisor allocated
1. Shilpa Manocha	1. Research Methodology (MREM0-101) 2. Contemporary Issues in Management (PCBM1-101) 3. Advance Financial Management (PCBM1-103) 4. Seminar(PCBM1-102)	4-0-0-4 4-0-0-4 4-0-0-4 0-0-2-1	Dr Pritpal Bhullar, MRSPTU
2. Jyoti Singla	1. Research Methodology (MREM0-101) 2. Contemporary Issues in Management (PCBM1-101) 3. Advance Marketing Management (PCBM1-105) 4. Seminar(PCBM1-102)	4-0-0-4 4-0-0-4 4-0-0-4 0-0-2-1	Dr Veerpal Kaur, MRSPTU
3. Neha Garg	1. Research Methodology (MREM0-101) 2. Contemporary Issues in Management (PCBM1-101) 3. Advance HRM (PCBM1-104) 4. Industrial Psychology (MBAD1-362) 5. Seminar(PCBM1-102)	4-0-0-4 4-0-0-4 4-0-0-4 4-0-0-4 0-0-2-1	Dr Suman Kathuria, MRSPTU

- In the wake of change of affiliation of a Supervisor, candidate be asked to change his supervisor having MRSPTU affiliation from concerned FACULTY. The Performa proposed by the O/O Dean(R&D), MRSPTU was approved for the purpose.
- In case, a candidate remain absent before the Deptt Committee for evaluation of the 6-monthly PhD progress report, his/her performance be treated as 'Unsatisfactory'. In the subsequent semester late fee fine @ Rs 500/month (as already notified in PhD fee structure) be charged w.e.f. the due date. Further, two consecutive absents be treated as per MRSPTU PhD Reegulation-2016 Clause 8.1(iii).

The meeting ended with vote of thanks to the Chairman

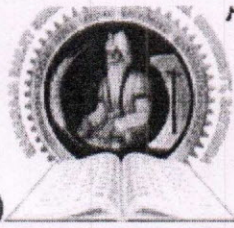
(Chairperson) *[Signature]*
Dr Soujev Sharma
Dean F&C & BM

[Signature] 9/7/18
Member Dr RK Bansal
Nominee (Dean R&D)

[Signature]
Member Pn Pritpal Bhullar

[Signature] 9/7/18
Member (Dr. Savina Bansal)

[Signature]
Member (Dr Suman Kathuria) 590



Ref No: DRD/MRSPTU/ _____ ਪੱਤਰ ਨੰ: ਡ.ਖ.ਵ/ਮਰਸਪਟਯ

Dated: _____ ਮਿਤੀ

Subject : Mintues of DDRC Meetings of Deptt. of ECE held on 10-07-2018

DDRC Meeting of Deptt. of ECE, GZSCCET, Bathinda was held on 10-07-2018 at MRSPTU, Bathinda. Following candidate presented herself before the committee PhD Admission July-2018.

1. Nitika Sehgal

The committee recommends provisional admission of candidate subjected to fulfilment/submission of following documents, as applicable, within two weeks.

- a) NOC From Employer for pursuing Regular Course Work
- b) Migration Certificate

After successful submission of these documents and admission fee deposition, pre-PhD course work and supervisor are recommended as follows-

Name of Candidate	Course-work allocated with Code	L-T-P-C	Supervisor Allocated
Nikita Sehgal	1. Research Methodology (MREM0-101)	4-0-0-4	Dr Savina Bansal, GZSCCET, MRSPTU, Bathinda
	2. Soft Computing (MECE1-163)	4-0-0-4	
	3. Research lab	0-0-4-2	
	4. Seminar	0-0-2-1	

Further, it is unanimously recommended that-

1. In the wake of change of affiliation of a Supervisor, candidate be asked to change his supervisor having MRSPTU affiliation from concerned FACULTY. The Performa proposed by the O/O Dean (R&D), MRSPTU was approved for the purpose.
2. Subsequent upon the shifting of affiliation of SSBSTC, Ferozepur to IKGPTU, Dr Rajni, SBSSTC, Ferozepur is recommended as Co-supervisor and Dr Savina Bansal, GZSCCET, MRSPTU as supervisor of the PhD candidate Mr Ravi Verma, as per the consent submitted by all concerned. Further, request of Mr Ravi Verma, admitted during **Jan-2018** with enrollment no 1711AMPE05, for Full-time PhD is acceded to as he has already done his course work during **Jan-June 2018** in a regular manner at MRSPTU.
3. Request of Sahil Gupta, 1711AMPE04, for change of Supervisor stand acceded to as per the consent given by all concerned.
4. In case, a candidate remain absent before the Deptt Committee for evaluation of the 6-monthly PhD progress report, his/her performance be treated as 'Unsatisfactory'. In the subsequent semester late fee fine @ Rs 500/month (as already notified in PhD fee structure) be charged w.e.f. the due date. Further, two consecutive absents be treated as per MRSPTU PhD Reeregulation-2016 Clause 8.1(iii).

The meeting ended with vote of thanks to the Chairman

(Signature)
(Chairperson)

(Signature)
Member

(Signature)
Member 10/7/18

(Signature)
Member 10/7/18

(Signature)
10/07/18
(Member)

(Signature)
Member
10/07/18
(Member)

(Signature)
Member 10/7/18

for your kind approval pl.



DRD/MRSPTU/.....

Date:.....

Subject : Mintues of DDRC Meeting of Deptt. of PHYSICS held on 12-07-2018

The DDRC Meeting of Deptt. of Physics, GZSCCET, MRSPTU, Bathinda was held on 12-07-2018 at MRSPTU, Bathinda. Following candidate presented themselves before the committee for MRSPTU, PhD Admission July-2018.

1. Supriya Rani 2. Jooli Shukla 3. Shyam Lal

The candidate at S No 2 does not fulfill the eligibility requirement as on date, and hence is not recommended. Candidates at S No 1 and 3, are recommended by committee for provisional admission subjected to submission of following documents, as applicable, within two weeks.

- Supervisor Consent Form
- NOC From Employer for pursuing Regular Course Work during July-Dec 2018/undertaking that the candidate is not serving anywhere in regular mode
- Migration Certificate (in original)
- Pending Degree/DMC/ Grade Equivalence in (%) of MPhil
- Clarification in regards to Name Discrepancy in academic certificates and admission form

After successful submission of these documents and admission fee deposition, pre-PhD course work and supervisor are recommended as follows-

Name of Candidate	Course work allocated/Sub-Code	L-T-P-C	Supervisor Allocated
1. Shyam Lal	1. Research Methodology (MREM0-101) 2. Research Techniques-Lab (PPHY-100) 3. Modelling & Simulation Techniques (PPHY-108) 4. Seminar (PPHY-101)	4-0-0-4 0-0-4-2 4-0-0-4 0-0-2-1	Dr Sandeep Kansal
2. Supriya Rani	1. Research Methodology (MREM0-101) 2. Research Techniques-lab(PPHY-100) 3. Seminar (PPHY-101) 4. Radiation Protection and Dosimetry (PPHY-103) 5. Experimental Techniques in Nuclear and particle Physics (PPHY-104)	4-0-0-4 0-0-4-2 0-0-2-1 4-0-0-4 4-0-0-4	Dr Sandeep Kansal

Further, it was proposed that-

- In the wake of change of affiliation of a Supervisor from MRSPTU, candidate be asked to change his supervisor having MRSPTU affiliation from concerned FACULTY. Performa proposed by the O/O Dean(R&D), MRSPTU was approved for the purpose.
- In case, a candidate remain absent before the Deptt Committee for evaluation of the 6-monthly PhD progress report, his/her performance be treated as 'Unsatisfactory'. In the subsequent semester, late fee fine @ Rs 500/month (as already notified in PhD fee structure) be charged w.e.f. the due date. Further, two consecutive absents be treated as per MRSPTU PhD Regulation-2016 Clause 8.1(iii).

(Chairperson)

Member

(Dr. Sandeep Kansal)

Member

(Dr. Savina Bansal)

(Nominee VC)

Member

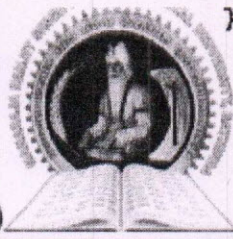
(Agarwal)

Member

(Dr. R.K. Kansal)
Nominee DRD

Member

(12/7/18)



RefNo: DRD/MRSPTU/ _____ ਪੱਤਰ ਨੰ: ਡ.ਖ.ਵ/ਮਰਸਪਟਯ

Dated: _____ ਮਿਤੀ

Subject : Mintues of DDRC Meetings of Deptt. of Textile Engg held on 10-07-2018

The DDRC Meeting of Deptt. of Textile Engg, GZSCCET, MRSPTU Bathinda was held on 10-07-2018 at MRSPTU, Bathinda. Following candidate presented himself before the committee for MRSPTU, PhD Admission July-2018.

1. Amit Madahar

The committee recommends provisional admission of the candidate subjected to fulfilment/submission of following documents, as applicable, within two weeks.

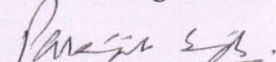
- Supervisor Consent Form
- NOC From Employer for pursuing Regular Course Work
- Migration Certificate

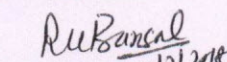
After successful submission of these documents and admission fee deposition, pre-PhD course work and supervisor are recommended as follows-

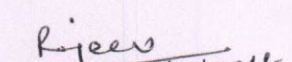
Name of Candidate	Course Allocated with Sub-Code	L-T-P-C	Supervisor Allocated
Amit Madahar	1. Research Methodology (MREM0-101)	4-0-0-4	Dr Rajeev Kumar Vashney, GZSCCET
	2. Advance Knitting Technology (MTEX1-261)	4-0-0-4	
	3. Structural Mechanics of fabrics (MTEX1-206)	4-0-0-4	
	4. Seminar	0-0-2-1	

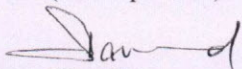
- Further, it was proposed that before the PhD registration, 6-monthly performance report of PhD candidates (during course work and research proposal preparation) enrolled with a Deptt may be presented before the faculty of concerned Deptt in the presence of Supervisor and certificate of satisfactory progress be submitted to o/o Dean (R&D) for records. In case, a candidate remain absent before the Deptt Committee for evaluation of the 6-monthly PhD progress report, his/her performance be treated as 'Unsatisfactory'. In the subsequent semester late fee fine @ Rs 500/month (as already notified in PhD fee structure) be charged w.e.f. the due date. Further, two consecutive absents be treated as per MRSPTU PhD Reeregulation-2016 Clause 8.1(iii).
- In the wake of change of affiliation of a Supervisor, candidate be asked to change his supervisor having MRSPTU affiliation from concerned FACULTY. The Performa proposed by the O/O Dean(R&D), MRSPTU was approved for the purpose.

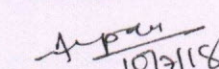
The meeting ended with vote of thanks to the Chairman



(Chairperson)


Member 10/7/2018


Member 10/7/2018


Member


Member 10/7/18


Member

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਸਟੇਟ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ
ਬਠਿੰਡਾ।
(Noting)

DRD/MRSPTU/681

dt: 27-8-18

Sub: Supervision of a Computer Application (CA) PhD candidate by Mathematics Deptt-in regards!

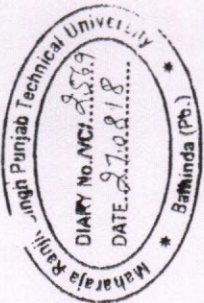
In reference to PhD admissions July 2018, one slot was advertized in National Dailies after the written consent of an approved supervisor from CA Discipline. Two of the candidates qualified PET-2018 test and appeared before DDRRC, where one of them was selected and other kept in waiting. However, the supervisor was not recommended by DDRRC, as the concerned supervisor, was on maternity leave, who has shown her unwillingness and inability to supervise the selected candidate now. The candidate has submitted the consent of an approved Supervisor from Mathematics Deptt., accordingly.

The guidelines for supervisor allocation, as per the UGC Regulations-2016, are as follows-

6.3 The allocation of Research Supervisor for a selected research scholar shall be decided by the Department concerned depending on the number of scholars per Research Supervisor, the available specialization among the Supervisors and research interests of the scholars as indicated by them at the time of interview/viva voce.

6.4 In case of topics which are of inter-disciplinary nature where the Department concerned feels that the expertise in the Department has to be supplemented from outside, the Department may appoint a Research Supervisor from the Department itself, who shall be known as the Research Supervisor, and a Co-Supervisor from outside the Department/ Faculty/College/Institution on such terms and conditions as may be specified and agreed upon by the consenting Institutions/Colleges.

Kindly issue the needful directions for further necessary action at this end pl.



[Signature]
Dean (R&D)

Hon'ble Vice-Chancellor

*May be allotted supervision of her choice,
for concerned faculty and reported to Academic
Council*

D (CA/CP)

*for the pt.
DAA
17/9/18*



ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ
MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

(Estb. under Act 5(2015) of Punjab Govt & under section 2 (f) & 12(b) of the UGC Act of 1956)

DABWALI ROAD, BATHINDA (Punjab) -151 001

Ref. No. DRD/MRSPTU/...682.....

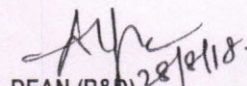
Dated: ...28-8-18

PROVISIONAL PhD ENROLLMENT CUM ADMISSION ORDER

As per the DDRC recommendations dated 12th July, 2018, approved by the competent authority, **Ms Nisha Gupta**, D/o Sh. D. K. Tayal & Smt. Nirmal Lata, Resident of House No. 17025-C, 40 Feet Road, Aggarwal Colony, Bathinda-151001, stand provisionally enrolled in the PhD PROGRAM OF MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA in the **FACULTY of SCIENCES** in the **DISCIPLINE COMPUTER APPLICATIONS** with effect from 28-08-2018. The PhD enrollment number issued to the candidate is **18404FPE01**. The candidate shall work under the supervision of Dr. Ajay Kumar Mittal (S405M78006), Associate Professor, Aryabhata Group of Institutions, Barnala. The Pre-PhD course work allocated to the candidate is as follows:

SN	Pre-PhD Course work	Code	L-T-P-C
1.	Research Methodology	MREM0-101	4-0-0-4
2	Soft Computing	MCAP1-673	3-1-0-4
3	Research Lab	MCAP1-678	0-0-4-2
4	Seminar	-	0-0-2-1
5	Digital Image Processing	MCSE1-375	3-1-0-4

The candidate shall qualify the course-work as per University PhD-Regulations-2016 in REGULAR manner at MRSPTU, Bathinda.


DEAN (R&D) 28/8/18.
(Dr. Savina Bansal)
Rt


Endst No. DRD/MRSPTU/.....

Dated.....

For information, records and further necessary action, as applicable. (Discrepancy, if any, be intimated immediately for rectification)

1. PA to Vice-Chancellor for kind information of the VC
2. Dean Academic Affair, MRSPTU, Bathinda (for reporting the case in Academic Council as per VC/2569 Date 27-08-18)
3. Campus Director, GZSCCET, Bathinda
4. Registrar, MRSPTU, Bathinda
5. Dean Academic Affair, GZSCCET, Bathinda
6. CoE, MRSPTU Bathinda
7. Dean (Student Welfare), MRSPTU, Bathinda
8. HoD (Computer Applications), MRSPTU, Bathinda
9. Supervisor (Dr. Ajay Kumar Mittal)
10. Candidate (Ms. Nisha Gupta)
11. AR(Accounts), MRSPTU
12. Librarian, GZSCCET
13. Candidate's Master File

(copy enclosed)


DEAN (R&D)
MRSPTU, Bathinda

PUNJAB INSTITUTE OF TECHNOLOGY

Near ITI Chowk, Rajpura.

(A Constituent College of Maharaja Ranjit Singh Punjab Technical University, Bathinda,
Established by Govt. of Punjab vide Punjab Act No. 5 of 2015)

Ref No: Pitr/- 1060

Dated 16-7-18

ਨੋਟ

ਵਿਸ਼ਾ:- ਬੀ ਕਾਮ (ਆਨਰਜ਼) ਕੋਰਸ ਦੀਆਂ ਸੀਟਾਂ ਵਿੱਚ ਵਾਧਾ ਕਰਨ ਸਬੰਧੀ।

ਪੀ ਆਈ ਟੀ ਰਾਜਪੁਰਾ ਵਿਖੇ ਆਨ ਲਾਇਨ ਰਜਿਸਟਰੇਸ਼ਨ ਰਾਹੀਂ ਤਕਰੀਬਨ 72 ਸੀਟਾਂ ਬੀ ਕਾਮ (ਆਨਰਜ਼) ਦੀਆਂ ਭਰ ਚੁੱਕੀਆਂ ਹਨ ਅਤੇ ਜਿਹਨਾਂ ਵਿੱਚੋਂ 60 ਵਿਦਿਆਰਥੀਆਂ ਨੇ ਆਪਣੀ ਪੂਰੀ ਫੀਸ ਭਰਵਾ ਦਿੱਤੀ ਹੈ ਬਾਕੀ 12 ਵਿਦਿਆਰਥੀ ਦੀ ਪੂਰੀ ਫੀਸ ਸੀਟਾਂ ਵਿੱਚ ਵਾਧੇ ਤੋਂ ਬਾਅਦ ਵਿੱਚ ਲਈ ਜਾਵੇਗੀ ਅਤੇ ਇਸ ਤੋਂ ਇਲਾਵਾ ਹੋਰ ਵਿਦਿਆਰਥੀਆਂ ਵੱਲੋਂ ਇਸ ਕੋਰਸ ਵਿੱਚ ਦਾਖਲੇ ਲਈ ਵੇਟਿੰਗ ਲਿਸਟ ਵਿੱਚ ਹਨ। ਇਸ ਕੋਰਸ ਵਿੱਚ ਘੱਟੋ ਘੱਟ 40 ਹੋਰ ਵਿਦਿਆਰਥੀ ਦਾਖਲਾ ਲੈ ਸਕਦੇ ਹਨ।

ਇਸ ਲਈ ਤਜਵੀਜ਼ ਕੀਤਾ ਜਾਂਦਾ ਹੈ ਪੀ ਆਈ ਟੀ ਰਾਜਪੁਰਾ ਵਿਖੇ ਮੌਜੂਦਾ ਬੀ ਕਾਮ (ਆਨਰਜ਼) ਦੀਆਂ 60 ਸੀਟਾਂ ਨੂੰ ਵਧਾ ਕੇ 120 ਸੀਟਾਂ ਕਰਨ ਦੀ ਪ੍ਰਵਾਨਗੀ ਦਿੱਤੀ ਜਾਵੇ ਜੀ।

ਇਹ ਆਪ ਜੀ ਦੇ ਵਿਚਾਰਨ ਅਤੇ ਪ੍ਰਵਾਨਗੀ ਹਿੱਤ ਪੇਸ਼ ਹੈ ਜੀ।

Recommend to approve upto 90 seats for B-com course.
June 16/7/18
D.A.M. R.S.P.U.

ਡਾਇਰੈਕਟਰ
ਪੀ ਆਈ ਟੀ ਰਾਜਪੁਰਾ

ਰਜਿਸਟਰਾਰ
ਮ ਰ ਸ ਯ ਤ ਯੂ ਬਠਿੰਡਾ

May be approved. Shall be ratified in next meeting of standing committee for Academic Council / Academic Council

Honorable Vice Chancellor.

*For record
send a copy of this office
to DR PIT Rajpura
June 17/7/18
DR (Acad.)*

may be sent to Director PIT Rajpura through e-mail and item be included in the Academic council agenda for notification of same.
Thrup
19/7/18

D.E.O.



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।

Department of Applied Physics

(head.physics.gzs@gmail.com, Ph. 87250-72490)

Ref No : Phy/18/ 609

Dated 30/10/18

Sub: Agenda for Academic Council meeting to be held on 12.11.2018.

Ref: Letter no. DAA/MRSPTU/2018/2202 dated 26.10.18

In reference to above, please find below the agenda items:

1. **Starting of New Course:** To start the B.Sc. (Hons. School) and M.Sc. (Hons. School) integrated 5-years course (semester basis) with intake of 60 students at B.Sc. (1st year) level.
2. **Regarding Ph.D. Admission Test:** To promote and develop research facilities in the department, it is proposed that Ph.D. admission test (PET) of university should be conducted twice a year at the department level (in June & in December) in the same manner as UGC-NET exam is also conducted twice a year. It will facilitate the intake of the Ph.D. students especially for the new faculty who don't have any research student at present.


Prof. & Head

Deptt. of Applied Physics

DAA, MRSPTU, Bathinda



Maharaja Ranjit Singh Punjab Technical University

Badal Road, Bathinda -151001

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

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਾਦਲ ਰੋਡ, ਬਠਿੰਡਾ

DEPARTMENT OF FOOD SCIENCE & TECHNOLOGY

Dr. Kawaljit Singh Sandhu
Associate Professor & Head

No. MRSPTU/AST/18/93
Dated: 26/7/18

To

Dean Academic Affairs
MRSPTU Bathinda

Subject: Request to make B. Voc. (Food Processing) and B. Voc. (Food Processing and Engineering) eligible for admissions to M.Sc. (Food Science and Technology).

Respected Sir,

The admissions to M.Sc. (Food Science and Technology)- 1st semester is under process. Many of the students with B. Voc. (Food Processing) and B. Voc. (Food Processing and Engineering) degree have registered for admissions to M.Sc. (Food Science and Technology) in the Department. I would like to point out that the equivalency of B.Sc. and B.Voc. has already been notified by UGC (letter attached). It is therefore requested that B. Voc. (Food Processing) as well as B. Voc. (Food Processing and Engineering) may be made eligible for admissions to M.Sc. (Food Science and Technology). Further, admission committee may be instructed to get these students admitted after verification of their necessary documents.

Thanking you in anticipation.

Yours sincerely,

(Kawaljit Singh Sandhu)

Recommend
Sum
26/7/18
VICE-CHANCELLOR

To be satisfied by AC.

Punjab Institute of Technology

GTB Garh (Moga)

(A Constituent College of Maharaja Ranjit Singh Punjab Technical University, Bathinda)

PITGTBG/DIR/18-19/228

Date 25/7/18

To

Dean Academics Affairs,
MRSPTU,
Bathinda

Sub: Regarding permission to ensue new course B.Com. (Hons.)

Sir,

As the admission 2018-19 is going in institute for various courses. Meanwhile we have a number of queries for B. Com. (Hons.). So, it is requested to give permission to start B.Com. (Hons.) to cater ^{to} the need of the population _{in} in local region of Moga.

Submitted for you kind approval.

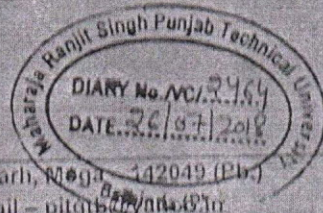
Recd 25/7/18
Assistant Registrar

25/7/18
Director
Punjab Institute of Technology
GTB Garh (Moga)

*Recommendation for 60 seats in B.Com (Hons.)
26/7/18*

VICE CHANCELLOR

Wb satisfied by A.C.



Moga - Kotkapura Road, GTB Garh, Moga - 142049 (P.N.)
Ph.: +91-1636-280806; Email - pitgtbgarh@pau.ac.in

M



daa mrsstu <daa.mrsstu@gmail.com>

Regarding Approval of new Course B.com (Hons)

1 message

Amit Kumar Manocha <pitgtb@yahoo.in>

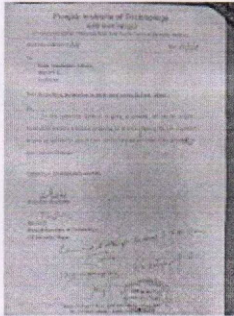
Fri, Jul 27, 2018 at 10:05 AM

To: daa@mrsptu.ac.in

Dear Sir,

Please find attachment herewith this email and please put this in upcoming academic council.

Regards,

**20180727_095800.jpg**
3926K



Maharaja Ranjit Singh Punjab Technical University

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

Department of Computational Sciences & Department of IT Enabled Services

Ref No : 4188

Dated : 14/08/18

Sub: BCA- MCA Dual Degree Programme (5-Years)

In reference to letter no. DAA/MRSPTU/Notifications/45 dated 27-07-2018 the notification regarding starting of BCA-MCA dual degree program (5-Years) for the current Academic Session in the Department of Computational Sciences, MRSPTU, Bathinda. In light of the same a meeting regarding the modularities and number of seats in the program is held on 06-08-2018. It was unanimously recommended that 60 seats may be approved for this program.

Submitted for approval by Compentent authorities, please.

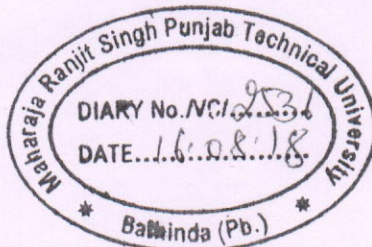
S Jay
(Prof. Sanjay Bhatnagar)
Associate Professor

MJ
(Dr. Munish Kumar)
Assistant Professor

(Telephonic consent)
(Dr. Amitoj Singh)
Assistant Professor

~~DAA~~ *Recommend*
Singh
14/8/18

VICE CHANCELLOR
[Signature]





Maharaja Ranjit Singh Punjab Technical University

Badal Road, Bathinda -151001

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

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਾਦਲ ਰੋਡ, ਬਠਿੰਡਾ

DEPARTMENT OF FOOD SCIENCE & TECHNOLOGY

No. MRSPTU/FST/18/298

Dated...14/11/2018

Subject: Regarding starting Ph.D. program in the Department of Food Science and Technology under the Faculty of Sciences.

Refer to letter no DRD/MRSPTU/706 dated 25/10/18 on the subject cited above, the desired information is attached herewith. Further, approval to start Ph.D. course in the Department has already been granted by Hon'ble Vice-Chancellor. Submitted for further necessary action.

Head

Dean (R & D)

15-11-18

CC:-

- i) PA to Vice-Chancellor (For kind information of Vice-Chancellor)
- ii) Dean Academic Affairs, MRSPTU

15/11/18

Head

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, (MRSPTU) BATHINDA

(Established by Govt of Punjab vide Punjab Act No. 5 of 2015 & under section 2(f) & 12(b) of the UGC Act 1956)

APPLICATION FORM FOR GRANT OF PhD RESEARCH CENTER (RC) (Acad. Year 2018 - 2019)

In the Discipline/Faculties of: Food Science and Technology (Submit separate forms for separate disciplines)

Name & Complete Address of the Institute intended to be the PhD-RC:		Maharaja Ranjit Singh Punjab Technical University, Bathinda
Month/Year of Institute Establishment:		2015
Chairperson of its Governing body with Complete Postal Address, official mail-id, Contact Number & Fax:		Prof. (Dr.) Mohan Paul Singh Ishar Vice Chancellor, MRSPTU, Bathinda
Name & Complete Postal Address of the Head of the Institute with official mail-id, Contact Number & Fax:		Prof. (Dr.) Mohan Paul Singh Ishar Vice Chancellor, MRSPTU, Bathinda
PhD-URC demanded in which of the seven faculties of MRSPTU?? <small>(Engg & Tech, Architecture, Pharmacy, Humanities & Social Sciences, Hospital & Tourism Management, Sciences, Commerce & Management)</small>	Faculties demanded:	Sciences
	Discipline sought (in above faculties) <small>(e.g. Mech Engg under faculty of Engg & Tech)</small>	Food Science and Technology
Is the above institute a post-graduate (PG) level institute: (Yes/No)		Yes (The Department is running M.Sc. Food Science and Technology)

IF YES, DETAILS OF ALL PG DISCIPLINES RUNNING AND YEAR OF THEIR ESTABLISHMENT:

Name of PG Programs and its duration	Sanctioning Agency & Strength	Regular/ Part-time	Starting Year/Month	Affiliated With	Actual strength (year wise)	
					Year	Actual Intake
M.Sc. (Food Science and Technology)	MRSPTU 30 Students	Regular	July - 2018	MRSPTU	2018	22
					2017	
					2016	
					2018	
					2017	
					2016	
					2018	
					2017	
					2016	

AVAILABLE RESOURCE DETAILS:

(Pl. fill up separate forms for each Discipline in a Faculty for which the Center of Research is demanded)

Name of the Faculties (in CAPITAL letters):

Dr. KAWALJIT SINGH SANDHU

Name of the Discipline (in CAPITAL letters):

FOOD SCIENCE AND TECHNOLOGY

DETAILS OF REGULAR FACULTY WITH PhD FOR ABOVE DISCIPLINE, ITS ALLIED & COGNATE AREAS:

No	Name, Contact no. & mail-id	Designation & Joining Date	Qualification/University & Year of Passing			Discipline/Area of Specialization	Basic & Present Scale	Total Experience (PG Teaching+ Research)
			Degree	University	Year			
1	Dr. KAWALJIT SINGH SANDHU M: 7015709403 kawsandhu@rediffmail.com	Associate Professor 04/10/2017	PhD	Guru Nanak Dev University, Amritsar	2006	Food Science and Technology	37400 (37400-67000/-)	Teaching Experience: 12 Years Research Experience: 18 Years
			PG	Guru Nanak Dev University, Amritsar	1999			
			UG	Guru Nanak Dev University, Amritsar	1997			

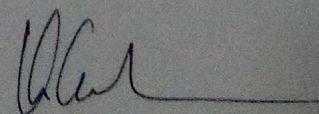
RESEARCH FACILITIES AVAILABLE IN CONCERNED DISCIPLINE:

LABs FOR RESEARCH WORK		MAJOR HARDWARE/MACHINES FACILITIES AVAILABLE	LICENSED SOFTWARE AVAILABLE
NO	NAME		
	Food Technology Research Lab	Hot air oven, muffle furnace, weighing balance, soxhlet apparatus, Kjeldahl assembly, laminar air flow, autoclave, waterbath. Further Department is in the process of procuring more equipment's for research.	NA

ANY RESEARCH PROJECT RUNNING/COMPLETED IN THE ABOVE DISCIPLINE (YES/NO):				(IF YES):
NO	SPONSORING AGENCY/ DETAILS	DURATI ON/STA TUS	AMOUNT (in Lac)	PROJECT TITLE
1	DST, New Delhi	3 Years	28.81	Study of bioactive compounds, flour and starch properties of underutilized pearl millet crop
2	DST, New Delhi	3 Years	26.32	Utilization of kinnow for value added product development for sustainable growth of kinnow growers
RESEARCH JOURNALS AVAILABLE IN INSTITUTE'S LIBRARY REGULARLY IN THE CONCERNED AREAS:				
NO	NAME OF THE JOURNAL	PUBLISHER	PRINT/ON-LINE	SUBSCRIPTION DETAILS
1	The Department is in the process of subscribing the Journals on National and International Repute.			
DETAILS OF AVAILABILITY OF INTERNET /Wi-Fi FACILITIES: NA				
ANY OTHER SPECIAL FACILITY/ RESOURCE TO SUPPORT YOUR CLAIM (BRIEF SUMMARY): <p style="text-align: center;">- NA -</p>				

I, Dr. Kawaljit Singh Sandhu (Name of the competent authority) , on behalf of the Department of Food Science and Technology, MRSPTU, Bathinda (Name of the Institute), hereby undertake that the above information is correct in every respect and further I assure that, if granted the status of 'Center of Research' of MRSPTU in the Faculty of Sciences in the Discipline of Food Science and Technology, all these facilities shall be extended to the PhD Research Scholars registered with MRSPTU, Bathinda unconditionally for carrying out their research works.

Dated: 14/11/18


 (Name & Designation with seal)

Head
 Department of Food Science and Technology
 Maharaja Ranjit Singh Punjab Technical University
 Bathinda (Pb.)

(For Office Use Only)

The above facilities are sufficient/Not-sufficient to accord the status of Center of Research of MRSPTU, Bathinda in the Discipline of **Food Science and Technology** under the Faculty of **Sciences** affiliated to MRSPTU for:

Course work	<input checked="" type="checkbox"/>	Course work	<input type="checkbox"/>
Part-time PhD work	<input type="checkbox"/>	Part-time PhD work	<input type="checkbox"/>
Full-time PhD work	<input checked="" type="checkbox"/>	Full-time PhD work	<input type="checkbox"/> (Tick Mark the concerned)

[Signature]
14/11/2018

DATED: (CHAIRPERSON OF CONCERNED BoS)
MRSPTU, BATHINDA

DATED: (DEAN OF CONCERNED FACULTY)
MRSPTU, BATHINDA

As per the recommendations made and information provided above, the _____ is
Recommended / Not-recommended as a 'Research Center' for Course-work / Part-time/ Full-time
research handlings in the Discipline _____ under the Faculty _____ for
_____.

DATED:

(DEAN R&D)
(MRSPTU, BATHINDA)

Approval is hereby granted/ not-granted to _____ as Center of Research
of MRSPTU, Bathinda, in the Discipline of _____ under the faculties of
_____ for carrying out PhD Course-work, Part-time/Full-time PhD research for the Year _____

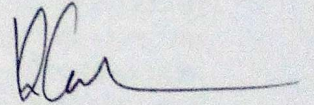
DATED:

(Vice-Chancellor)
MRSPTU, Bathinda

- i) Statement of Purpose and Justification in the light of UGC/University requirements for starting Ph.D. program: The Department of Food Science is newly established in the main campus of MRSPTU, Bathinda. In the first phase, the Department is running M.Sc. (Food Science and Technology). In order to promote research environment in the Department, the Ph.D. should be started immediately. Further, the University is autonomous body to start Ph.D. course in the Department.
- ii) Admission Eligibility Criteria for candidates: M.Sc.in Food Science and Technology/Food Engineering or equivalent with minimum of 55% marks (50% marks for SC/ST students)
- iii) Ph.D. admission syllabus for the Entrance Test: Syllabus of NET examination, ASRB, New Delhi attached (Annexure 1).
- iv) Sample Question paper for Ph.D. Entrance Test: Annexure 2.
- v) List of Experts: Annexure 3.
- vi) List of Manpower/Computing/Library/Research facilities available for Ph.D. candidates:
 - a) Dr. Kawaljit Singh Sandhu, Associate Professor & Head, is only faculty member eligible to guide Ph.D. students
 - b) The University Library has good number of books, journals and e-books/resources.
 - c) The Department is in the process of establishing laboratories of national/international standards. The laboratory facilities available with other Departments of MRSPTU can be utilized for carrying out research. Two research projects have already been granted by DST, New Delhi.
- vii) Ongoing Research Projects Details/other Dept. Strengths:
 - a) Study of bioactive compounds, flour and starch properties of underutilized pearl millet crop (Sanctioned by DST, New Delhi; Amount: Rs. 28.81 lakh; Duration 3 years).
 - b) Utilization of Kinnow for value added product development for sustainable growth of kinnow growers (Sanctioned by DST, New Delhi; Amount: Rs. 26.32 lakh; Duration 3 years).
- viii) Supervisor/s applications from the Department:
Dr. Kawaljit Singh Sandhu
Associate Professor & Head
Department of Food Science & Technology

MRSPTU Bathinda

- ix) List of affiliated Institutes running the course with details: Nil
- x) Ph.D. slots Demanded on the Proforma for the Session Jan-July 2019: Annexure 4.

A handwritten signature in black ink, consisting of stylized initials followed by a horizontal line.

55. FOOD TECHNOLOGY

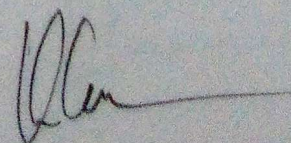
Unit 1: Introductory Food Technology

Introduction to food technology. Food processing industries/institutions/food scientists of importance in India. Food attributes viz. colour, texture, flavour, nutritive value and consumer preferences. Causes of food spoilage, sources of microbial contamination of foods, food borne illnesses, water activity and its relation to spoilage of foods. Spoilage of processed products and their detection. Principles and methods of food preservation. Food fortification, Composition and related quality factors for processing. Methods of food preservation such as heat processing, pasteurization, canning, dehydration, freezing, freeze drying, fermentation, microwave, irradiation and chemical additives. Refrigerated and modified atmosphere storage. Aseptic preservation, hurdle technology, hydrostatic pressure technology and microwave processing. Use of non-thermal technologies (microfiltration, bacteriofugation, ultra high voltage electric fields, pulse electric fields, high pressure processing, irradiation, thermosonication), alternate-thermal technologies (ohmic heating, dielectric heating, infrared and induction heating) and biological technologies (antibacterial enzymes, bacteriocins, proteins and peptides) in food processing.

Unit 2: Technology of Foods of Plant Origin

(a) Fruits and Vegetable Processing: Post harvest handling and storage of fresh fruits and vegetables. Preparation of fruits and vegetables for processing. Minimally processed products. Cold chain logistics. ZECC (Zero Energy Cool Chambers), CCSR (Charcoal cool storage Rooms) Thermal processing and process time evaluation for canned products, process optimization, aseptic canning, methods for canning of different fruits, and vegetables; Dehydration and associated quality changes during drying and storage of dehydrated products. Solar drying. Intermediate moisture foods. Preparation and utilization of fruits and vegetables juices in non-fermented/fermented/ aerated beverages, health drinks. Membrane technology. Chemistry and manufacture of pectin, role in gel formation and products like jellies and marmalades. Technology of preservatives, pickles, chutney's and sauces. Nature and control of spoilage in these products. Re-structured fruits and vegetables. By products utilization of fruits and vegetable processing industry. Processing methods of frozen fruits and vegetables, IQF products, packaging, storage and thawing. Role of Pectinases. Tomato products such as juice, puree, paste, soup, sauce and ketchup. Other convenience foods from fruits and vegetables. Beverages, tea, cocoa and coffee processing. Medicinal and aromatic plants: their therapeutic values. Spice Processing viz. cleaning, grading, drying, grinding, packaging and storage. Oleoresins and essential oils.

(b) Food grain Processing: Structure, composition of different grains like wheat, rice, barley, oat, maize and millets. Anti-nutritional factors in food grains and oilseeds. Milling of grains. Wheat flour/semolina and its use in traditional/non-traditional foods like breads, biscuits, cakes, doughnuts, buns, pasta goods, extruded, confectionary products, breakfast and snack foods. Rheology of wheat and rice flour. Preparation of vital wheat gluten and its utilization. Instant ready mixtures. Enzymes (amylases and proteases) in milling and baking. Milling and parboiling of rice. by-products of rice milling and their utilization. Processed products from rice. Pearling, malting, brewing and preparation of malted milk feeds from barley. Significance of β -glucans. Milling of oats and its processing into flakes, porridge and oatmeal. Wet and dry milling of corn, manufacture of corn flakes, corn syrup, corn starch, corn steep liquor and germ oil. Structure and composition of pulses and their importance in



Indian diet. Milling and processing of pulses viz. germination, cooking, roasting, frying, canning and fermentation. Use in traditional products, protein concentrates and isolates. Modified starches and proteins. Oilseeds: edible oilseeds, composition and importance in India. Oilseed processing. Oil extraction and its processing, by-products of oil refining. Production, packaging and storage of vanaspati, peanut butter, protein concentrates, isolates and their use in high protein foods. Export of oilseed cakes. International market and consumer preferences for quality in cakes for use in textured vegetable proteins. Millets: composition, nutritional significance, structure and processing. Dairy analogues based on plant milk. Spices Processing: Oleoresin and essential oil extraction

Unit 3: Technology of Foods of Animal Origin

(a) Technology of Milk and Milk Products: Milk and Milk production in India. Importance of milk processing plants in the country. Handling and maintenance of dairy plant equipment. Dairy plant operations viz. receiving, separation, clarification, pasteurization, standardization, homogenization, sterilization, storage, transport and distribution of milk. Problems of milk supply in India. UHT, toned, humanized, fortified, reconstituted and flavoured milks. Technology of fermented milks. Milk products processing viz. cream, butter, *ghee*, cheese, condensed milk, evaporated milk, whole and skimmed milk powder, ice-cream, butter oil, *khoa*, *channa*, *paneer* and similar products. Judging and grading of milk products. Cheese spreads by spray and roller drying techniques. EMC (Enzyme modified cheese), Enzymes in dairy processing. Insanitization viz. selection and use of dairy cleaner and sanitizer. In plant cleaning system. Scope and functioning of milk supply schemes and various national and international organizations. Specifications and standards in milk processing industry. Dairy plant sanitation and waste disposal.

(b) Technology of Meat / Fish / Poultry Products: Scope of meat, fish and poultry processing industry in India. Chemistry and microscopic structure of meat tissue. Ante mortem inspection. Slaughter and dressing of various animals and poultry birds. Post mortem examination. Rigor mortis. Retail and wholesale cuts. Factors affecting meat quality. Curing, smoking, freezing, canning and dehydration of meat, poultry and their products. Sausage making. Microbial factors influencing keeping quality of meat. Processing and preservation of fish and its products. Handling, canning, smoking and freezing of fresh water fish and its products. Meat tenderization and role of enzymes in meat processing. Utilization of by-products. Zoonotic diseases. Structure and composition of egg and factors effecting quality. Quality measurement. Preservation of eggs using oil coating, refrigeration, thermo stabilization and antibiotics. Packing, storage and transportation of eggs. Technology of egg products viz. egg powder, albumen, flakes and calcium tablets. Industrial and food user physiological conditions and quality of fish products.

Unit 4: Food Quality Management

Objectives, importance and functions of quality control. Quality systems and tools used for quality assurance including control charts, acceptance and auditing inspections, critical control points, reliability, safety, recall and liability. The principles and practices of food plant sanitation. Food and hygiene regulations. Environment and waste management. Total quality management, good management practices, HACCP and codex in food. International and National food laws. US FDA/ISO 9000 and FSSAI. Food adulteration, food safety. Sensory evaluation, panel screening, selection methods. Sensory and instrumental analysis quality control. Quality control of food at all stages and for packaging materials. Non-destructive food quality evaluation methods.

Unit 5: Food Engineering/Packaging and Labelling

Unit operations of food processing viz. grading, sorting, peeling and size reduction machineries for various unit operations, energy balance in food processing. Packaging materials viz. properties and testing procedures, packaging of fresh and processed foods. Shelf life studies. Recent trends in packaging, aseptic, modified atmosphere, vacuum and gas packaging. Nutritional labelling requirements of foods. Requirements and functions of containers. Principles of package design.

Unit 6: Food Microbiology & Biotechnology

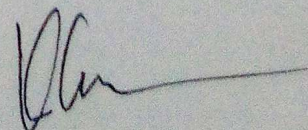
Fermentation technology, fermented food products (animal and plant based), microbial spoilage of foods, bacterial growth curve, hurdle technology. Role of biotechnology in productivity of plants, livestock and microbes of improved nutrition and quality. Use of biotechnology in production of food additives viz. preservatives, colorants, flavours. Use of biotechnologically improved enzymes in food processing industry, biomass production using industrial wastes. Single cell proteins, Food contaminants viz. aflatoxins. Food intoxication and infection. Consumer concerns about risks and values, Biotechnology and food safety.

Unit 7: Flavour Chemistry Technology

Flavour composition of foods/beverages (identification and quantitative analysis of the flavour precursors and their products, characterization of the staling reaction using stable isotopes). Flavour composition of foods/beverages in relation with maturation and microbial activity/or the processing conditions (e.g. fermented dairy products, beer, wine, honey, fruits). Analysis of odour-active compounds of food/beverages (Charm analysis). Synthesis of flavour by microorganisms and plant cells. Lipid derived flavours. Investigation of equilibrium of key flavour compounds that govern the flavour stability of beverages. Natural antioxidant constraints in spices. Role of microorganisms in flavour development. Flavor emulsions, flavour composites, essential oils and oleoresins.

Unit 8: Consumer Sciences / Food Product Development / Health Foods

Socio-cultural, psychological and economical consideration for food appearance, domestic and export marketing. Consumer trends and their impact on new product development. Product development viz. to conceive ideas, evaluation of ideas, developing ideas into products, test marketing and commercialization. Role of food in human nutrition. Nutritional disorders, natural contaminants and health hazards associated with foods. Diet therapy. Therapeutic / Engineered / Fabricated and Organic foods/ Nutraceutical and functional foods.





MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY DABWALI ROAD, BATHINDA
[State University Estd. by Govt. of Punjab vide Act No. 5(2015) u/s 2(f) & 12(B) of UGC Act 1956]
(Recognized by UGC as a State University u/s 2(f) and Approved u/s 12(B))

PhD ENTRANCETEST (PET-2018) EXAM PATTERN

Total Marks: 100

Total Time : 90 Min

Section -I: Knowledge of the Subject of Specialization : 40 MCQs of 1.25 mark each = 50 marks

Section -II: Research Methodology/Quantitative & Logical Aptitude/Language Skills:

: 40 MCQs of 1.25 mark each = 50 marks

- NO NEGATIVE MARKING FOR WRONG ANSWERS
- UN-ATTEMPTED QUESTIONS WILL CARRY ZERO MARKS
- CANDIDATE OBTAINING 50% MARKS OR HIGHER SHALL BE CONSIDERED QUALIFIED, (AS PER LATEST UGC REGULATIONS-2016)
- SAMPLE QUESTION PAPER IS AVAILABLE ON MRSPTU WEBSITE (WWW.MRSPTU.AC.IN)

READ FOLLOWING INSTRUCTIONS CAREFULLY

1. Please check your answer sheet pages carefully and report for any damaged or missing page, before starting
2. Any electronic gadget including Mobile, Bluetooth or Calculator shall invite disqualification from the examination
3. Any type of Charts, Graph sheets or Tables are **NOT** allowed in the Examination hall
4. Rough Work can be done only on the page provided at the end of the question paper itself
5. Write a proper **A** or **B** or **C** or **D** as per your correct choice on the provided Answer Sheet

IN CASE OF ANY DIFFICULTY PLEASE CONTACT AT:

HELP LINE NUMBERS: **087250-72343; 087250-72344**

(Contact e-mail id: phdadmission.mrsstu@gmail.com with a cc to process.pet@gmail.com)

Proforma for Ph.D. Experts for PET and R. Proposal evaluations

S. No.	Name	Designation	Affiliation	Qualification	Teaching Experience	Area of Research Specialization	Phone	Mail	Postal
1.	Dr. D. C. Saxena	Professor	Department of Food Engineering and Technology, Sant Longowal Institute of Engineering and Technology, Longowal, Sangrur, Punjab	Ph.D.	20 Years	Food Engineering	09815608859	desaxena@yahoo.com	Same as Affiliation
2.	Dr. Paramjit S Panesar	Professor	Department of Food Engineering and Technology, Sant Longowal Institute of Engineering and Technology, Longowal, Sangrur, Punjab	Ph.D.	20 Years	Food Science & Technology	9417494849	pspbt@yahoo.csm	Same as Affiliation
3.	Dr. Poonam A. Sachdev	Professor	Dept. of Food Science & Technology, PAU, Ludhiana	Ph.D.	25 Years	Food Science & Technology	9855055871	sachdev_poonam@pau.edu	Same as Affiliation
4.	Dr. B. S. Khatar	Professor	Dept. of Food Technology, GTU of Science & Tech, Hisar	Ph.D.	25 Years	Food Science & Technology	099992656849	bskhatkar@yahoo.co.in	Same as Affiliation
5.	Dr. Amarjeet Kaur	Professor	Dept. of Food Science & Technology, PAU, Ludhiana	Ph.D.	25 Years	Food Science & Technology	098888466677	foodtechak@gmail.com	Same as Affiliation
6.	Dr. Alka Sharma	Professor	Dept. of Food Technology, GTU of Science & Tech, Hisar	Ph.D.	25 Years	Food Science & Technology	9812155510	alkabhardwaj@rediffm ail.com	Same as Affiliation
7.	Dr. Balmeet Singh Gill	Professor	Department of Food Science & Technology, Guru Nanak Dev University, Amritsar	Ph.D.	20 Years	Food Science and Technology	09815803709	balmeet_singh@yahoo.co.in	Same as Affiliation
8.	Dr. Savita Sharma	Professor	Dept. of Food Science & Technology, PAU, Ludhiana	Ph.D.	18 Years	Food Science & Technology	9814769992	savita@pau.edu	Same as Affiliation

No.....

Dated.....

PhD Supervisor Slot Performa

PhD Supervisor's Slots Details for PhD Admission (2018-19)	
1	Name
2	Designation
3	Affiliation and mail-id/mobile no:
4	Whether approved as MRSPTU Supervisor (If Yes, mention Supervisor-id/FACULTY/Discipline)
5	Are you a REGULAR faculty member of the MRSPTU affiliated institute (mention Date of joining)
6 (i)	Total number of PhD candidates currently under your supervision / co-supervision of MRSPTU or any other University
6 (ii)	PHD Candidates already supervised/co-supervised (Thesis viva-voce defended successfully)
7	PHD Slots demanded
8(i)	Tentative R. areas for Phd supervision (as per the slots desired)
8(ii)	Research facilities required for the above mentioned research areas (pl. specify)
8(iii)	Availability status of R facilities, as required above, in your Institute
9	Number of R. publications in reputed Journals/attach details of best 5 R. papers in SCI/UGC listed journals)

Dr. Kawajit Singh Sandhu
Associate Professor and Head
Department of Food Science and Technology,
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Bathinda
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Yes
Joined on 04/10/2017

Five (05)

Five (05)

Cereal Technology/Food Technology

The Department is in the process of procuring the required equipments to carry out Ph.D. Research. Further, Research facilities available with other Departments will be utilized.

University has good research facilities. Other research testing not available in the University will be done on payment basis from other Institutions.

53 Publications in Journals of International Repute.
Total Impact Factor: 127.08 (Thomson Reuters)
Total Citation: 2830 (Google scholar)
h index: 21 (List of Research Publications attached)
Annexure: 5

Forwarded by Head of Institute

(Signature of Supervisor)

With seal and stamp

[Signature]
14/11/18

Head
Department of Food Science and Technology
Maharaja Ranjit Singh Punjab Technical University
Bathinda (Pb.)

Publications

Journal	Publisher	Impact Factor 2017	No. of Papers
Food Chemistry	Elsevier	4.946	7
LWT-Food Science and Technology	Elsevier	3.129	8
Carbohydrate Polymers	Elsevier	5.158	2
Food Hydrocolloids	Elsevier	5.089	1
Journal of Food Science and Technology	Springer	1.797	6
Food Research International	Elsevier	3.520	2
Journal of Food Engineering	Elsevier	3.197	2
Starch/Stärke	Wiley	2.173	2
International Journal of Food Properties	Taylor and Francis	1.845	4
Journal of the Science of Food and Agriculture	Wiley	2.379	1
Journal of Food Science	Institute of Food Technologists	2.018	1
Drying Technology	Taylor and Francis	2.219	1
Journal of Food Measurement and Characterization	Springer	1.181	4
3 Biotech	Springer	1.497	1
Journal of Food Process Engineering	Wiley	1.955	1
Food Science and Biotechnology	Springer	0.786	1
Quality Assurance and Safety of Crops and Foods	Wageningen Academic Publishers	0.588	1
Journal of the Saudi Society of Agricultural Sciences	Elsevier	-	2
Biocatalysis and Agricultural Biotechnology	Elsevier	-	1
Nutrafoods	CEC	-	1
Carpathian Journal of Food Science and Technology	North University of Baia Mare Publishing House, Romania	-	1
Current Research in Nutrition and Food Science		-	2
Progress in Food Biopolymer Research	e-journal	-	1
	Total	127.08	53

List of publications

S. No.	Publications
1.	Anil Kumar Siroha, Kawaljit Singh Sandhu , and Sneha Punia. Impact of octenyl succinic anhydride (OSA) on rheological properties of sorghum starch. <i>Quality Assurance and Safety of Crops and Foods</i> (2018, Accepted).
2.	Loveleen Sharma, Charanjiv Saini, Harish Kumar Sharma, and Kawaljit Singh Sandhu . Biocomposite edible coatings based on cross linked sesame protein and mango puree for the shelf life stability of fresh cut mango fruit. <i>Journal of Food Process Engineering</i> (2018, Accepted).
3.	Anil Kumar Siroha and Kawaljit Singh Sandhu . Physicochemical, rheological, morphological, and <i>in vitro</i> digestibility properties of cross-linked starch from pearl millet cultivars. <i>International Journal of Food Properties</i> , 21, 1371-1385 (2018).

4. Pinderpal Kaur, Sanju Bala Dhull, **Kawaljit Singh Sandhu**, Raj Kumar Salar and Sukhwinder Singh Purewal. Tulsi (*Ocimum tenuiflorum*) seeds: *in vitro* DNA damage protection, bioactive compounds and antioxidant potential. *Journal of Food Measurement and Characterization* (2018) (In Press).
5. Sneh Punia, **Kawaljit Singh Sandhu** and Anil Kumar Siroha. Difference in protein content of wheat (*Triticum aestivum* L.): effect on functional, pasting, color and antioxidant properties. *Journal of the Saudi Society of Agricultural Sciences* (Accepted, 2018).
6. Rahul Thory, **Kawaljit Singh Sandhu** and Archana Sinhmar. Effect of location on physico-chemical, cooking and antioxidant properties of variously-treated and milled Indian rice cultivars. *Current Research in Nutrition and Food Science*, 6, 183-190 (2018).
7. Sanju Bala Dhull and **Kawaljit Singh Sandhu**. Wheat-fenugreek composite flour noodles: Effect on functional, pasting, cooking and sensory properties. *Current Research in Nutrition and Food Science*, 6, 174-182 (2018).
8. **Kawaljit Singh Sandhu** and Anil Kumar Siroha. Relationships between physicochemical, thermal, rheological and *in vitro* digestibility properties of starches from pearl millet cultivars. *LWT-Food Science and Technology*, 83, 213-224 (2017).
9. Raj Kumar Salar, Sukhwinder Singh Purewal, and **Kawaljit Singh Sandhu**. Fermented pearl millet (*Pennisetum glaucum*) with *in vitro* DNA damage protection activity, bioactive compounds and antioxidant potential. *Food Research International*, 100, 204-210 (2017).
10. **Kawaljit Singh Sandhu** and Sneh Punia. Enhancement of bioactive compounds in barley cultivars by solid state fermentation. *Journal of Food Measurement and Characterization*, 11, 1355-1361 (2017).
11. **Kawaljit Singh Sandhu**, Poonam Godara, Maninder Kaur, and Sneh Punia. Effect of toasting on physical, functional and antioxidant properties of oat cultivars. *Journal of the Saudi Society of Agricultural Sciences*, 16, 197-203 (2017).
12. Rahul and **Kawaljit Singh Sandhu**. A comparison of mango kernel starch with a novel starch from litchi (*Litchi chinensis*) kernel: physicochemical, morphological, pasting and rheological properties. *International Journal of Food Properties*, 20, 911-921 (2017).
13. Anil Kumar and **Kawaljit Singh Sandhu**. Effect of different methods of heat processing's on the antioxidant properties of pearl millet (*Pennisetum glaucum* L.) cultivars. *Journal of Food Measurement and Characterization*, 11, 872-878 (2017).
14. Raj Kumar Salar, Sukhwinder Singh Purewal, and **Kawaljit Singh Sandhu**. Bioactive profile, free radical scavenging potential, DNA damage protection activity and mycochemicals in *Aspergillus awamori* (MTCC-548) extracts: A novel report on filamentous fungi. *3 Biotech*, 7, 164 (2017).
15. Raj Kumar Salar, Sukhwinder Singh Purewal, and **Kawaljit Singh Sandhu**. Relationships between DNA damage protection activity, total phenolic content, condensed tannin content and antioxidant potential among Indian barley cultivars. *Biocatalysis and Agricultural Biotechnology*, 11, 201-206 (2017).
16. Sneh Punia, **Kawaljit Singh Sandhu** and Somesh Sharma. Comparative studies of color, pasting, and antioxidant properties of wheat cultivars as affected by toasting and roasting heat treatments. *Nutrafoods*, 16, 1-8 (2017).
17. **Kawaljit Singh Sandhu**, Sneh Punia and Maninder Kaur. Effect of fermentation duration by *Aspergillus awamori* using solid state fermentation: antioxidant properties of wheat cultivars. *LWT-Food Science and Technology*, 71, 323-328 (2016).
18. Anil Kumar, **Kawaljit Singh Sandhu** and Maninder Kaur. Physicochemical, functional, and antioxidant properties of flour from pearl millet varieties grown in India. *Journal of Food Measurement and Characterization*, 10 (2), 311-318 (2016).
19. **Kawaljit Singh Sandhu**, Loveleen Sharma, and Maninder Kaur. Effect of granule size on physicochemical, morphological, thermal and pasting properties of native and 2-octenyl-1-ylsuccinylated potato starch prepared by dry heating under different pH conditions. *LWT-Food*

- Science and Technology*, 61, 224-230 (2015).
20. Maninder Kaur, **Kawaljit Singh Sandhu**, AmitPal, and Aruna Sharma. Gluten free biscuits prepared from buckwheat flour by incorporation of various hydrocolloids: physicochemical and sensory properties. *LWT-Food Science and Technology*, 62, 628-632 (2015).
 21. Maninder Kaur, Navneet Kaur, Mandeep Kaur, and **Kawaljit Singh Sandhu**. Some properties of rice grains, flour and starches: A comparison of organic and conventional modes of farming. *LWT-Food Science and Technology*, 61, 152-157 (2015).
 22. Maninder Kaur, **Kawaljit Singh Sandhu**, RavinderPal Ahlawat, and Somesh Sharma. *in vitro* starch digestibility, pasting and textural properties of mung bean: effect of different processing methods. *Journal of Food Science and Technology*, 52, 1642-1648 (2015).
 23. Sneha Punia and **Kawaljit Singh Sandhu**. Functional and antioxidant properties of different milling fractions of Indian barley cultivars. *Carpathian Journal of Food Science and Technology*, 7(4), 19-27 (2015).
 24. Maninder Kaur, **Kawaljit Singh Sandhu**, and Jasmeen Kaur. Pasting properties of tamarind (*Tamarindus indica*) flour in the presence of xanthan, carboxymethyl cellulose, and locust bean gum in comparison to rice and potato flour. *Journal of Food Science and Technology*, 50, 809-814 (2013).
 25. Maninder Kaur, Pragati Kaushal and **Kawaljit Singh Sandhu**. Studies on functional and pasting properties of taro flour in comparison with a cereal, tuber and legume flour. *Journal of Food Science and Technology*, 50, 94-100 (2013).
 26. Maninder Kaur, **Kawaljit Singh Sandhu**, Narpinder Singh, and Seung-Taik Lim. Amylose content, molecular structure, physicochemical properties and *in vitro* digestibility of starches from Indian mung bean (*Vigna radiata* L.) cultivars. *Starch/Stärke*, 63, 709-716 (2011).
 27. **Kawaljit Singh Sandhu**, Maninder Kaur and Mukesh. Studies on noodle quality of potato and rice starches and their blends in relation to their physicochemical, pasting and gel textural properties. *LWT-Food Science and Technology*, 43, 1289-1293 (2010).
 28. Maninder Kaur and **Kawaljit Singh Sandhu**. *in vitro* digestibility, structural and functional properties of starch from pigeon pea (*Cajanus cajan*) cultivars grown in India. *Food Research International*, 43, 263-268 (2010).
 29. Hyun-Na Kim, **Kawaljit Singh Sandhu**, Ju Hun Lee, Hyesook S Lim, and Seung-Taik Lim. Characterization of 2-octen-1-ylsuccinylated waxy rice amyloextrins prepared by dry heating. *Food Chemistry*, 119, 1189-1194 (2010).
 30. Maninder Kaur, **Kawaljit Singh Sandhu** and Seung-Taik Lim. Microstructure, physicochemical properties and *in vitro* digestibility of starches from different Indian lentil (*Lens culinaris*) cultivars. *Carbohydrate Polymers*, 79, 349-355 (2010).
 31. Maninder Kaur and **Kawaljit Singh Sandhu**. Functional, thermal and pasting characteristics of flours from different lentil (*Lens culinaris*) cultivars. *Journal of Food Science and Technology*, 47, 273-278 (2010).
 32. **Kawaljit Singh Sandhu** and Seung-Taik Lim. Structural characteristics and *in vitro* digestibility of mango kernel starches (*Mangifera indica* L.). *Food Chemistry*, 107, 92-97 (2008).
 33. **Kawaljit Singh Sandhu** and Seung-Taik Lim. Digestibility of legume starches as influenced by its physical and structural properties. *Carbohydrate Polymers*, 71, 245-252 (2008).
 34. **Kawaljit Singh Sandhu**, Maninder Kaur, Narpinder Singh, and Seung-Taik Lim. A comparison of native and oxidized normal and waxy corn starches: Physicochemical, thermal, morphological and pasting properties. *LWT-Food Science and Technology*, 41, 1000-1010 (2008).
 35. **Kawaljit Singh Sandhu**, Narpinder Singh and Seung-Taik Lim. A comparison of native and acid thinned normal and waxy corn starches: Physicochemical, thermal, morphological and pasting properties. *LWT-Food Science and Technology*, 40, 1527-1536 (2007).
 36. **Kawaljit Singh Sandhu**, Narpinder Singh and Nachhattar Singh Malhi. Some properties of corn grains and their flours I. Physicochemical, functional and chapati making properties of flours. *Food*

- Chemistry*, 101, 938-946 (2007).
37. **Kawaljit Singh Sandhu** and Narpinder Singh. Some properties of corn starches II. Physicochemical, gelatinization, retrogradation, pasting and gel textural properties. *Food Chemistry*, 101, 1516-1524 (2007).
 38. Maninder Kaur, **Kawaljit Singh Sandhu** and Narpinder Singh. Comparative study of the functional, thermal and pasting properties of flours from different field pea and pigeon pea cultivars. *Food Chemistry*, 104, 259-267, (2007).
 39. Su-Jin Lee, **Kawaljit Singh Sandhu**, and Seung-Taik Lim. Effect on of microwave irradiation on crystallinity and pasting viscosity of corn starches different in amylose content. *Food Science and Biotechnology*, 16, 832-835 (2007).
 40. **Kawaljit Singh Sandhu**, Narpinder Singh and Seung-Taik Lim. Functional properties of normal, waxy and sugary corn starches. *Journal of Food Science and Technology*, 44, 565-571 (2007).
The above paper has been awarded with the Best Paper Award for the year 2007 by Association of Food Scientists and Technologists (India).
 41. Maninder Kaur, Narpinder Singh and **Kawaljit Singh Sandhu**. Preparation and characterization of protein isolates from different lentil (*Lens culinaris*) cultivars. *Journal of Food Science and Technology*, 44 (3), 327-329 (2007).
 42. Narpinder Singh, Lovedeep Kaur, **Kawaljit Singh Sandhu**, Jagdeep Kaur and Katsuyoshi Nishinari. Relationships between physicochemical, morphological, thermal, rheological properties of rice starches. *Food Hydrocolloids*, 20, 532-542 (2006).
 43. **Kawaljit Singh Sandhu**, Narpinder Singh and Nachhattar Singh Malhi. Physicochemical and thermal properties of starches separated from corn produced from crosses of two germ pools. *Food Chemistry*, 89/4, 541-548 (2005).
 44. **Kawaljit Singh Sandhu** and Narpinder Singh. Relationships between selected properties of starches from different corn lines. *International Journal of Food Properties*, 8, 481-491 (2005).
 45. Narpinder Singh, Maninder Kaur and **Kawaljit Singh Sandhu**. Physicochemical and functional properties of freeze-dried and oven dried corn gluten meals. *Drying Technology*, 23/4, 975-988 (2005).
 46. **Kawaljit Singh Sandhu**, Narpinder Singh and Maninder Kaur. Characteristics of the different corn types and their grain fractions: physicochemical, thermal, morphological, and rheological properties of starches. *Journal of Food Engineering*, 64/1, 119-127 (2004).
The above paper has been listed in the TOP25 Hottest Articles - Downloaded during July-September, 2004 - within the Journal of Food Engineering.
 47. Narpinder Singh, **Kawaljit Singh Sandhu** and Maninder Kaur. Characterization of starches from Indian chickpea (*Cicer arietinum* L.) cultivars. *Journal of Food Engineering*, 63/4, 441-449 (2004).
 48. Narpinder Singh, Maninder Kaur, **Kawaljit Singh Sandhu** and Navdeep Singh Sodhi. Physicochemical, cooking and textural characteristics of some Indian Black gram varieties (*Phaseolus mungo* L.). *Journal of the Science of Food and Agriculture*, 84, 977-982 (2004).
 49. Maninder Kaur, Narpinder Singh, **Kawaljit Singh Sandhu** and Harmeet Singh Guraya. Physicochemical, morphological, thermal and rheological properties of starches separated from kernels of some Indian mango cultivars (*Mangifera indica* L.). *Food Chemistry*, 85, 131-140 (2004).
The above paper was Rapid Communication in Food Chemistry.
 50. Narpinder Singh, Maninder Kaur, **Kawaljit Singh Sandhu** and Harmeet Singh Guraya. Physicochemical, thermal, morphological and pasting properties of starches from some Indian black gram (*Phaseolus mungo* L.) varieties. *Starch*, 56, 535-544 (2004).
 51. Maninder Kaur, Narpinder Singh and **Kawaljit Singh Sandhu**. Relationship between selected properties of black gram seeds and their composition. *International Journal of Food Properties*, 7, 541-552 (2004).
 52. J. Ahmed, U.S. Shivhare and **K.S. Sandhu**. Thermal degradation kinetics of carotenoids and visual

color of papaya puree. *Journal of Food Science*, 67, 2692-2695 (2002).

Review paper:

53. Narpinder Singh, **Kawaljit Singh Sandhu** and Maninder Kaur. Physicochemical properties including granular morphology, amylose content, swelling and solubility, thermal and pasting properties of starches from normal, waxy, high amylose and sugary corn. *Progress in Food Biopolymer Research [e-journal]* 1, 44-54 (2005).

Book chapter:

1. Pearl millet: flour and starch properties. **Kawaljit Singh Sandhu**, Anil Kumar Siroha, Maninder Kaur, and Sneha Punia. Edited by: Harish K Sharma. Apple Academic Press (2018).
2. Recent advances in biodegradable films, coatings and their applications. **Kawaljit Singh Sandhu**, Loveleen Sharma, Charanjiv Singh and Anil Kumar Siroha. *Plant Biotechnology: Recent Advancements and Developments*. Edited by: S K Gahlawat et al. *Springer-Verlag* (2017).
3. Starch nanoparticles: their preparation and applications. **Kawaljit Singh Sandhu** and Vikash Nain. *Plant Biotechnology: Recent Advancements and Developments*. Edited by: S K Gahlawat et al. *Springer-Verlag* (2017).
4. Fermentation in cereals: A tool to enhance bioactive compounds. **Kawaljit Singh Sandhu**, Sneha Punia and Maninder Kaur. *Plant Biotechnology: Recent Advancements and Developments*. Edited by: S K Gahlawat et al. *Springer-Verlag* (2017).
5. Sweet potato flour and starch. Maninder Kaur and **Kawaljit Singh Sandhu**. *Tropical Roots and Tubers: Production, Processing and Technology*. Edited by: Harish K Sharma et al. *John Wiley and Sons* (2016).
6. Indigenous fermented foods involving acid fermentation. **Kawaljit Singh Sandhu** et al. *Indigenous fermented foods of South Asia*. Edited by: V. K. Joshi. *Taylor and Francis* (2015).
7. Traditional fermented foods: Composition and nutritive value. **Kawaljit Singh Sandhu** et al. *Indigenous fermented foods of South Asia*. Edited by: V. K. Joshi. *Taylor and Francis* (2015).
8. Starch: its functional, in vitro digestibility, modification and application. Maninder Kaur and **Kawaljit Singh Sandhu**. *Biotechnology: prospectus and applications*. Editors, Salar RK et al., *Springer-Verlag* (2014).

Patents filed:

Patents	Date of filing	Patent Number
1. Rapid process for synthesis of biodegradable starch films from nonedible starch sources	23/3/2018	
2. Biodegradable broad spectrum antimicrobial food packaging film and method thereof	1/10/2018	

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY

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

DABWALI ROAD, BATHINDA (Punjab) -151 001

Sub: **PROPOSAL TO START BTECH PROGRAM IN DEFENCE TECHNOLOGY**

Following are submitted for your kind consideration please:

2. On the occasion of 238th Birth anniversary, Hon' Vice Chancellor MRSPTU has announced to start a BTech program in Defence Technology in the university. The case may please be put up for deliberations before the Academic Council in its forthcoming meeting to be held on 16.11.2018 as a table agenda item for kind consideration and approval please
3. Similarly, case of starting a Chair at MRSPTU in the name of Sher-E-Punjab Maharaja Ranjit Singh may also be put up as a table agenda item for deliberations before the Academic Council in the forthcoming Academic Council meeting to be held on 16.11.2018 as a table agenda item for kind consideration and deliberation please

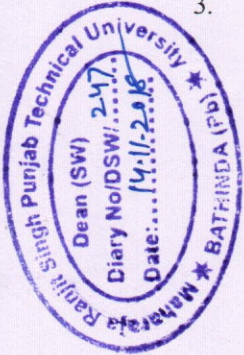
This has the consent of the Hon' VC.

RuBansal
14/11/2018

Prof Dr R K Bansal
Dean Student Welfare

DEAN (ACADEMIC AFFAIRS)

15/11/18
DR (A&A)



Basics of Engineering Drawings

Software: AutoCAD

Session 1	Engineering Drawing: Introduction and its importance Relationship to other technical drawing types - Conventions - Viewing of engineering drawing sheets
Session 2	Drawing Instruments : their Standard and uses - Drawing board, T-Square, Drafter (Drafting M/c), Set Squares, Protractor, Drawing Instrument Box (Compass, Dividers, Scale, Diagonal Scales etc.), Pencils of different Grades, Drawing pins / Clips
Session 3	Lines : - Definition, types and applications in Drawing Classification of lines (Hidden, centre, construction, Extension, Dimension, Section) - Drawing lines of given length (Straight, curved) - Drawing of parallel lines, perpendicular line - Methods of Division of line segment
Session 4	Drawing of Geometrical Figures: Definition, nomenclature and practice of - Angle: Measurement and its types, method of bisecting. - Triangle -different types - Rectangle, Square, Rhombus, Parallelogram. - Circle and its elements
Session 5	Lettering and Numbering: - Single Stroke, Double Stroke, inclined, Upper case and Lower case.
Session 5	Dimensioning: - Definition, types and methods of dimensioning (functional, nonfunctional and auxiliary) - Types of arrowhead - Leader Line with text
Session 6	Method of presentation of Engineering Drawing - Pictorial View - Orthogonal View - Isometric view
Session 7	Construction of Scales and diagonal scale Title Block

AutoCAD (Common for all trades)

Software: AutoCAD

<p>Session 1 & 2 : An Introduction to Engineering drawings and AutoCAD</p>	<ul style="list-style-type: none"> • Introduction to Engineering Drawings • Applications of AutoCAD(Machine drawings, Production drawings, Part drawings, Assembly drawings) • Introduction to AutoCAD and AutoCAD Mechanical • Co-ordinate systems • Display Control : Zoom, Pan, Redraw, Regen, Clean Screen, Steering wheels • File Management - New, Open, Save, Save as, Close, Exit
<p>Session 3 & 4 : Drafting Basic Geometry Shapes in AutoCAD</p>	<ul style="list-style-type: none"> • Drawing settings : Units, Limits • Drafting settings : Snap and Grid, Polar tracking, Object snap, Dynamic input(F1 to F12 Function keys) • Drawing tools : Line, Circle, Arc, Ellipse, Donut, Polygon, Rectangle • Modify tools : Erase, Undo, Redo, Move, Copy, Rotate, Mirror, Array, Scale, Stretch, Lengthen, Trim, Extend, Break, Join, Chamfer, Fillet, Object selection • Object properties : Properties window, Color, Linetype, Line weight, Match properties
<p>Session 5&6 : Advanced Drafting and Modifying tools in AutoCAD</p>	<ul style="list-style-type: none"> • Drawing Tools : Multiline, Poly line, Spline, Construction Line, Revision cloud
<p>Session 7 : Layer Management</p>	<ul style="list-style-type: none"> • Layer Management • Adding / Removing Layers • Layer Status • Object Selection Methods : Select, Qselect, Filter
<p>Session 8 : Hatch Technics and Isometric view</p>	<ul style="list-style-type: none"> • Hatching utilities : Hatch, Hatchedit, Gradient, Boundary, Fill • Inquiry commands : Id, Dist, List, Radius, Angle, Area • Isometric drawings : Isometric snap and Isometric drawings
<p>Session 9 & 10 : Dimensioning and Table creation Technics</p>	<ul style="list-style-type: none"> • Dimensions : Linear, Aligned, Radius, Diameter, Angle, Arc length, Continuous, Baseline, Dimension Space, Dimension

Software: AutoCAD

	<p>Break, Inspection, Jogged radius, Ordinate dimensions, Oblique, Quick dimension</p> <ul style="list-style-type: none"> • Leader : Multi leader, Multi leader style • Annotation Tools : Text, Style, Multiline Text, Scale Text, Spell, Table, Table style, Table edit • Dimension style Manager
<p>Session 11 : Parametric Drawing</p>	<ul style="list-style-type: none"> • Parametric Modeling : Geometric Constraints, Dimensional Constraints, Delete constraints
<p>Session 12 : Application of Blocks and Attributes</p>	<ul style="list-style-type: none"> • Create Block, Write block, Insert, Design Center, and Tool Palette • Attributes : Attribute definition
<p>Session 13 : Layout, Plot and Publish</p>	<ul style="list-style-type: none"> • Etransmit • Layout, Page setup • Viewports, Model space • Plot styles and Plot (Print) in Model and Layout area
<p>Session 14, 15 : Basic 3D modeling in AutoCAD</p>	<ul style="list-style-type: none"> • AutoCAD 3D Introduction, Solid Modeling, Surface Modeling • Basic Modeling Tools : Primitives, Extrude, Sweep, Revolve, Loft, Press pull • Blend, Patch, Surface Offset, Surface Trim • Basic Editing Tools : Union, Subtract, Intersect, Slice, Extrude Faces, Shell, Fillet, Chamfer • UCS Co-ordinates, Viewport controls, View controls, Visual controls, Section, Import & Export options • Layout : Base View from Model space and Inventor, View creation: Projected, Section, and Detail views

SOLIDWORKS for Mechanical

Software: SolidWorks	
Session	Topics
Introduction to CAD Session 1	Features of SolidWorks, Various products available in SolidWorks for Product Design, Simulation, Communication SolidWorks Graphical User Interface - Feature manager design tree, Handles, Confirmation corner, mouse buttons, Command Manager
Sketching Session 2	Sketch Entities – Centerline line, Line, Circle, Arc, Ellipse, Rectangle, Slots, Polygon, Parabola, Ellipse, Partial Ellipse, Spline, Spline tools, Points, Text, Construction geometry Sketch Tools - Fillet, Chamfer, Offset, Convert entities, Trim, Extend, Mirror, Move, Copy, Rotate, Scale, Stretch, Sketch pattern, Sketch picture Blocks – Make block, Edit block, Insert block, Add/Remove Entities, Rebuild, Save, Explode Relations - Adding Sketch Relation, Automatic relations, Dimensioning - Smart, Horizontal, Vertical, Fully define sketch. 3D Sketching
Part Modeling Tools Session 3 to 5	Creating Extrude features – Direction1, Direction2, From option, Thin feature, Applying draft, Selecting contours Creating Revolve features – Selecting Axis, Thin features, Selecting contours Creating Swept features -Selecting, Profile and Path, Orientation/twist type, Thin feature, Creating reference planes

Software: SolidWorks

Session 4	<p>Creating Loft features – Selecting Profiles, Guide curves, Start/End Constraints, Centerline parameters, Close loft.</p> <p>Selecting geometries – Selection Manager, Multiple Body concepts</p> <p>Creating Reference - points, axis, coordinates</p> <p>Creating curves -</p> <p>Split line, Project curve, Composite curve, Helix and Spiral</p> <p>Creating Fillet features</p> <p>Inserting Hole types</p>
Session 5	<p>Creating Chamfer</p> <p>Creating Shell</p> <p>Creating Rib</p> <p>Creating Pattern - Linear pattern, Circular pattern, Sketch driven pattern, Curve driven pattern, Table driven pattern, Fill pattern, mirror</p> <p>Advanced Modeling Tools- Dome, Deform, indent, Flex</p>
Assembly Modeling Tools Session 6 to 8	<p>Introduction to Assembly Modeling & Approaches – Top down and Bottom up approach</p> <p>Applying Standard Mates- Coincident, Parallel, Perpendicular, Tangent, Concentric, Lock, Distance, Angle.</p>
Session 7	<p>Applying Advanced Mates – Symmetric, Width, Path Mate, Linear/Linear Coupler, and Limit Mate.</p> <p>Applying Mechanical Mates – Cam, Hinge, Gear, Rack Pinion, Screw, and Universal Joint.</p> <p>Applying Smart mates</p> <p>Applying Mate reference</p>
Session 8	<p>Manipulating Components - Replacing Components, Rotating Components, Move Components, Collision Detection, Detecting Interference</p> <p>Creating Pattern - Assembly Pattern, Mirror</p>

Software: SolidWorks

	<p>Creating Exploded Views</p> <p>Top Down Assembly</p> <p>Smart Fasteners</p>
<p>Surface Modeling tools</p> <p>Session 9</p>	<p>Creating Extrude, Revolve, Swept, loft, Boundary surface.</p> <p>Inserting Planar Surface, Offset Surface, Free form</p> <p>Extending a surface, Surface fill, Ruled Surface, Trim Surface, Replace Face, Delete face, Untrim surface, Knit surface, Thickening a Surface</p>
<p>Session 10</p>	<p>Generating Drawing Views</p> <p>Introduction To Angle Of Projection</p> <p>Generating Views - Generating Model View, Projected Views, Inserting Standard 3 View, Auxiliary Views, Detailed Views, Crop view, Broken –Out Section, Section View, Alternate Position View, Working assembly specific view, Drawing properties, Manipulating views</p>
<p>Session 11</p>	<p>Creating Dimensions – Smart, Horizontal, Vertical, Baseline, Ordinate, Horizontal Ordinate, Vertical Ordinate, Chamfer, Auto dimension</p>
<p>Session 12</p>	<p>Inserting Annotations - Datum Features, Geometric Tolerance, Surface Finish, Jog Leaders, Hole Callout, Datum Target, Area Hatch, Cosmetic Thread, Balloon, Centre Mark, Centre Lines, Bill Of Materials, Sheets And Templates, Sheet Format.</p>
<p>Sheet Metal Design</p> <p>Session 13</p>	<p>Concepts in Sheet metal design bend allowance, K-factor</p> <p>Inserting Base Flange, Sheet Metal Tab, Edge Flange, Miter Flange, Hem, Jog.</p> <p>Creating Break Corner/Corner Trim, Closed Corners.</p> <p>Inserting Sketched Bend, Fold/Unfold, Forming Tools.</p> <p>Inserting Cross Break, Welded Corner, Loft</p> <p>Working with import data - Importing In SolidWorks, Editing Imported Features, Feature Recognition, 2d To 3d Conversion</p>

Software: SolidWorks

<p>Weldment Design</p> <p>Session 14</p> <p>PhotoWorks</p> <p>Session 15</p>	<p>Introduction to Weldment, 3D sketch, How to create user defined profile for structural member? How to insert structural member? How to apply gusset and fillet bead? How to insert end cap? Extruded Boss/Base, Trim/Extend, placing holes, using different structural members</p> <p>Introduction to PhotoWorks, How to render model in PhotoWorks Studio? How to render specified area? How to save image to a specified file? How to edit scenery? How to apply background and base? Scene editor, How to apply material and decal? How to set camera and lights? Render options</p>
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REVIT ARCHITECTURE for Civil/Architecture

Software: Revit Architecture	
Session	Topics
Session 1	<ul style="list-style-type: none">• Introduction• About BIM• Introduction to Autodesk Revit Architecture• Revit File Types• Exploring User Interface• Building Elements• Starting a New Project
Session 2	<ul style="list-style-type: none">• Drawing Plan as per Dimension• Drawing Aids• Project Units• Levels<ul style="list-style-type: none">○ Adding Levels○ Modifying Levels○ Creating Level Head○ Constrain Levels• Grids• Walls<ul style="list-style-type: none">○ Create New Wall type○ Location Line○ Wall joins○ Compound Wall
Session 3	<ul style="list-style-type: none">• Modify walls• Wall layer wrapping• Stacked wall• Wall shapes and Openings• Wall sweeps and Reveals
Session 4&5	<ul style="list-style-type: none">• Modify Tools• Move• Copy• Create Similar• Rotate

Software: Revit Architecture

	<ul style="list-style-type: none">• Mirror• Array• Scale• Split Element• Trim• Align• Offset• Pin• Unpin• Doors• Windows
Session 6	<p>3D Modeling</p> <ul style="list-style-type: none">• Floor• Adding Floor• Sloped Floor• Floor Slab Edge• Ceiling• Create Ceiling• Components• Working with Modern Medium Library
Session 7	<p>3D Modeling</p> <ul style="list-style-type: none">• Roof• Creating Roof• Modifying Roof• Shape editing for Roofs and Floors• Roof Soffit• Roof Fascia• Roof Gutter• Openings• Opening on face and Vertical Opening• Wall opening• Shaft opening• Dormer Opening

Software: Revit Architecture

Session 8	<ul style="list-style-type: none">• Dimensions• Temporary Dimensions• Permanent Dimensions• Modifying Dimensions• Constraints
Session 9	<p>Managing Views</p> <ul style="list-style-type: none">• Creating views• Plan views• View range• Plan region• Elevation• Section• 3D Views• Lock 3D view• Background• Cropping View• Visibility or Graphics• View Templates• Duplicate Views• Visual Styles• Filter• Graphic Display Options
Session 10	<ul style="list-style-type: none">• Curtain Wall• Adding Curtain Grids• Mullions• Stair• Stair by component• Creating stair by sketching• Ramp• Railings• Add railings• Add railings by sketching

Software: Revit Architecture

Session 11&12	<ul style="list-style-type: none"> • Massing • In place Mass • Forms • Modify Forms • Splitting Faces • Paint Tool
Session 13	<ul style="list-style-type: none"> • Text • Adding text notes • Modify text notes • Model text • Tag • Tag tools • Applying tag by category • Tag all not tagged • Material Tag • Keynote • Types of Keynote • Placing Keynotes • Keynoting Settings • Custom Keynotes • Adding Keynote in 3D view
Session 14	<ul style="list-style-type: none"> • Callout Views • Types of Callouts • Detailing • Drafting Views <ul style="list-style-type: none"> ○ Creating drafting views ○ Importing views from CAD program ○ Reusing drafting view ○ Inserting detail components ○ Repeating detail
Session 15	<ul style="list-style-type: none"> • Schedules <ul style="list-style-type: none"> ○ Creating Schedules/quantities ○ Schedule properties ○ Custom parameters ○ Modify schedules ○ Material take off schedules, Creating annotation schedule

Software: Revit Architecture

Session 16	<ul style="list-style-type: none">• Rooms<ul style="list-style-type: none">○ Creating rooms○ Room boundaries○ Room volume• Schedule Keys• Area<ul style="list-style-type: none">○ Area schemes○ Area types○ Area plans○ Area tags• Color Scheme• Legend
Session 17	<ul style="list-style-type: none">• Sheets• Title Blocks<ul style="list-style-type: none">○ Creating title blocks• Sheet List• Print
Session 18	<ul style="list-style-type: none">• Lights<ul style="list-style-type: none">○ Lighting fixtures○ Light groups• Materials<ul style="list-style-type: none">○ Creating material library○ About the material properties and assets○ Editing material properties○ Editing assets○ Creating material○ Applying material to elements○ Changing the graphic properties of a material○ Changing the appearance properties of a material• Sun settings<ul style="list-style-type: none">○ Specifying sun settings○ Using sun path• Rendering• Decals• Walkthrough

Software: Revit Architecture

Session 19	<ul style="list-style-type: none"> • Toposurface <ul style="list-style-type: none"> ○ Building pads ○ Property lines ○ Contour line labels ○ Site components
Session 20	<ul style="list-style-type: none"> • Working with linked models <ul style="list-style-type: none"> ○ Link Revit ○ Visibility of linked models ○ Manage links ○ Shared positioning ○ Project base point and survey points • Working with point clouds files • Import/ Link CAD <ul style="list-style-type: none"> ○ Manage links ○ Opening IFC • Export <ul style="list-style-type: none"> ○ Exporting to CAD formats ○ Exporting to dwg/dwf ○ Exporting to DWF format ○ Linking DWF Mark-ups ○ Exporting o IFC ○ Creating Room /Area Report ○ Exporting to 3D's max
Session 21	<ul style="list-style-type: none"> • Design options • Transferring project standards
Session 22	<ul style="list-style-type: none"> • Customizing project settings <ul style="list-style-type: none"> ○ Fill patterns ○ Line weights ○ Line pattern ○ Line styles • Purge unused objects • Interference check • Groups <ul style="list-style-type: none"> ○ Create groups ○ Modify groups ○ Saving groups, Loading groups

Software: Revit Architecture

Session 23	<ul style="list-style-type: none">• Family creation<ul style="list-style-type: none">○ Reference planes○ Reference lines○ Constraints and dimensions• Creating door family<ul style="list-style-type: none">○ Drawing the door plan view components○ Creating door panel solid geometry○ Creating swing door family• Window family creation<ul style="list-style-type: none">○ Sliding window family○ Creating arched window
Session 24	<ul style="list-style-type: none">• Creating new furniture family<ul style="list-style-type: none">○ Table family• Lighting fixture• Chandelier
Session 25	<ul style="list-style-type: none">• Face based family<ul style="list-style-type: none">○ kitchen cabinet○ door handle• custom staircase<ul style="list-style-type: none">○ stair nosing○ custom handrail○ custom baluster• Grill design• Railing on curved surface• Adaptive curved railing

ANSYS WORKBENCH for Mechanical

Software: ANSYS Workbench

Session	Topics
<p>Session 1</p>	<p style="text-align: center;">Chapter 1: Introduction to CAE</p> <ul style="list-style-type: none"> • Introduction to CAE • General working of FEA • Boundary conditions • Elements and Element Shapes • General procedure to conduct FEA • FEA software • Key Assumptions in FEA • Types of Engineering Analysis • Important terms and definitions • Classification of materials <p style="text-align: center;">Chapter 2: Introduction to ANSYS Workbench</p> <ul style="list-style-type: none"> • Starting ANSYS Workbench • ANSYS Workbench GUI • Working on a Project • Units in ANSYS Workbench • ANSYS Workbench Database and File format • Changing the unit system • Components of the system <p style="text-align: center;">Chapter 3: Sketching and Part Modeling in DesignModeler</p> <ul style="list-style-type: none"> • Introduction to Modeling • Introduction to DesignModeler Window • Illustration1: I-section • Illustration 2: Spring Plate • Illustration 3: Clamp
<p>Session 2</p>	<p style="text-align: center;">Chapter 4: Solid Modeling Fundamentals</p> <ul style="list-style-type: none"> • Overview • Introduction • Extrusion • Revolution

Software: ANSYS Workbench

	<ul style="list-style-type: none">• Sweep
Session 3	<p style="text-align: center;">Chapter 5: Placed Features and Assembly</p> <ul style="list-style-type: none">• Overview• Introduction• Adding a hole• Adding a round• Adding a chamfer• Patterns• Assembly
Session 4	<p style="text-align: center;">Chapter 6: Modeling techniques</p> <ul style="list-style-type: none">• Overview• Introduction• Parameters• Other cad systems• Surface and Line models
Session 5	<p style="text-align: center;">Chapter 7: Defining Material Properties</p> <ul style="list-style-type: none">• Introduction to Engineering Workspace• Creating and Adding Materials• Assigning Material to the Beam• Assigning Material to the Clamp• Assigning Material to the Assembly
Session 6	<p style="text-align: center;">Chapter 8: Meshing</p> <ul style="list-style-type: none">• Introduction• Meshing of Plate with Holes• Generating the mesh, optimize the model and generating the local mesh (illustration through three examples)• Assembly Meshing

Software: ANSYS Workbench

Session 7	<p>Chapter 9: Static Structural Analysis</p> <ul style="list-style-type: none"> • Introduction to Static Structural Analysis • Pre-processing • Solution • Post-processing • Static Structural Analysis of: <ul style="list-style-type: none"> ○ Cantilever Beam ○ Plate with a central circular holes ○ Plate with a square slot ○ Pressure vessel ○
Session 8	<p>Bracket Clevis assembly</p> <p>Chapter 10: Wizard and Tools</p> <ul style="list-style-type: none"> • Overview • Introduction • Static loadings-ductile materials • Static loadings-Brittle materials • Fatigue loading-ductile material
Session 9	<p>Chapter 11: Surface and Line Model</p> <ul style="list-style-type: none"> • Overview • Introduction • Sheet with circular hole-plane stress • Pressure vessel • Bracket • Line body model
Session 10	<p>Chapter 12: Natural Frequencies</p> <ul style="list-style-type: none"> • Overview • Introduction • Performing the Modal analysis • Specifying analysis settings • Modal analysis :

Software: ANSYS Workbench

	<ul style="list-style-type: none">○ Cantilever beam○ Simply supported beam○ Chime○ Connecting rod○ Motor cover○ Assembly
Session 11	<p style="text-align: center;">Chapter 13: Buckling Loads</p> <ul style="list-style-type: none">● Introduction● Buckling analysis of<ul style="list-style-type: none">○ Fixed free column (flag pole)○ Pinned-pinned column○ Built-up structure
Session 12	<p style="text-align: center;">Chapter 14: Thermal Analysis</p> <ul style="list-style-type: none">● Introduction● Important terms used in thermal analysis● Types of thermal analysis● Steady state thermal analysis of<ul style="list-style-type: none">○ Car Disk Brake Rotor○ Heat sink● Transient thermal analysis of Piston
Session 13	<p style="text-align: center;">Chapter 15: Thermal Stress</p> <ul style="list-style-type: none">● Introduction● Thermal stress-uniform temperature change● Thermal stress in a cylinder

STAAD.PRO for Civil/Architecture

Software: STAAD.Pro V8i

Session	Topics
1	<ul style="list-style-type: none"> • Overview of Structural Analysis and Design • Calculating Shear Force and Bending Moment values for various supports and load types • Introduction <ul style="list-style-type: none"> ○ STAAD.Pro V8i ○ STAAD Editor
2	<ul style="list-style-type: none"> • Co-ordinate Systems <ul style="list-style-type: none"> ○ Global Vs Local • Creating a New Project in STAAD.Pro • Units • Model Generation <ul style="list-style-type: none"> ○ Creating Nodes & Members
3	<ul style="list-style-type: none"> • Model Editing Tools <ul style="list-style-type: none"> ○ Translational Repeat ○ Circular Repeat ○ Move ○ Mirror ○ Rotate ○ Insert Node <ul style="list-style-type: none"> ▪ For a Single Member ▪ For Multiple Members ○ Add Beam <ul style="list-style-type: none"> ▪ Point to Point ▪ Between Midpoints ▪ Perpendicular Intersection ▪ Curved Member
4	<ul style="list-style-type: none"> • Model Editing Tools <ul style="list-style-type: none"> ○ Connect Beams Along ○ Merge Selected Members ○ Break Beams at Selected Nodes • Creating Models by using Structure Wizard

Software: STAAD.Pro V8i

5	<ul style="list-style-type: none"> • Support Specification • Member Property Specification • Member Offset • Material Specification • Group Specification • Loading <ul style="list-style-type: none"> ○ Creating a Primary Load ○ Adding Selfweight
6	<ul style="list-style-type: none"> • Loading <ul style="list-style-type: none"> ○ Nodal Load ○ Member Load <ul style="list-style-type: none"> ▪ Uniform Force and Moment ▪ Concentrated Force and Moment ▪ Linear Varying Load ▪ Trapezoidal Load ▪ Hydrostatic Load ○ Area Load ○ Floor Load • Mini Project 2
7	<ul style="list-style-type: none"> • Loading <ul style="list-style-type: none"> ○ Wind Load ○ Creating Load Combination ○ Automatic Load Combination ○ Moving Load ○ Reference Load • Mini Project 3
8	<ul style="list-style-type: none"> • Introduction to Analysis <ul style="list-style-type: none"> ○ Perform Analysis ○ Overview of Output Page • General Guidelines for Design • Concrete Design in STAAD.Pro <ul style="list-style-type: none"> ○ Column Design ○ Beam Design

Software: STAAD.Pro V8i

9	<ul style="list-style-type: none"> • RC Designer <ul style="list-style-type: none"> ○ Beam Design ○ Column Design • Project 1
10	<ul style="list-style-type: none"> • Seismology <ul style="list-style-type: none"> ○ Introduction ○ Standards for Earthquake Design • Dynamic Analysis <ul style="list-style-type: none"> ○ Response Spectrum Analysis • Mini Project 4
11	<ul style="list-style-type: none"> ○ Create Infill Plates ○ Generate Surface Meshing ○ Generate Plate Mesh
12	<ul style="list-style-type: none"> • Adding Plate Thickness • Plate Load <ul style="list-style-type: none"> ○ Pressure on Full Plate ○ Concentrated Load ○ Partial Plate Pressure Load ○ Trapezoidal Load ○ Hydrostatic Load
13	<ul style="list-style-type: none"> • Water Tank Design • Slab Design <ul style="list-style-type: none"> ○ One-way Slab ○ Two-way Slab • Mini Project 5
14	<ul style="list-style-type: none"> • Staircase Design • Shear wall Modelling and Design • Mini Project 6

Software: STAAD.Pro V8i

15	<ul style="list-style-type: none">• STAAD.Beava
16	<ul style="list-style-type: none">• Steel Design in STAAD.Pro• Design of Overhead Transmission Line Towers• Time History Analysis
17	<ul style="list-style-type: none">• Foundation Design<ul style="list-style-type: none">○ Isolated Footing○ Combined Footing
18	<ul style="list-style-type: none">• Foundation Design<ul style="list-style-type: none">○ Pile Cap Design• Mini Project 7
19	<ul style="list-style-type: none">• Importing CAD Models• Report Setup• Plotting from STAAD.Pro• Final Project

Software: Master CAM

Session	Topics
Session 1	Manufacturing process What is manufacturing Types of manufacturing CNC machines NC codes
Session 2 & 3	About MasterCAM Details of MasterCAM Developer, Version, Features of MASTERCAM, Workflow, Application, Minimum hardware requirement. GUI of MasterCAM Creating 2D profile Creating/Importing 3D models Repairing/Preparing models
Session 4 & 5	Milling - 2D Counter Mill Area Mill Drill Dynamic Milling Dynamic Facing Dynamic Counter

Session 6, 7 & 8	Milling - 3D Roughing Optirough Parallel Area Rough Finish Waterline Hybrid Scalop
Session 9	Turning
Session 10	EDM

MASTER CAM for Mechanical

3D Printing

Session	Topics
Session 1	<p>Introduction of 3D Printing</p> <ul style="list-style-type: none"> • Visual • Printing • Scanning/Reverse engineering <p>Evolution of 3D Printing</p> <p>What is Additive Manufacturing?</p> <p>General procedure of 3D Printing</p> <p>3D CAD File formats</p> <p>Stereo lithography files</p> <p>Various Printing technologies (SLA, SLS, FDM, Poly jet printing, Color jet Printing, SHS, SLM, LOM, Multi jet Printing, DLP)</p> <p>FDM in detail</p>
Session 2	<p>Preparation of print ready file using Plasto 200:</p> <ul style="list-style-type: none"> • Introduction • Architecture • Functions of various parts • Materials used • Accuracy • Advantages • Limitations <p>Operating Plasto 200 - Live demonstration</p> <ul style="list-style-type: none"> • Problem Definition • Procedure

	<ul style="list-style-type: none"> • Output • Review and Suggestions
<p>Session 3</p>	<p>STL principles</p> <ul style="list-style-type: none"> • How to identify bad spots of STL? • How to fix bad spots of STL? <p>Object Placement</p> <ul style="list-style-type: none"> • Placing the component • Duplication of components • Orientation of components • Setting cut portions for printing <p>Object Analysis</p> <p>Slicer Settings</p> <p>Print Settings</p> <ul style="list-style-type: none"> • Layers and Perimeters • Infill • Speed • Skirt and brim • Creation of Supports • Filament settings • Printer settings <p>Material Properties</p> <p>Manual Controls</p>

Session 4

Live demonstration of advanced settings and support

Hands on

Project

- Choose Project
- Design the CAD file
- Convert to STL
- 3D Print
- Analyze defects
- Make design changes

3D PRINTING for all trades

Punjab Institute of Technology

GTB Garh (Moga)

(A Constituent College of Maharaja Ranjit Singh Punjab Technical University, Bathinda)

PITGTBG/DIR/18-19/ 05A

Date:- 04.4.18

To

Dean Academic Affairs,
MRSPTU, Bathinda

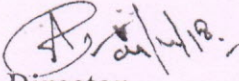

Sub: Regarding approval of skill course (Electrician) at PIT, GTB Garh (Moga).

Sir,

We had proposed six new courses i.e. (BBA, BCA, B.Sc (Non-Medical), B.Sc (Agriculture), Skill course (Electrician), Skill Course (CMPA) to be started at PIT, GTB Garh (Moga) for session 2018-19. In the Standing Committee of Academic Council held on dated 26-02-2018, B.Sc (Agriculture), B.Sc (Non-Medical) and Skill Certificate (Electrician) Course were deferred, also mentioned in minutes of meeting released on 05/03/2018.

As per discussion with Hon'ble Vice Chancellor, You & Director, CDC, it was decided to look after the scope of skill course (Electrician) in the Industries as well as admission scenario in the local region.

So, you are requested to permit us to start one year Skill Course (Electrician) for the session 2018-19 as there is a good scope of admission in skill courses.


Director


DEPARTMENT OF ARCHITECTURE

Agenda Item No. 1: Permission is sought for starting the courses of Bachelors in Interior Design and Bachelors in Fine Arts in the Department of Architecture, MRSPTU, Bathinda. Syllabus / Curriculum for these courses shall be finalised in the BOS, after grant of permission.

Agenda Item No. 2: The approval for the course of M. Planning w.e.f. session 2019-20 had already been taken in the BOC meeting held on 17.10.18. The formulation of syllabus for the same course is being undertaken and the inputs of a senior town planner are required in this regard.

Therefore permission may kindly be granted for including Mr. Jit Kumar Gupta, Senior Town Planner, Retd. Govt. of Punjab, Ex-Principal, IET Punjab, in the existing panel of Board of Studies.

4-5-18