

# ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਠਿੰਡਾ।

## MINUTES OF MEETING

A meeting of all Deans, directors and heads of departments of the University and GZSCCET MRSPTU Bathinda was held in the office of the Hon'ble Vice Chancellor on 30-01-2020 at 11:00 am. The following were present:-

1. Dr. M.P.S. Ishar, Vice Chancellor
2. Dr. Jasbir S. Hundal, Head, Deptt. of Physics and Dean, Research & Development, MRSPTU, Bathinda
3. Dr. Savina Bansal, Campus Director, GZSCCET MRSPTU and Dean, Academic affairs, MRSPTU, Bathinda
4. Dr. Buta Singh, Dean, Planning & Development, MRSPTU, Bathinda
5. Dr. Sanjiv Aggarwal, Dean, Distance Education Program MRSPTU, Bathinda
6. Dr. Manjeet Bansal, Dean, Consultancy & Industry Linkage, MRSPTU, Bathinda
7. Dr. Paramjeet Singh, Dean, Student Welfare, MRSPTU, Bathinda
8. Dr. Ashish Baldi, Registrar, MRSPTU, Bathinda
9. Dr. Sarabjeet Kaur Bath, Head, Deptt. of Electrical Engg., GZSCCET MRSPTU
10. Dr. Anupam Kumar, Head, Deptt. of Textile Engg., GZSCCET MRSPTU
11. Dr. Rakesh Singla, Head, Deptt. of Civil Engg., GZSCCET MRSPTU
12. Dr. Karanvir Singh, Head, Deptt. of Mathematics and CoE, MRSPTU
13. Dr. Seema Sharma, Head, Deptt. of Chemistry, MRSPTU
14. Dr. Rahul Deshmukh, Head, Deptt. of Pharm. Sc. & Tech., MRSPTU
15. Dr. Kawaljeet Singh Sandhu, Head, Deptt. of Food Sci. & Tech., MRSPTU
16. Dr. Pritpal Singh Bhullar, Incharge, UBS, MRSPTU
17. Dr. Rajesh Gupta, Professor, Mech. Engg., GZSCCET MRSPTU (for HoD)
18. Er. Jyoti Rani, Associate Professor, Deptt. of CSE, GZSCCET MRSPTU (for HoD)
19. Dr. R.K. Bansal, Professor, Deptt. of ECE, GZSCCET also attended the meeting.

### During the meeting, following decisions were taken after discussion.

1. Depending on response of students towards courses offered in previous years and for rationalization of resources special with reference to financial feasibility, it was mutually decided that to change intake of programs if any, in session 2020-21 as per following details:

S. N.	Name of College	Name of Course	Existing Intake 2019-20	Proposed Intake 2020-21	Remarks
1.	PIT, Moga	B. Tech. CSE	60	30	Decrease in intake
2.	PIT, Moga	B. Tech. EE	60	30	Decrease in intake
3.	PIT, Moga	B. Tech. ME	60	0	Closure
4.	PIT, Moga	B. Tech. CE	60	0	Closure
5.	PIT, Arniwala	Skill certificate of food processing	30	0	Closure
6.	PIT, Arniwala	Skill Certificate of Computer Maintenance & Program. Assistant	30	30	Proposed
		BCA	00	30	
		PGDCA	00	30	
7.	School of Architecture	B. Interior Design	30	0	Closure
8.	School of Architecture	B. Arch.	40	40	No change
9.	School of Architecture	M. Arch. (Building Engg. & Mgt.)	18	18	No change
10.	School of Architecture	M. Planning	18	18	No change
11.	Textile Deptt.	B. Tech. Textile	60	60	No change

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12.	Textile Deptt.	M. Tech. Textile	18	18	No change
13.	Mechanical Deptt.	B. Tech. Mech.	120	90	Decreased
14.	Mechanical Deptt.	M. Tech. Mech.	18	18	No change
15.	Mechanical Deptt.	B. Tech. Mechatronics	30	0	closure
16.	Computer Science & Engg. Deptt.	B. Tech. CSE	150	150	Morning Session
17.	Computer Science & Engg. Deptt.	M. Tech. CSE	18	18	No change
18.	ECE Deptt.	B. Tech. ECE	60	30 each in EEE and ECE	Change in stream
19.	ECE Deptt.	M. Tech. ECE	18	18	No change
20.	Electrical Engg. Deptt.	B. Tech. EE	60	60	No change
21.	Electrical Engg. Deptt.	M. Tech. EE (Power system)	18	18	No change
22.	Civil Engg. Deptt.	B. Tech. CE	60	60	No change
23.	Civil Engg. Deptt.	M. Tech. CE (Construction Tech. & Mgt.)	18	18	No change
24.	Applied Physics	B. Sc. (Hons.) Physics	60	60	No change
25.	Applied Physics	M. Sc. Physics	60	60	No change
26.	Applied Maths	B. Sc. (Hons.) Maths	60	60	No change
27.	Applied Maths	M. Sc. Maths	60	60	No change
28.	Applied Chemistry	B. Sc. (Hons.) Chemistry	60	60	No change
29.	Applied Chemistry	M.Sc. Chemistry	60	60	No change
30.	Food Sci. & Technology	M. Sc. (Food Sci. & Technology)	30	30	No change
31.	Food Sci. & Technology	Integrated Undergraduate Course B.Sc. (Food Science and Technology) 3 years / Bachelor of Food Sciences & Technology (Hons.) 4 years	30	30	No change
32.	Computational Sciences	BCA-MCA Dual Degree Programme	60	60	No change
33.	Computational Sciences	M. Sc. (Mathematics & Computing)	18	18	Closure
34.	Computational Sciences	M. Tech. (Computer Applications)	18	18	Closure
35.	Computational Sciences	MCA	60	60	No change
36.	University Business School	MBA	60	60	No change
37.	Pharmaceutical Sciences	B. Pharm.	60	60	No change
38.	Pharmaceutical Sciences	M. Pharm. (Pharmaceutics)	9	9	No change
39.	Pharmaceutical Sciences	M. Pharm. (Pharmacology)	9	9	No change
40.	Pharmaceutical Sciences	M. Sc. (Clinical Research)	15	15	No change

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## New Courses:

S. N.	College Name/ Deptt.	Course Name	Duration of Programme	Proposed Intake for 2020-21
1.	PSAEC, Patiala	BBA Aviation Management	3 Yrs.	60 seats
2.	University Business School	MBA (Part - time)	2 Yrs.	30 seats
3.	University Business School	BBA-MBA Integrated	5 Yrs.	30 seats
4.	University Business School	MBA (Business Analytics) as new specialization	2 Yrs.	As new specialization

2. It was unanimously decided that Dr. Manjeet Bansal, Professor, Department of Civil Engg., GZSCCET MRSPTU will act as Chairman, Admission Cell for main campus of the University and its all constituent colleges.

In order to carry out admission related activities in centralized manner, a separate admission cell will be established in the new building of the University on ground floor of Admin. Block. This admission cell will function throughout the year for all activities related to improve admissions and Chairman of admission cell is authorize to make his own team among the staff of main campus of the University and GZSCCET, MRSPTU for set outcomes. All HoD(s)/Directors of Constituent Colleges and other officials shall cooperate with admission cell as top priority.

3. For applied sciences and non-AICTE courses, the need to revise fees structure was emphasized by concerned HoD(s). In view of this, the following committee is constituted to rationalize the fee of B.Sc./M.Sc. courses offered by these departments:

- Head, Department of Physics Chairman
- Head, Department of Mathematics
- Head, Department of Chemistry
- Deputy Registrar (Academic & Registration)
- Finance Officer

Further, as pointed out in the meeting that fee for some courses also needs to be rationalize with reference to PIT(s) GTB Garh, Nandgarh and Rajpura. For the same, following committee is constituted:

- Director, PIT Nandgarh Chairman
- Director, PIT GTB Garh
- Director, PIT Rajpura
- Deputy Registrar (Academic & Registration)
- Finance Officer

The above said committees shall submit the revised fee structure within one month for timely implementation from next academic session.

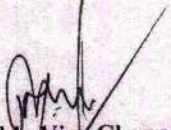
4. It was also pointed out that due to lesser admission in the Mechanical Engineering and Electronics Communication Engineering (ECE) departments, few faculty members from these departments will teach aligned subject as per their expertise in other departments of GZSCCET, MRSPTU.
5. In regard to ECE branch, it was decided that existing intake of 60 seats of B. Tech. (ECE) course may be revised as 30 seats each in EEE and ECE. Further, if any action is

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required with reference to AICTE. Campus Director GZSCCET MRSPTU is authorized to take necessary steps and an exercise to improve admissions and corresponding financial viability of branch.

6. B. Tech. (Mechatronics) course offered earlier by the Department of Mech. Engineering will be closed from upcoming session. However, syllabi may be devised in such a manner that B. Tech. (Minor in Mechatronics) can be offered for interested students.
7. In view of existing admission scenario in Textile Engineering, it was decided to put specific efforts toward improvement in LEET admissions. Also as per current trend, it was suggested to start Fashion Technology related courses in this department. However, HoD emphasized on strengthening the existing course by improving the admission and not to consider new courses from upcoming academic session.
8. Recent subjects like Artificial Intelligence, Big Data, Quantum Computational and Machine Learning etc. should be introduced as open elective new subjects in appropriate programs like B. Tech. (CSE)/MCA/M. Tech. and other allied programs for this HoD (Computational Science) and HoD (Computer Science Engineering) will formulate syllabi through their BOC/BOS. These courses shall be taken up by students from any stream and shall be offered by Computational Science /CSE department.
9. HoD, Pharmaceutical Science & Technology must emphasize on improvement in admission of M. Sc. (Clinical Research) program. Also, the department should take initiative to collaboration related to industry for better outcome of this course.
10. As informed in the meeting that Baba Hira Singh Bhattal Institute of Engineering & Technology, Lehragaga is going to close its operation, initiative shall be taken to get computers, smart class rooms and other equipments from that institute for better utilization and improvement of main campus and GZSCCET.

Submitted for approval please.

  
Hon'ble Vice Chancellor

  
Registrar

A copy of the above is forwarded to the following for information & necessary action:

1. P.A. to Vice Chancellor: For the information to Vice Chancellor.
2. Director: GZSCCET MRSPTU, PIT Nandgarh, PIT GTB Garh, PIT Rajpura, PSAEC and PIT Arniwala
3. All concerned
4. Finance Officer and Dy. Registrar (Admin.)

Date- 04/03/2020

No- 779



# Maharaja Ranjit Singh Punjab Technical University

Badal Road, Bathinda -151001

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

ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਾਦਲ ਰੋਡ, ਬਠਿੰਡਾ

Ref No : Notification/Reg-117/969

Dated : 6<sup>th</sup> April, 2020

## NOTIFICATION

Consequent upon the approval of the Competent Authority, courses to be offered by Maharaja Ranjit Singh Punjab Technical University, Bathinda at its Main Campus and Constituent Colleges for the academic session 2020-21 is hereby notified.

### 1. University Main Campus:

S. No.	Programme Name	Programme Code	Duration (yrs)	Total Intake
1.	B. Pharm. (1 <sup>st</sup> Sem.)	BPHA-1	4	60 Seats
2.	B. Pharm. (3 <sup>rd</sup> Sem.)	BPHA-1	3	As applicable
3.	M. Pharm. (Pharmaceutics)	MPHA-1	2	09 Seats
4.	M. Pharm. (Pharmacology)	MPHA-2	2	09 Seats
5.	M. Sc. (Food Sci. & Technology)	MFOT-1	2	30 Seats
6.	M. Sc. (Clinical Research)	MPHA-8	2	15 Seats
7.	M. Sc. (Physics)	MPHY-1	2	60 Seats
8.	M. Sc. (Chemistry)	MCHM-1	2	60 Seats
9.	M. Sc. (Mathematics)	MMAT-1	2	60 Seats
10.	M. Tech (Electronics & Communication Engg.)	MECE-1	2	18 Seats
11.	M. Tech. Electrical (Power System)	MELE-3	2	18 Seats
12.	M. Tech. (Textile Engg.)	MTEX-1	2	18 Seats
13.	M. Arch. (Building Engg. & Management)	MARC-3	2	18 Seats
14.	MBA	MBAD-1	2	60 Seats
15.	*MCA	MCAP-1	As per AICTE APH	60 Seats
16.	B. Sc. (Hons.) Mathematics	BMAT-1	3	60 Seats
17.	B. Sc. (Hons.) Physics	BPHY-1	3	60 Seats
18.	B. Sc. (Hons.) Chemistry	BCHM-1	3	60 Seats
19.	BCA-MCA Dual Degree	MCAP-2	5	60 Seats
20.	BCA-MCA Dual Degree (LEET)	MCAP-2	4	As applicable
21.	M. Planning	MARC-2	2	18 Seats
22.	Integrated Undergraduate Course B.Sc. (Food Science and Technology) 3 years / Bachelor of Food Sciences & Technology (Hons.) 4 years	BFOT-2	3 Yrs./ 4 Yrs.	30 Seats
23.	MBA (Part Time)**	MBAD-3	3	30 Seats
24.	BBA-MBA Integrated**	MBAD-2	5	30 Seats
25.	MBA (Business Analytics)**	-----	2	New Specialization (in existing MBA course)
26.	B. Arch.	BARC-1	5	40 Seats

## 2. GZSCCET, MRSPTU, Bathinda

S. No.	Programme Name	Programme Code	Duration (yrs)	Total Intake
1.	B. Tech. Civil Engg.	BCIE-1	4	60 Seats
2.	B. Tech. Civil (LEET)	BCIE-1	3	As applicable
3.	B. Tech. Electrical Engg.	BELE-1	4	60 Seats
4.	B. Tech. Electrical Engg. (LEET)	BELE-1	3	As applicable
5.	B. Tech. Electronics & Communication Engg.	BECE-1	4	60 Seats
6.	B. Tech. Electronics & Communication Engg. (LEET)	BECE-1	3	As applicable
7.	B. Tech. Mechanical Engg.	BMEE-1	4	90 Seats
8.	B. Tech. Mechanical Engg. (LEET)	BMEE-1	3	As applicable
9.	B. Tech. Textile Engg.	BTEX-1	4	60 Seats
10.	B. Tech. Textile Engg. (LEET)	BTEX-1	3	As applicable
11.	B. Tech. Computer Science & Engg.	BCSE-2	4	150 Seats
12.	B. Tech. Computer Science & Engg. (LEET)	BCSE-2	3	As applicable
13.	M. Tech. (Construction Technology & Mgt.)	MCIE-6	2	18 Seats
14.	M. Tech. Computer Science & Engg.	MCSE-2	2	18 Seats
15.	M. Tech. Mechanical Engg.	MMEE-2	2	18 Seats

## 3. PIT, Nandgarh

S. No.	Programme Name	Programme Code	Duration (yrs)	Total Intake
1.	BBA	BBAD-1	3	60 Seats
2.	BCA	BCAP-1	3	60 Seats
3.	BCA (LEET)	BCAP-1	2	As applicable
4.	B. Com. (Hons.)	BCOM-1	3	60 Seats
5.	*MCA	MCAP-1	As per AICTE APH	30 Seats
6.	M. Com.	MCOM-1	2	60 Seats
7.	PGDCA	PCAP-1	1	30 Seats
8.	Skill Certificate course in Computer Maintenance & Programming Assistant	CCOP-1	1	60 Seats
9.	Skill Certificate course in Computer Proficiency	CCAP-2	6 months	30 Seats
10.	B. Sc. (Social Science)		3	30 Seats

## 4. PIT, GTB Garh, Moga

S. No.	Programme Name	Programme Code	Duration (yrs)	Total Intake
1.	B. Tech. (Electrical Engg.)	BELE-1	4	30 Seats
2.	B. Tech. Electrical Engg. (LEET)	BELE-1	3	As applicable
3.	B. Tech. Computer Science & Engg.	BCSE-2	4	30 Seats

4.	B. Tech. Computer Science & Engg. (LEET)	BCSE-2	3	As applicable
5.	BBA	BBAD-1	3	60 Seats
6.	BCA	BCAP-1	3	60 Seats
7.	BCA (LEET)	BCAP-1	2	As applicable
8.	B.Com. (Hons.)	BCOM-1	3	60 Seats
9.	M. Tech. (EE)	MELE-1	2	18 Seats
10.	Skill Certificate Course in Electrician	CELE-1	1	30 Seats
11.	Skill Certificate Course in Computer Maintenance & Programming Assistant	CCOP-1	1	30 Seats
12.	Skill Certificate Course in Refrigeration and Air Conditioning Mechanic	CMEE-3	1	30 Seats

### 5. PIT, Rajpura

S. No.	Programme Name	Program me Code	Duration (yrs)	Total Intake
1.	B.Tech. Computer Science & Engg.	BCSE-2	4	30 Seats
2.	B. Tech. Computer Science & Engg. (LEET)	BCSE-2	3	As applicable
3.	B. Tech. (Electrical Engg.)	BELE-1	4	30 Seats
4.	BBA	BBAD-1	3	90 Seats
5.	BCA	BCAP-1	3	120 Seats
6.	BCA (LEET)	BCAP-1	2	As applicable
7.	B. Com. (Hons.)	BCOM-1	3	90 Seats
8.	M.Tech. Computer Science & Engg.	MCSE-2	2	18 Seats
9.	*MCA	MCAP-1	As per AICTE APH	30 Seats
10.	Skill Certificate Course in Welding	CMEE-1	1	30 Seats
11.	Skill Certificate Course in Tool & Die making	CMEE-2	1	30 Seats
12.	Skill Certificate Course in Refrigeration & Air Conditioning Mechanic	CMEE-3	1	30 Seats
13.	Skill Certificate Course in Servicing & Maintaining of Electronic Instruments	CECE-1	1	30 Seats
14.	Skill Certificate Course in Computer Maintenance & Programming Assistant	CCOP-1	1	60 Seats

### 6. Punjab State Aeronautical Engineering College, Patiala


S. No.	Programme Name	Program me Code	Duration (yrs)	Total Intake
1.	B. Tech. (Aeronautical Engineering)	BAEE-1	4	60 Seats
2.	B. Tech. Aeronautical Engineering (LEET)	BAEE-1	3	As applicable
3.	B. Tech. Aerospace Engineering	BAEE-4	4	30 Seats
4.	B. Tech. Aerospace Engineering (LEET)	BAEE-4	3	As applicable
5.	BBA (Aviation Management)**	BBAD-3	3	60 Seats
6.	Bachelor of Management Studies (Airlines, Tourism & Hospitality)	BHOM-1	3	60 Seats

### 7. PIT, Arniwala

S. No.	Programme Name	Programme Code	Duration (yrs)	Total Intake
1.	Skill Certificate Course in Computer Maintenance & Programming Assistant	CCOP-1	1	30 Seats
2.	BCA	BCAP-1	3	30 Seats
3.	PGDCA	PCAP-1	1	30 Seats

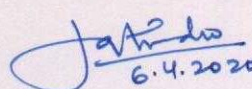
\* Duration of MCA course is as per AICTE APH 2020-21.

\*\* Subjected to approval from Academic Council.

  
Registrar

#### Copy to:

1. P.A. to Vice Chancellor: for the information to the Hon'ble Vice Chancellor.
2. Dean: Academic Affairs, Research & Development, Planning & Development, Distance Education Programme, Student Welfare and Consultancy & Industry Linkage.
3. Campus Director, GZSCCET, MRSPTU, Bathinda – To circulate amongst the departments under your preview.
4. Director: CDC, IQAC, Sports & Youth Welfare, PIT Arniwala, Nandgarh, Rajpura, GTB-Garh Moga, PSAEC, Patiala, Public Relations, T & P and IT Enabled Services.
5. HODs: Physics, GZS School of Architecture & Planning, Mathematics, Chemistry, Computational Sciences, Food Science & Tech., Pharmaceutical Sciences & Technology and University Business School.
6. Controller of Examination and Chief Warden
7. DR (Admin.), Finance Officer and Library.

  
6.4.2020  
Registrar





# Maharaja Ranjit Singh Punjab Technical University

Dabwali Road, Bathinda -151001

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

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Director, College Development Council

Ref No : 1328

Dated 23/06/2020

Through – Email Only

Director/Principal  
Dolphin PG College  
VPO Chunni Kalan, Sirhind  
Fatehgarh Sahib - 140406

**Subject: Recommendations Regarding Opening of New Institute, w.e.f Academic Session 2020-21.**

It is with reference to your application for affiliation, for the opening of new institute, w.e.f. Academic Session 2020-21;

This is for your kind attention that recommendations of the expert committee, deputed for the scrutiny of your application, for affiliation, opening of new institute, has already been communicated to you, vide email dated 8<sup>th</sup> June, 2020.

Keeping in view of the prevalent situation, due to Covid-19 pandemic, it is not possible to physically verify the infrastructure, faculty etc. Therefore, as per the directions and approval from the Competent Authority, it has been decided to provisionally grant the approval, for running the courses, as per the recommendations, of the scrutiny committee.

Therefore, you are required to deposit Provisional Affiliation Fee, before 29<sup>th</sup> June, 2020. The details of the Provisional Affiliation Fee, without any late payment charges, are mentioned below:-

Sr. No.	Name of the Course	Existing Intake for the Academic Session 2019-20	Applied Intake for the Academic Session 2020-21	Recommended intake 2020-21	Provisional Affiliation Fee (in Rs.)
1.	B.Sc. Medical Lab Science	NA	60	60	1,00,000/-
2.	B.Sc. Operation Theater Technology	NA	60	60	1,00,000/-
3.	B.Sc. Radiography and Imaging Technology	NA	60	60	1,00,000/-
4.				Youth Welfare Fee(in ₹)	7,500/-
5.				Sports Fee(in ₹)	7,500/-
				<b>Total Fee (in ₹)</b>	<b>3,15,000/-</b>
<b>Total Fee (in words) : Rupees Three Lakhs and Fifteen Thousand only</b>					



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

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

Further, you are also required to submit the following documents to the University, by the due date mentioned above, i.e. 29<sup>th</sup> June, 2020 :

1. Compliance of the deficiencies, if any, pointed out by the scrutiny committee.
2. Approval of the new courses by the statutory body, if applicable.
3. Affidavit on Non-Judicial stamp paper, from the Chairman of the Trust/Society, to effect that all the rules and regulations of the University/Statutory body, pertaining to infrastructure, faculty etc. required for the new course(s), in your new institution, will be followed, in true spirit.
4. Endowment Fund of Rupees 10 Lacs, in the form of Joint FDR/Bank Guarantee, jointly issued in the name of your College/Trust and Registrar, MRSPTU, Bathinda, for a period of 10 years, should be deposited in the office of the undersigned on or before 29<sup>th</sup> June, 2020.

This approval is subject to successful physical inspection of the institution, which will be carried out as and when the current situation, due to Covid-19 Pandemic, normalizes. In case of the rejection of institute in the expert visit, the Provisional Affiliation thus granted, will stand cancelled and all the students, admitted by the institution, will be shifted to other institutions, under the University.

This is for your kind information and further necessary action, please.

*ms*  
23/6/2020

Director  
College Development Council

Copy to :

1. PA to Hon'ble Vice Chancellor, MRSPTU, Bathinda
2. PA to Registrar, MRSPTU, Bathinda
3. Dean, Academic Affairs, MRSPTU, Bathinda
4. Finance Officer, MRSPTU, Bathinda



**Maharaja Ranjit Singh Punjab Technical University**  
Dabwali Road, Bathinda -151001  
(Estb. by Govt. of Punjab vide Act No. 5 [2015] and u/s 2(f) and 12 B of UGC Act, 1956)  
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Director, College Development Council

Ref No : 1735

Dated 14/08/2020

Through – Email Only

Director/Principal  
Dolphin PG College  
VPO Chunni Kalan, Sirhind  
Fatehgarh Sahib - 140406

**Subject: Recommendations Regarding Starting New Course, w.e.f Academic Session 2020-21.**

It is with reference to your application for affiliation, for starting new course, w.e.f. Academic Session 2020-21;

This is for your kind attention that recommendations of the expert committee, deputed for the scrutiny of your application, for affiliation, for starting new course, has already been handed over to you, personally on dated 13<sup>th</sup> August, 2020.

Keeping in view of the prevalent situation, due to Covid-19 pandemic, it is not possible to physically verify the infrastructure, faculty etc. Therefore, as per the directions and approval from the Competent Authority, it has been decided to provisionally grant the approval, for running the courses, as per the recommendations, of the scrutiny committee.

Therefore, you are required to deposit Provisional Affiliation Fee, before 14<sup>th</sup> August 2020. The details of the Provisional Affiliation Fee, without any late payment charges, are mentioned below:-

Sr. No.	Name of the Course	Existing Intake for the Academic Session 2019-20	Applied Intake for the Academic Session 2020-21	Recommended intake 2020-21	Provisional Affiliation Fee (in Rs.)
1.	B.Sc. Optometry	NA	30	30	50,000/-
<b>Total Fee (in ₹)</b>					50,000/-
<b>Total Fee (in words) : Rupees Fifty Thousand only</b>					

Further, you are also required to submit the following documents to the University :

1. Compliance of the deficiencies, if any, pointed out by the scrutiny committee.
2. Approval of the new courses by the statutory body, if applicable.
3. Original copy of the Endowment Fund of Rupees 10 Lacs, in the form of Joint FDR/Bank Guarantee, jointly issued in the name of your College/Trust and Registrar, MRSPTU, Bathinda, for a period of 10 years, should be deposited in the office of the undersigned at the earliest.



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

(Estb. by Govt. of Punjab vide Act No. 5 [2015] and u/s 2(f) and 12 B of UGC Act, 1956)  
ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ।

**Director, College Development Council**

This approval is subject to successful physical inspection of the institution, which will be carried out as and when the current situation, due to Covid-19 Pandemic, normalizes. In case of the rejection of institute in the expert visit, the Provisional Affiliation thus granted, will stand cancelled and all the students, admitted by the institution, will be shifted to other institutions, under the University.

This is for your kind information and further necessary action, please.

*Mh*  
13/5/2020

Director  
College Development Council

**Copy to :**

1. PA to Hon'be Vice Chancellor, MRSPTU, Bathinda
2. PA to Registrar, MRSPTU, Bathinda
3. Dean, Academic Affairs, MRSPTU, Bathinda
4. Finance Officer, MRSPTU, Bathinda

Sl. No.	Name of the Institution	Address	Year of Establishment	Year of Admission	Year of Affiliation
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Ref. No.: CS/5350

Dated: 13/11/19

ਡੀਨ ਅਕਾਦਮਿਕ ਮਾਮਲੇ  
ਮ.ਰ.ਸ.ਪੀ.ਟੀ.ਯੂ  
ਬਠਿੰਡਾ।

ਵਿਸ਼ਾ: BCA-MCA Dual Degree LEET ਦੇ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਸਬੰਧ ਵਿੱਚ।

ਉਪਰੋਕਤ ਵਿਸ਼ੇ ਦੇ ਸਬੰਧ ਵਿੱਚ ਕੰਪਿਊਟੇਸ਼ਨਲ ਸਾਇੰਸਜ ਵਿਭਾਗ ਵਿੱਚ MCA LEET, BCA-MCA Dual Degree ਅਤੇ BCA-MCA Dual Degree LEET ਕੋਰਸ ਚੱਲ ਰਹੇ ਹਨ, ਪਰ BCA-MCA Dual Degree LEET ਦੇ ਵਿਦਿਆਰਥੀਆਂ ਦਾ ਡਾਟਾ BCA LEET ਵਿੱਚ ਆ ਰਿਹਾ ਹੈ। ਕ੍ਰਿਪਾ ਕਰਕੇ ਇਸ ਨੂੰ ਜਲਦ ਤੋਂ ਜਲਦ ਠੀਕ ਕੀਤਾ ਜਾਵੇ ਜੀ। ਇਹ ਆਪਣੀ ਦੀ ਅਗਲੇਰੀ ਕਾਰਵਾਈ ਹਿੱਤ ਭੇਜਿਆ ਜਾਂਦਾ ਹੈ।

[Signature]  
ਅਕਾਦਮਿਕ ਵਿਚਾਰਜ

[Signature]  
ਮੁਖੀ

malika

DR (Acad) / coo/ P. Lisany  
[Signature]  
14/11/19

'A' | The noting was approved after as per the recommendations and requests made by HOD, CA for admissions to BCA (LEET) vide CS/5063  
dt. 03/07/19 [Signature]  
15/11/19

RFO

DAA, MRSPTU

'A' | Pl. clarify, whether BCA (LEET),<sup>m</sup> main campus as approved is to be read as BCA-MCA Dual Degree LEET now.  
[Signature]  
15/11/19

HOD (CA) Akadk

As in MRSPTU, Main Campus course named BCA-MCA Dual Degree is approved and run from 2018. In 2019 the approval for BCA LEET admission was taken as the name of course is BCA-MCA Dual Degree so BCA LEET

in main campus as approved is to be treated as BCA-MCA Dual Degree

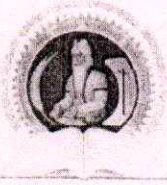
LEET now.

15/11/19  
15/11/19  
15/11/19

for the pt.  
15/11/19

- DR(A)/CDEO
- DITeS

*[Faint, mostly illegible handwritten notes and signatures in the lower half of the page, including dates like 15/11/19 and various initials.]*



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

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

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

ਡੀਨ (ਅਕਾਦਮਿਕ ਮਾਮਲੇ)

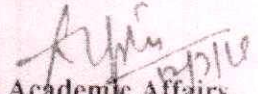
Ref. No.: DAA/MRSPTU/Notifications/66

**DEAN (Academic Affairs)**

Date: 11.07.2019

**NOTIFICATION**

Consequent upon the approval of the competent authority vide VC/597 dated 11.07.19, the BCA-MCA Dual Degree programme of MRSPTU, Bathinda may have BCA (LEET) admission based on already approved eligibility criteria for BCA (LEET) at its Main Campus from the current academic session.

  
Dean Academic Affairs,  
MRSPTU, Bathinda

Copy to the following for information & further necessary action, as applicable:

1. PA to Vice Chancellor, MRSPTU, Bathinda for information to the Vice Chancellor, please.
2. Registrar, MRSPTU, Bathinda
3. Head, Deptt. of Computational Sciences, MRSPTU, Bathinda
4. Director, ITES, MRSPTU, Bathinda
5. All concerned.



Ref No : CS/5063

Dated : 3/07/19

Dean Academics Affairs  
M.R.S.P.T.U  
Bathinda

**Subject: Justification for BCA-LEET admission in BCA-MCA dual degree program.**

1. As the demand for BCA-LEET admission in BCA-MCA dual degree is being raised by the candidates. In view of the same admission of BCA-LEET in BCA-MCA Dual Degree be started.
2. In BCA-MCA Dual Degree program of University, student is awarded 2 degrees namely BCA and MCA which are UGC/AICTE programme. University is already running BCA-MCA program.
3. Since the department is already running BCA-MCA dual degree program so the students admitted will be studying with existing batch 2018. So, no additional faculty & resources will be required till the strength is 30 (i.e 09 old & 21 new).
4. The syllabi of this course is already approved and is being followed for existing batch.
5. Eligibility for BCA-LEET in BCA-MCA Dual Degree is same as that of BCA-LEET of University.
6. Mode of Admission could be online counselling based on marks in diploma or manual counselling for left over seats after online counselling.

As the result of diploma is not yet declared so the admission for this will be in line with other LEET Courses though the admission portal of University in the next round.

7. The publicity for admission in this course can be done on University website, Department website, telephonically and in the next round of printed advertisements.

Please allow the admissions in BCA-LEET in anticipation of the Academic control from this session

for comments H.  
10/7/19  
DR(A) / CAO (AA)

Only BCA course is not running in Uni. Main Campus. The Uni. Main Campus is offering BCA-MCA Dual degree program, in which no leet has been offered by Uni. Decision may be taken in this regard pl.  
10/7/19  
DA, MRSP TU

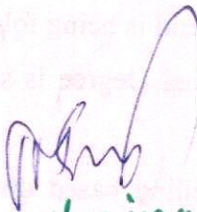
Sany  
Head  
Prong  
Malika

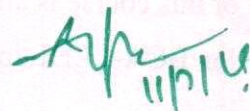


As per the recommendation of chairman BOS cum  
HOD (Comp App<sup>n</sup>) & approval granted in principle  
by Hon'ble VC, BCA-MCA dual programme may  
have BCA (LEET) admission based on already  
approved eligibility criteria for BCA (LEET) of  
MRSPV.

Permission be granted to admit students from  
the current session (July-Dec '19) with Dept. to  
make requisite provisions at appropriate offices  
in this regard.

Matter shall be put b/f before the AC in the next  
meeting.

  
Hon'ble VC cum chairman AC, MRSPV

  
11/1/19



for issuing notification & for pl.

DR (Acad) / COED

  
12/1/19

<p>ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਾਦਲ ਰੋਡ, ਬਠਿੰਡਾ-151001, ਪੰਜਾਬ (ਭਾਰਤ) ਪ੍ਰੋ. ਕਰਾਮ ਸਿੰਘ ਕੰਟਰੋਲਰ (ਪ੍ਰੀਖਿਆਵਾਂ)</p>		<p>MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY BADAL ROAD, BATHINDA-151001, PUNJAB Prof. Karanw Controller (Exam</p>
<p>(Established by Govt. of Punjab vide Punjab Act No. 5 of 2013 under section 2(f) of UGC Act)</p>		

Ref. No. CoE/MRSPTU/ 9891

Dated: 14/11

**NOTIFICATION**

**Subject: Absolute Grading System for 2019 batch onwards.**

The university started the Choice based credit system (CBCS) in 2016 and followed the relative grading system for the 2016 to 2018 batch students. With the approval of the competent authority, the university will follow the CBCS with absolute grading system for 2019 batch onwards. The previous batches shall continued to be governed by the rules & regulation of CBCS with relative grading system.

*Karanw Singh 14/11/2019*  
Controller of Examination  
MRSPTU, Bathinda

- CC: 1. Hon'ble Vice Chancellor, MRSPTU, Bathinda  
2. Registrar, MRSPTU, Bathinda  
3. Dean Academics, MRSPTU, Bathinda  
4. Principal/Director All colleges

*for records +  
M. DITES for uploading  
14/11/19*

Receipt No. ...2168.....  
Date ...15/11/19.....  
Dean Academic Affairs,  
MRSSTU, Bathinda

**Sub: Reviewing of CBCS-2016 norms-in regards!**

In reference to above, a meeting of the deputed committee members was held on 23.10.2019 to review the problems faced by students due to relative grading system notified in CBCS-2016 adopted by MRSPTU. The issue was mulled and deliberated in depth and following observations are made.

1. Applicability of Relative Grading System is meaningful, if the number of students in a particular subject/course is significant so as to have even distribution among the 8 grading levels. However, owing to falling trend in admissions in recent years, number of students per program are declining successively, which is adversely affecting the relevance of relative grading system to continue.
2. Further, there is a distinct disparity among the internal evaluation pattern of various Institutions, which makes students of MRSPTU main campus and constituent colleges at a loss w.r.t. affiliated colleges as they end up scoring lower grades relatively.
3. CoE and Dy. CoE, further, showed grave concern on the practical/legal issues related to students and software implementation in case the ongoing relative grading system (upto 2K18 batch) is modified in between for a batch.

In the light of above, it is recommended that-

*Till the admission scenario improves, in place of Relative grading system, Absolute grading system, as specified in CBCS-2016, be adopted for all UG/PG courses under MRSPTU w.e.f. 2019 batch onwards.*






  
**Dr Savina Bansal** (DAA, MRSPTU)   
 **Dr J S Hundal** (Dean R&D, MRSPTU)   
 **Dr Ashish Baldi** (Registrar, MRSPTU)   
 **Dr Karanvir Singh** (CoE, MRSPTU)   
 **Dr Harish Garg** (Dy CoE, MRSPTU)


Submitted for your approval, if agreed.



**Hon'ble VICE-CHANCELLOR**

Receipt No. 2079  
 Date 29/10/19  
 Dean Academic Affairs  
 MRSSTU, Bathinda

  
 (DAA, MRSPTU)

*for records & verification in AC meeting & to notify in antibiosis*  
  
 DR (Acw)

# ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਠਿੰਡਾ।

**Subject :** Shifting of students of B.Tech. -Electrical & Electronics Engineering/  
Electronics & Electrical Engineering, from Kings Group of Institutions,  
Near Bus Stand, Barnala, to GZSCCET, MRSPTU, Bathinda.

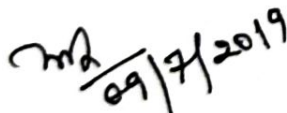
Kings Group of Institutions, Near Bus Stand, Barnala, applied for abrupt closure of the institution w.e.f. Academic Session 2019-20. The college deposited required application fee of Rs. 50,000/-, to the Accounts Department of the University, for the closure of institution, vide Cheque No 023230 Dated 13/05/2019 drawn on DENA Bank, Barnala.

The institute was offering courses in the various disciplines of engineering including B.Tech. -Electrical & Electronics Engineering/ Electronics & Electrical Engineering, with sanctioned intake of 60 seats, in all the sessions starting from 2015-16. The above said course is not offered by any of the institutes, affiliated with the University (including PITs, GZSCCET and MRSPTU main Campus).

Therefore, keeping in view of the future of the students special permission may be taken from AICTE, New Delhi to start the above said course in GZSCCET, MRSPTU, Bathinda to accommodate the students of the above said course, in all the sessions starting from 2015-16, enrolled with Kings Group of Institutions, Barnala.

Further, Campus Director, GZSCCET, MRSPTU, Bathinda may be requested to initiate the process of taking special permission from AICTE, New Delhi to start the above said new course in the institute.

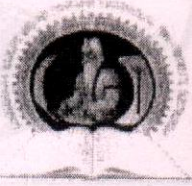
Submitted for directions and approval, please.

  
09/7/2019

Director

College Development Council

  
Vice Chancellor



# Maharaja Ranjit Singh Punjab Technical University

Dabwali Road, Bathinda -151001

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

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

Director, College Development Council

Through Email Only

Ref No : 2529

Dated 12/07/2019

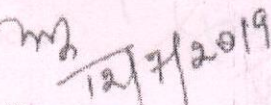
## OFFICE ORDER

Due to closure of **Kings Group of Institutions, Near Bus Stand, Barnala, Pincode-148101 (Pb)** and as per the directions from the competent authority, all the students of B.Tech. -Electrical & Electronics Engineering/ Electronics & Electrical Engineering of the above said institution are hereby shifted to **Maharaja Ranjit Singh Punjab Technical University, Dabwali Road, Bathinda - 151001 (Pb)**, as the above said course is not offered by any of the affiliated/constituent colleges of the University.

Further, **Department of Electronics & Communication Engineering, Giani Zail Singh Campus College of Engineering & Technology, Dabwali Road, Bathinda**, will conduct the classes of the above said students in coordination with **Department of Electrical Engineering, Giani Zail Singh Campus College of Engineering & Technology, Dabwali Road, Bathinda**.

Students must obtain a 'No Dues Certificate' from the relieving college and submit the same to the reporting college. The University roll numbers of the students shall remain unchanged. The receiving college must confirm the date of reporting of the students to Dean Academic Affairs, MRSPTU, Bathinda and Controller of Examination, MRSPTU, Bathinda, office.

This has the approval of the competent authority.

  
12/7/2019  
Director

College Development Council

Cc:

1. PA to Vice Chancellor, MRSPTU, Bathinda, for kind information
2. PA to Registrar, MRSPTU, Bathinda
3. Dean Academic Affairs, MRSPTU, Bathinda
4. Controller of Examination, MRSPTU, Bathinda
5. Director/Principal, Kings Group of Institutions, Near Bus Stand, Barnala, Pincode-148101 (Pb), with request to inform the students concerned
6. Campus Director, Giani Zail Singh Campus College of Engineering & Technology, Dabwali Road, Bathinda - 151001 (Pb), with request to inform the students concerned
7. Head, Department of Electrical Engineering, GZSCEET, MRSPTU, Bathinda
8. Head, Department of Electronics & Communication Engineering, GZSCEET, MRSPTU, Bti.
9. Concerned student through the Existing/new allotted college.

# PHARMACY COUNCIL OF INDIA

(Constituted under the Pharmacy Act, 1948)

E-MAIL : registrar@pci.nic.in  
WEBSITE : www.pci.nic.in  
Telephone : 011-61299901  
011-61299902  
011-61299903

NBCC Centre, 3<sup>rd</sup> Floor,  
Plot No.2, Community Centre  
Maa Anandamai Marg  
Okhla Phase I  
NEW DELHI – 110 020

Ref.No.14-48/2012-PCI

4473

30 SEP 2020

## 1. To all institutions approved by PCI –

- i) u/s 12 of the Pharmacy Act.
- ii) for conduct of course.

## 2. To all Universities/Examining Authorities

## 3. To all State Pharmacy Councils / Registration Tribunals.

Sub: Clarification regarding supernumerary seats in various categories like Tuition Fee Waiver (TFW)/Economically Weaker Section (EWS)/J&K seats etc.

Ref: Council's circular Nos.-

1. 14-11/2002-PCI/13762-14498 dt. 13.12.2004 regarding admission of pharmacy Diploma holders directly to second year of B.Pharm.
2. 14-11/2017-PCI/57950-60127 dt, 2.1.2018 regarding filling up of the vacant seats of Ist for B.Pharm course through lateral entry in the 2nd year B.Pharm.
3. Judgment dt. 5.3.2020 passed by Hon'ble Supreme Court of India in TRANSFER PETITIONS (CIVIL) NOS. 87-101 OF 2014 and Council's circular dt. 14-56/2019-PCI (A)/9851-55 dt. 11.3.2020 pursuant to it.

Sir/Madam,

1. This has a reference to subject cited above. In this connection, I am directed to inform that 109 Central Council of the PCI in its meeting held on 8<sup>th</sup> and 9<sup>th</sup> April, 2020 noted that pharmacy institutions are admitting students in various categories like TFW / EWS/ J&K seats etc. over and above the sanctioned intake by the PCI.
- 2) Considering the information on record, the Central Council decided that if the State Government or the statutory admission making authority has allotted the said seats over and above the sanctioned intake by PCI, the PCI may consider such excess admissions over and above the sanctioned intake by PCI subject to submission of documentary evidence by the institution clearly indicating the category and number of students allotted in the said category by the concerned statutory authority.

3. Accordingly, the following category of supernumerary seats made by institutions approved u/s 12 of the Pharmacy Act, 1948 will be considered by the PCI.

S.No.	Category	supernumerary seats	Remarks
1	Lateral entry seats in B.PharmIInd year course.	10% of sanctioned intake of B.PharmIst year (For Example if the approved intake of B.PharmIst year is 60 seats, then lateral entry seats will be 6 seats)	<p>Admission qualification for lateral entry to B.Pharm shall be a pass in D.Pharm course from an institution approved by the PCI u/s 12 of Pharmacy Act, 1948.</p> <p>Vacant seats of B.PharmIst year can also be filled through lateral entry in B.PharmIInd year for persons holding D.Pharm qualification from an institution approved u/s 12 of the Pharmacy Act, 1948 subject to the following conditions -</p> <p>i) Such D.Pharm holders admitted directly to B.Pharm 2<sup>nd</sup> year shall pass those subjects of B.Pharm 1<sup>st</sup> year which are not covered under D.Pharm.</p> <p>ii) At any given time the admission in B.Pharm 2nd year should not exceed the sanctioned intake of B.Pharm 1st year + 10% seats of sanctioned intake of 1st year B.Pharm.</p> <p>iii) The vacant seats of 1st year filled in the 2nd year should be only those that remained vacant in the 1st year and not created by the failure of students or not permitting the students for examination etc. for lack of attendance.</p>

S.No.	Category/Scheme	supernumerary seats	Remarks
2.	Supernumerary seats for J &K under Prime Minister's Special Scholarship Scheme (PMSSS) subject to changes suggested by the inter-ministerial committee of MHRD from time to time.	2 seats per course	<p>2 seats per Course shall be available for these admissions with the maximum of 10 seats per institution. These seats shall be supernumerary in nature. This category shall be mandatory for all Institutions approved by the PCI subject to, the changes suggested by the Inter-Ministerial Committee of MHRD from time to time.</p> <p><b>Eligibility</b></p> <ul style="list-style-type: none"> <li>• All students having domicile of J&amp;K are eligible for seats under this scheme.</li> <li>• The student shall have passed Higher Secondary Examination (12th Std.) from the schools located in J&amp;K.</li> <li>• Sons/ Daughters of parents whose annual income from all sources does not exceed Rs. 8.00 Lakh.</li> </ul>
3.	EWS (Economic Weaker Section)	10% of "Approved Intake" (For Example if the approved intake of B.Pharm1st year is 60 seats, then EWS seats will be 6)	<p>Scheme has been asked to implement to all the Central and State universities in consultation with the respective State Governments.</p> <p>It is still to be implemented to private institutions until the State Government directed through specific circular.</p> <p>A documentary evidence of the said circular needs to be uploaded.</p>
4.	Tuition Fee Waiver Scheme (TFW)	5% of "Approved Intake" (For Example if the approved intake of B.Pharm1st year is 60 seats, then TFW seats will be 3)	<p>A) Under this Scheme, up to a maximum of 5% of "approved intake" per Course shall be available for this admission. These seats shall be supernumerary in nature. These supernumerary seats shall be available only to such Course(s) in an institution, where a minimum of 30% of "approved intake" are filled up.</p>



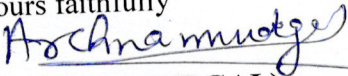
S.No.	Category/Scheme	supernumerary seats	Remarks
			<p>B) The Competent Authority to effect this admission is the State Government/ UT or its designated authority.</p> <p>C) The State Admission Authority shall invite applications under this category, make a separate merit list for this category and effect admission on the basis of the merit list so generated.</p> <p>D) The Institutions shall publish in their Brochure and Web site the details of this scheme. The Institutions shall also display information regarding admitted candidates in its Web site for information to the students and other stakeholders.</p>

**NOTE:** The seats in above categories shall be filled with only those candidates for whom the benefit is meant for by the competent authority and not by the institution.

In the event of such seats not being filled, the said seats shall remain vacant and not be filled by other category candidates.

This is for information and necessary action.

Yours faithfully



**(ARCHNA MUDGAL)**  
Registrar-cum-Secretary

# ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਠਿੰਡਾ।

**Sub.: Clarification regarding supernumerary seats in various categories like Tuition Fee Waiver (TFW), Economically Weaker Section (EWS), J&K Seats etc. in B. Pharmacy course.**

It is being brought to your kind notice that emails/letter (copy attached) have been received from S.D. College of Pharmacy, Barnala, GPCG, Patiala and MRSPTU, Main Campus for clarification regarding supernumerary seats in various categories like Tuition Fee Waiver (TFW), Economically Weaker Section (EWS), J&K Seats etc. in B. Pharma course, whether the supernumerary seats may be filled as per the **circular ref. no. 14-48/2020-PCI/4473 dt. 30.09.2020** of PCI, New Delhi for session 2020-21.

Previous Tuition Fee Waiver seats for the B. Pharmacy courses were dealt as per memo no. 886/S-1/E.C.C./2016 dated 30.06.2016 of DTE&IT, Chandigarh, Punjab (copy attached).

The detail of seats is as under;

S. No.	B Name of College/Institute	C Sanctioned Intake (1 <sup>st</sup> year) for 2020-21	D Notified supernumerary seats for 2020-21			E Seats after implementation of circular ref. no. 14-48/2020-PCI/4473 dt. 30.09.2020		
			LEET (10%)	TFW (5%)		LEET (10%)	TFW (5%)	
				1 <sup>st</sup> Yr.	3 <sup>rd</sup> Sem.		1 <sup>st</sup> Yr.	3 <sup>rd</sup> Sem.
1.	MRSPTU, Main Campus	60	0	0	0	6	3	0
2.	Bahra Institute of Pharmacy, Vill. Bhedpur., Patiala.	60	6	0	0	0	3	0
3.	Department of Pharmaceutical Sciences, Govt. Polytechnic for Girls, SST Nagar, Patiala	30	3	0	0	0	2	0
4.	Lala Lajpat Rai College of Pharmacy, G.T Road, Near P.S	60	6	0	0	0	3	0
5.	S.D. College of Pharmacy, Barnala (Distt. Barnala).	40	4	0	0	0	2	0
6.	Aryans College of Pharmacy, Village Nepra/Thuha, Near Chandigarh, Chandigarh-Patiala Highway, P.O. Chamaru, Tehsil	60	6	0	0	0	3	0
7.	Gurukul Institute of Pharmaceutical Sciences, V.P.O. Badesh Kalan, Teh. Khamano, Distt. Fatehgarh Sahib.	60	6	0	0	0	3	0
8.	Maa Saraswati Institute of Pharmaceutical Sciences, VPO Kala Tibba, Sitto Road, P.O. Ramsara, Abohar, Distt. - Fazilka	60	NA	0	NA	NA	3	NA
<b>Total</b>			31	0	0	6	22	0

In view of above facts and latest circular issued by Pharmacy Council of India Ref. No. 14-48/2012-PCI/4473 dated 30.09.2020 direction may please be given whether supernumerary seats for admissions in the Lateral Entry / Tuition Fee Waiver (TFW) category of B.Pharmacy course ~~as~~ are to be allowed or not at this stage.

Submitted for directions please.

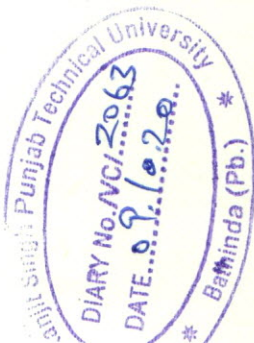
*[Signature]*  
9/10/2020  
Clerk/Cum DEO

*[Signature]*  
Deputy Registrar (A & R)

Dean Academic Affairs

*[Signature]*  
Vice Chancellor

*TFW seats may be permitted to be admitted as per University issued date, if agreed.*



# ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਠਿੰਡਾ।

**Sub.: Regarding addition of supernumerary seats in B. Pharmacy (Lateral Entry) course for session 2020-21.**

In reference to the subject above, the facts of the case are as under;

1. A letter has been received ref. no. MRSPTU/PHARM/825 dt. 02.11.2020 from HOD Pharmaceutical Sciences, MRSPTU Main Campus for addition of supernumerary seats in B. Pharmacy (LEET) as per circular ref. no. 14-48/2020-PCI/4473 dt. 30.09.2020 of PCI, New Delhi for session 2020-21.
2. However, the two rounds of centralized online counselling by MRSPTU, Bathinda for the B. Pharmacy (LEET) course has already been conducted upto 04.10.2020.
3. As intimated by the Director ITES, seat matrix for increased seats cannot be uploaded on the admission portal at this stage in the online admissions going on.

In view of above facts, if agreed, permission may be given to carry out admissions on manual basis for additional supernumerary seats.

Encl.: 1. Letter no. MRSPTU/PHARM/825 dt. 02.11.2020  
2. PCI Letter No. 14-48/2020-PCI/4473 dt. 30.09.2020

(Annexure-I)  
(Annexure-II)

*[Signature]*  
05/11/20  
Clerk Cum DEO

~~Deputy Registrar (A&R)~~ for consideration & approval

*[Signature]*  
5/11/20

Dean Academic Affairs

HON'BLE VICE CHANCELLOR

Allowed for admissions direct online counselling

Dean (Acad.)

*[Signature]*  
5/11/20

for records + file in 'B'

*[Signature]*  
5/11/20

- DR (Acad) may be sent to Director, ITES for further necessary action  
cc: Director ITES for file as per 1B

*[Signature]*  
6/11/20



Receipt No. 3253  
Date 6/11/2020  
Dean Academic Affairs,  
MRSSTU, Bathinda

Ref. No. MRSPTU/PHARM/825

Date: 02/11/2020

To

Dean Academic Affairs

MRSPTU, Bathinda.

Subject: Addition of Supernumerary seats ; Lateral entry in B. Pharmacy course.

Dear Madam,

With reference to the recent notification by Pharmacy Council of India, (Ref. No 14-48/2012-PCI/4473 dated 30.09.2020) & our request letter (Ref. No MRSPTU/PHARM/758 dated 08.10.2020); It is once again requested to kindly notify Supernumerary seats in B.Pharm LEET at the earliest so that the admission could be initiated timely in the current year.

The details are as mentioned below :-

Sr. No.	Category	Supernumerary Seats	Remarks
1	B.Pharm Lateral Entry	10% of approved intake (06)	Approved intake-60/Currently available 54 Total Lateral Entry seats 06+06=12

Thanking you in anticipation.

(Dr. Rahul Deshmukh)  
HoD

Pls Vice-Chancellor  
Mian  
5/11/20

cc: Registrar + HoD (Pharmacy)

**BACHELOR OF MANAGEMENT STUDIES (AIRLINE, TOURISM &  
HOSPITALITY SYLLABUS 2017 BATCH ONWARDS (3 YRS.)  
(UPDATED ON 30.08.2019)**

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**RESORT MANAGEMENT**

**Subject Code –BHOM-530**

**L T P C**

**Duration – 60 Hrs**

**4 0 0 4**

**UNIT – I (12 Hrs)**

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

**UNIT –II (15 Hrs)**

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 (16 Hrs)**

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

**UNIT – IV (17 Hrs)**

Resort Management: Resort Management and Sales Promotion: Research and Analysis: The environment, current market, properly analysis, Module V- Market segmentation and potential guest markets, Tools of marketing, Advertising, Promotion and Publicity

**Recommended Books**

1. Boardman, R.D. Hotel, catering costing and Budgets,1975,Heinement,London.
2. Bursteen Harnery, Management of HotelsandMotels1980Marcil DekherInc.
3. Negi Jagmohan– TourismandHoteliering1982GitanjaliPublishing House, New Delhi.
4. Negi Jagmohan, Principles of Grading and Classification of Hotels

**ITINERARY PREPARATION AND AIRLINE TICKETING**

**Subject Code –BHOM-531**

**L T P C**

**Duration – 60 Hrs**

**4 0 0 4**

**UNIT-I (13 Hrs)**

Itinerary Preparation: Concept, Typology, Duration, GIT, FIT, Do's and don'ts of itinerary preparation - limitations and constraints. Custom made itinerary and readymade itinerary, Factors to be considered while preparing an itinerary – Seasonal itinerary-Product based itinerary All inclusive itinerary.

**UNIT – II (12 Hrs)**

Popular tourist itineraries of India: Golden Triangle, Great Indian Heritage Circuit, Buddhist Circuit, Temple Circuit of South India, Desert Triangle (Bikaner-Jodhpur-Jaisalmer), Himalayan Safari. Special interest tourism itineraries in India: Adventure, Health, Cultural and Religious tourism.

**UNIT-III (18 Hrs)**

Aviation Geography: Time Difference, Flight Time, Elapse Time, Division of World by IATA. OAG (ABC) Book Familiarisation, Important Airlines, Airports of World, Minimum connecting time, Coding & Decoding of Country, City, Airport, Airline. Domestic Ticketing. Global Indicators, International Sales Indicators. Practice Itinerary Planning, Passengers Documentation/Travel Formalities (TIM), Familiarisation of Air Tariff, Introduction to Fare Construction, Mileage Principles, Fare Construction with Extra Mileage Allowance (EMA) & Extra Mileage Principle, Highest Intermediates Point (HIP), Circle Trip, Minimum (CTM), Back-haul Check, Add- ons.

**BACHELOR OF MANAGEMENT STUDIES (AIRLINE, TOURISM & HOSPITALITY SYLLABUS 2017 BATCH ONWARDS (3 YRS.)**  
**(UPDATED ON 30.08.2019)**

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**UNIT-IV (17 Hrs)**

General Limitations on Indirect Travel, Mixed Class Journeys, Special Fares (Excursion, Students & Seaman), Passenger Ticket & Baggage check (with issuance of ticket with itineraries – One way (OW), Return (RT), Circle Trip (CT), Mixed Class Special Fares, Passengers Expenses en route, Credit Cards, Universal Air Travel Plan (UATP), Baggage Rules.

**Recommended Books**

1. Mohinder Chand, Travel Agency Management, Anmol: Delhi
2. Chunk, James, Dexter & Boberg, Professional Travel Agency Management. Prentice Hall
3. D.L. Foster, The Business of Travel Agency Operations and Management. Singapore: McGraw Hill
4. ABC World wide Airways Guide (Red & Blue)
5. Air Tariff Book 1, World wide Fares.
6. Air Tariff Book 1, World wide Rules, IT Fares etc.
7. Air Tariff Book 1, World Wide Maximum Permitted Mileage
8. Travel Information Manual (TIM )

**BASICS OF ENTREPRENEURSHIP**

**Subject Code –BHOM-532**

**L T P C**

**Duration – 60 Hrs**

**4 0 0 4**

**UNIT-I (15 Hrs)**

Tourism industry and business ideas; business strategy understanding customers and analysing competition

**UNIT-II (15 Hrs)**

Tourism marketing mix; tourism marketing planning; financial planning; planning for people and operations

**UNIT-III (15 Hrs)**

Form of organisation and legal considerations; networking and collaboration; good business practices

**UNIT-IV (15 Hrs)**

Feasibility; Writing a business plan- marketing, financial, operations, people, etc. Planning, Setting up a tourism business

**Recommended Books**

1. IGNOU MTM-8, Managing Entrepreneurship and Small Business in Tourism.
2. Mohanty, Sangram Keshari, Fundamentals of entrepreneurship, New Delhi: Prentice Hall of India.
3. Sido-online. Portal of MSME, Government of India ([www.smallindustryindia.com](http://www.smallindustryindia.com))
4. Scarborough, N.M. and Zimmerer, T.W. , Effective Small Business Management, 5/e, New York: Prentice Hall, Inc.

**RESEARCH METHODOLOGY**

**Subject Code – BHOM-533**

**L T P C**

**Duration – 60 Hrs**

**4 0 0 4**

**BACHELOR OF MANAGEMENT STUDIES (AIRLINE, TOURISM &  
HOSPITALITY SYLLABUS 2017 BATCH ONWARDS (3 YRS.)  
(UPDATED ON 30.08.2019)**

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Objectives: The course aims at equipping students with an understanding of the research process, tools and techniques in order to facilitate managerial decision making.

**UNIT-I (14 Hrs)**

Research Methodology: Definition, Objectives, Role, Scope in Management Research, Process of Research, Limitations & Types, Research Design: Formulating the Research Problem, Choice of Research Design, Types of Research Design, Sources of Experimental Errors

**UNIT-II (16 Hrs)**

Sampling: Advantages and Limitation of Sampling, Sampling process, Types of Sampling: Non-Probability Sampling Techniques, Probability Sampling Techniques, Sampling and Non Sampling Errors. Data Collection: Primary, Secondary Data Collection, Observation Methods and Survey Method:

**UNIT-III (15 Hrs)**

Measurement Concept, Levels of Measurement—Nominal, Ordinal, Interval and Ratio  
Attitude Measurement: Comparative Scaling techniques, Non-comparative Scaling techniques, Questionnaire Designing: Types, Guidelines for developing a good questionnaire

**UNIT-IV (15 Hrs)**

Data Preparation and Analysis: Editing, Coding, Cross Tabulation and Practices through Excel (Basic Concepts), Report Writing: Types of Research Reports, Guidelines for Writing a Report, Report Format, Guidelines for evaluating a report.

**Recommended Books**

1. C.R. Kothari, 'Research Methodology', New Age International Publishers
2. K.V. Rao, 'Research Methodology', Sterling Publishers
3. Srivastava and Rego, 'Business Research Methodology' Tata McGraw Hill
4. Rajinder Nargundhkar : Marketing Research, Tata McGraw Hill
5. Cooper and Schindler, Business Research Methods, Tata McGraw Hill

**CONFERENCE AND EVENT MANAGEMENT**

**Subject Code –BHOM-534**

**L T P C**

**Duration – 60 Hrs**

**4 0 0 4**

**UNIT-I (13 Hrs)**

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. Event Planning, Event Marketing, Event Evaluation.

**UNIT-II (15 Hrs)**

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

**UNIT-III (16 Hrs)**

**BACHELOR OF MANAGEMENT STUDIES (AIRLINE, TOURISM &  
HOSPITALITY SYLLABUS 2017 BATCH ONWARDS (3 YRS.)  
(UPDATED ON 30.08.2019)**

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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-IV (16 Hrs)**

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.

**Recommended Books**

1. Event Planning by Jude Allen
2. Event Management by Lynn Van Der Wagen and Brenda Carlos
3. The Art of Successful Event Management by Tanaz Basrur
4. Successful Event Management – A Practical Handbook by Anton Shone & Bryn Parry 2nd Edition
5. Event Coordination by National Institution of Event Management (NIEM)

**DESTINATION MARKETING AND MANAGEMENT**

**Subject Code –BHOM-535**

**L T P C**

**Duration – 60 Hrs**

**4 0 0 4**

**UNIT I (15 Hrs)**

Case Studies: Golden Triangle , Pilgrimage Tourism , Cultural Tourism

**UNIT II (15 Hrs)**

Adventure Tourism, Incentive Travel ,Health Tourism

**UNIT III (15 Hrs)**

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

**UNIT IV (15 Hrs)**

Introduction to Destination marketing , Environment of Destination ,Destination marketing plan ,Consumer buying Behavior Module, Destination Product , Destination Pricing ,Distribution Channel ,Promotion I ,Promotion

**Recommended Books**

1. Baud, Bovy Munuel and Lawson, Tourism and Recreation Development, C.B.I. Pub.
2. Likorish Leonard J, Development, Tourism Destination Policies and Perspectives.
3. Seth P.N, Successful Tourism Planning Management, Cross publication.
4. Murphy Peter E. Tourism- A Community Approach New York.
5. Kaul R.N, Dynamic of Tourism- A Trilogy Sterling Publishers, New Delhi.

**PROJECT REPORT**

**Subject Code –BHOM-536**

**L T P C**

**Duration – 60 Hrs**

**0 0 4 4**



**M. PLANNING**  
**(URBAN PLANNING)**

**MRSPTU**  
**STUDY SCHEME**

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

**FIRST SEMESTER**

S. No	Code	Subject	Hrs. per Week		End Semester Exam/ External Jury (Marks)	Internal Assessment (Marks)	Credits (T)	Credits (P)	Total Credit
<b>FIRST SEMESTER</b>									
1	MARPL1-101	Planning History and Theory	3	--	50	50	3	--	3
2	MARPL1-102	Socio-economic basis for Planning	3	--	50	50	3	--	3
3	MARPL1-103	Planning Techniques	3	--	50	50	3	--	3
4	MARPL1-104	Infrastructure and Transport Planning	3	--	50	50	3	--	3
5	MARPL1-105	Housing Environments and Planning	3	--	50	50	3	--	3
6	MARPL1-106	Basic Planning Techniques	3	--	--	100	3	--	3
7	MARPL1-107	Planning Studio	--	12	150	250	--	6	6
<b>Sub-Total</b>			<b>18</b>	<b>12</b>	<b>400</b>	<b>600</b>	<b>18</b>	<b>6</b>	<b>24</b>
<b>SECOND SEMESTER</b>									
1	MARPL1-201	City and Metropolitan Planning	3	--	50	50	3	--	3
2	MARPL1-202	Infrastructure Planning	3	--	50	50	3	--	3
3	MARPL1-203	Urban Heritage Conservation	3	--	50	50	3	--	3
4	MARPL1-204	Advanced Planning Techniques	3	--	50	50	3	--	3
5	MARPL1-205	<b>Urban Planning Studio - I</b>							
		Geo-Informatics – I	3	--	50	50	3	--	3
		Development Plan	--	12	150	250	--	6	6
6	MARPL1-206 (Elective)	Inclusive Urban Planning	3	--	50	50	3	--	3
	MARPL1-207 (Elective)	Planning for Tourism							
7	<b>Mandatory Training of Six Weeks after Second Semester during Summer Vacation</b>								
<b>Sub-Total</b>			<b>18</b>	<b>12</b>	<b>450</b>	<b>550</b>	<b>18</b>	<b>6</b>	<b>24</b>

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

<b>THIRD SEMESTER</b>									
1	MARPL1-301	<b>Urban Development and Management</b>	3	--		50	3	--	3
2	MARPL1-302	<b>Project Planning and Management</b>	3	--	50	50	3	--	3
3	MARPL1-303	<b>Urban Governance</b>	3	--	50	50	3	--	3
4	MARPL1-304	<b>Politics and Planning</b>	3	--	50	50	3	--	3
5	MARPL1-305	<b>Urban Planning Studio - II</b>							
		Geo-Informatics – II	3	--	50	50	3	--	3
		Management and Governance Plan	--	12	150	250	--	6	6
6	MARPL1-306 (Elective)	<b>Environment, Development and Disaster Management</b>	3	--	50	50	3	--	3
	MARPL1-307 (Elective)	<b>Energy, Climate Change and Urban Development</b>							
7	MARPL1-308	<b>Review of Six Weeks Mandatory Training during Summer Vacation after Second Semester.</b>							
<b>Sub-Total</b>			<b>18</b>	<b>12</b>	<b>450</b>	<b>550</b>	<b>18</b>	<b>6</b>	<b>24</b>
<b>FOURTH SEMESTER</b>									
1	MARPL1-401	<b>Development Finance</b>	3	-	50	50	3	--	3
2	MARPL1-402	<b>Legal Issues and Professional Practice</b>	3	-	50	50	3	--	3
3	MARPL1-403	<b>Thesis</b>	--	24	300	500	--	12	12
<b>Sub-Total</b>			<b>6</b>	<b>24</b>	<b>400</b>	<b>600</b>	<b>6</b>	<b>12</b>	<b>18</b>
<b>Grand Total</b>			<b>60</b>	<b>60</b>	<b>1700</b>	<b>2300</b>	<b>60</b>	<b>30</b>	<b>90</b>

- Note:
- (1) Credits for Theory: One Credit for one hour of teaching per week.
  - (2) Credits for Practical: One Credit for two hours of practical per week.
  - (3) Six Weeks Training after Second Semester during the summer vacation is **mandatory** for which the Review will be held in Third Semester.

**SYLLABUS**  
**1<sup>ST</sup> SEMESTER**

MRSPTU

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

Name of the Subject: <b>PLANNING HISTORY AND THEORY</b>		
Subject Code: <b>MARPL1-101</b>	Semester: <b>First</b>	
Duration: <b>48 Hours</b>	Maximum Marks: <b>100</b>	Credits: <b>(3 + 0) = 3</b>
<b>Teaching Scheme</b>		<b>Examination Scheme</b>
Lecture : <b>3 hrs/week</b>	End Semester Exam: <b>Marks 50</b>	
Practical : --	Internal Assessment: <b>Marks 50</b>	
<b>Aim: To study History and Theory of Urban and Regional Planning.</b>		
<b>Objective:</b>		
1.	<b>To study Evolution of Cities and History of Planning.</b>	
2.	<b>To study Theories of City Development.</b>	
Pre-Requisites: --		
<b>Contents</b>		<b>Hrs</b>
Unit - 1	<b>Evolution of City Building</b> Relevance of the study of evolution of settlements; Hunter, gatherer, farmer and formation of organized society; Cosmological and other influences, origins and growth of cities, effects of cultural influence on physical form; Human settlements as an expression of civilizations; Basic elements of the city; Concepts of space, time, scale of cities.	9
Unit - 2	<b>Planning History</b> Town planning in ancient India; Medieval, renaissance, industrial and post industrial cities; City as a living spatial entity; Concepts of landmark, axis, orientation; City form as a living space; City as a political statement: New Delhi, Chandigarh, Washington D.C. Brasilia etc; Contribution of individuals to city planning: Lewis Mumford, Patrick Geddes, Peter Hall, etc; Dynamics of the growing city, impact of industrialization and urbanization, metropolis and megalopolis.	15
Unit - 3	<b>Definitions and Objectives of Planning</b> Definitions of town and country planning; Orthodoxies of planning; Goal formulation, objective, scope, limitations; Sustainability and rationality in planning; Components of sustainable urban and regional development.	9
Unit - 4	<b>Theories of City Development and Planning Theories</b> Theories of city development including Concentric Zone Theory, Sector Theory, Multiple Nuclei Theory and other latest theories; Land use and land value theory of William Alonso; Ebenezer Howard's Garden City Concept; and Green Belt Concept; City as an organism: a physical, social, economic and political entity; Emerging Concepts: global city, inclusive city, safe city, etc.; City of the future and future of the city; Shadow cities, divided cities; Models of planning: Advocacy and Pluralism in Planning; Systems approach to planning: rationalistic and incremental approaches, mixed scanning and middle range planning; Equity planning; Political Economy Model; Types of development plans, plan making process.	15

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS  
(UPDATED ON 16.10.2019)**

<b>Text / Reference Books:</b>				
<b>S. No.</b>	<b>Name of Authors</b>	<b>Titles of the Book</b>	<b>Edition</b>	<b>Name of the Publisher</b>
1	Hall, P.	Cities of tomorrow: an intellectual history of urban planning and design in the twentieth century,	2001	Blackwell, London.
2	Birch, E.L. and Silver, C.	One Hundred Years of City Planning's Enduring and Evolving Connections, Journal of the American Planning Association, Vol.75, Issue 2, pp.113-122.	2009	
3	Sandercock, L.	Making the Invisible Visible: A Multicultural Planning History	1998	University of California Press, London.
4	Brooks, M.P.	Four critical junctures in the history of the urban planning profession: An exercise in hindsight, Journal of the American Planning Association, Vol. 54, Issue 2, 241-248.	1988	
5	McLoughlin, J. B.	Urban and Regional Planning. A systems approach,	1969	Faber and Faber, London.
6	Faludi, A.	A Reader in Planning Theory,	1973	Pergamon Press, London.
7	Healey, P.	Collaborative Planning: Shaping Places in Fragmented Societies	1997	Macmillan, London.
8	Peter, G.H. and Tewdwr-Jones, M.	Urban and Regional Planning,	2011	Routledge, London. Edition.
<b>List of Exercises / Practicals:</b>				
1	Visit to Planning Organization / Department and submit Report on adoption of Concepts and Theories by them.			
<b>List of Assignments/Tests:</b>				
1	Test on Unit 1 or Unit 2.			
2	Assignment on Unit 4.			

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
**(UPDATED ON 16.10.2019)**

2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

Name of the Subject: <b>SOCIO - ECONOMIC BASIS FOR PLANNING</b>		
Subject Code: <b>MARPL1-102</b>	Semester: <b>First</b>	
Duration: <b>48 Hours</b>	Maximum Marks: <b>100</b>	Credits: <b>(3 + 0) = 3</b>
<b>Teaching Scheme</b>		<b>Examination Scheme</b>
Lecture : <b>3 hrs/week</b>	End Semester Exam: <b>Marks 50</b>	
Practical : --	Internal Assessment: <b>Marks 50</b>	
Aim: <b>To develop understanding with relevance to Socio-economic Issues in Urban and Regional Planning.</b>		
Objective:		
1.	<b>To study Socio-cultural Profile of Indian Society in the context of Urban and Rural Settlements.</b>	
2.	<b>To study the Economic Growth and Development of Urban and Rural Settlements.</b>	
Pre-Requisites: --		
<b>Contents</b>		<b>Hrs</b>
Unit - 1	<b>Nature and Scope of Sociology</b> Sociological concepts and methods, man and environment relationships; Socio- cultural profile of Indian society and urban transformation; Tradition and modernity in the context of urban and rural settlements; Issues related to caste, age, sex, gender, health safety, and marginalized groups; Displacement, resettlement and rehabilitation due to compulsory land acquisition.	9
Unit - 2	<b>Community and Settlements</b> Social problems of slums and squatters communities, urban and rural social transformation and their impact on social life, safety, security; Crimes in urban areas and their spatial planning implications, social structure and spatial planning; Role of socio-cultural aspects on growth patterns of city and neighbourhood communities; Social planning and policy, and community participation; Marginalization and concepts of inclusive planning, and gender concerns in planning. Settlement Policy: National Commission on Urbanization, Rural Habitat Policy and experiences from developing countries regarding settlement structure, growth and spatial distribution.	15
Unit - 3	<b>Elements of Micro and Macro Economics</b> Concepts of demand, supply, elasticity and consumer markets; concept of revenue costs; Economies of scale, economic and social costs, production and factor market; Different market structures and price determination; market failures, cost-benefit analysis, public sector pricing; Determinants of national income, consumption, investment, inflation, unemployment, capital budgeting, risk and uncertainty, and long-term investment planning.	12

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS  
(UPDATED ON 16.10.2019)**

Unit - 4	<b>Development Economics and Lessons from Indian Experiences</b> Economic growth and development, quality of life; Human development index, poverty and income distribution, employment and livelihood; Economic principles in land use planning; Policies and strategies in economic planning, balanced versus unbalanced growth, public sector dominance; changing economic policies, implications on land.	12
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**Text / Reference Books:**

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	N. Jayapalan	Urban Sociology	2002	Atlantic Publishers & Distributors, New Delhi
2.	William G. Flanagan	Urban Sociology-images and Structures	2010	Rowman & Littlefield Publishers Inc
3.	Mani Monto, L.S. Ganesh & K. Verghese	Sustainability and Human Settlements: Fundamental Issues, Modeling and Simulation	2005	SAGE Publications Pvt. Ltd, New Delhi
4.	Dr. D N Dwivedi	Principles of Economics	2006	Vikas Publishing House
5.	Karl E. Case	Principles of Economics	2009	Pearson Education
6.	Jhingan, M	The Economics of Development and Planning	1998	Vrinda Publications, Delhi,

**List of Exercises / Practicals:**

1.	Visits to a Village / Small town to ascertain Socio-economic Impact of Development and submit Report.
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**List of Assignments/Tests:**

1	Test on Unit 1 or Unit 3.
2	Assignment on Unit 2 or Unit 4

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).



**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

Name of the Subject: <b>PLANNING TECHNIQUES</b>				
Subject Code: <b>MARPL1-103</b>		Semester: <b>First</b>		
Duration: <b>48 Hours</b>		Maximum Marks: <b>100</b>	Credits: <b>(3 + 0) = 3</b>	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Lecture : <b>3 hrs/week</b>		End Semester Exam: <b>Marks 50</b>		
Practical : --		Internal Assessment: <b>Marks 50</b>		
Aim: <b>To study Mapping and Survey Techniques and Spatial Standards.</b>				
Objective:				
1.	<b>To study the Database for Physical Surveys and Techniques of preparation of Base Maps.</b>			
2.	<b>To study the Methods of Population Forecast and Projections.</b>			
Pre-Requisites: --				
<b>Contents</b>				Hrs
Unit - 1	<b>Survey Techniques and Mapping</b> Data base for physical surveys including land use, building use, density, building age, etc., and socio-economic surveys; Survey techniques; Land use classification or coding and expected outputs; Techniques of preparing base maps including understanding the concepts of scales, components and detailing for various levels of plans like regional plan, city plan, zoning plan, and local area plan.			12
Unit - 2	<b>Analytical Methods</b> Classification of regions, delineation techniques of various types of regions, analysis of structure of nodes, hierarchy, nesting and rank size; Scalogram, sociogram, etc.; Planning balance sheet; Threshold analysis; Input output analysis, SWOT analysis;			15
Unit - 3	<b>Demographic Methods</b> Methods of population forecasts and projections; Lorenz Curve, Ginni Ratio, Theil's index, ratios: urban – rural, urban concentration, metropolitan concentration; Location dimensions of population groups – social area and strategic choice approach – inter connected decision area analysis.			12
Unit - 4	<b>Planning Standards</b> Spatial standards, performance standards and benchmarks, and variable standards; UDPFI guidelines, zoning regulations and development control rules and regulations.			9
<b>Text / Reference Books:</b>				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Margaret Robert	An introduction to town planning techniques	1974	Hutchinson Educational, University of California
3	Ian Braken	Urban Planning Methods	2007	Routledge,
4	Kruekeberg D. A. and Silvers A. A.	Urban Planning Analysis	1988	John Willey and Sons Inc.

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<b>List of Exercises / Practicals:</b>	
1	Visit to a Local Body / Development Authority and submit report with relevance to adoption of Planning Techniques by them.
<b>List of Assignments/Tests:</b>	
1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 4.

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

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(UPDATED ON 16.10.2019)

Name of the Subject: <b>INFRASTRUCTURE AND TRANSPORT PLANNING</b>		
Subject Code: <b>MARPL1-104</b>	Semester: <b>First</b>	
Duration: <b>48 Hours</b>	Maximum Marks: <b>100</b>	Credits: <b>(3 + 0) = 3</b>
<b>Teaching Scheme</b>		<b>Examination Scheme</b>
Lecture : <b>3 hrs/week</b>	End Semester Exam: <b>Marks 50</b>	
Practical : --	Internal Assessment: <b>Marks 50</b>	
<b>Aim: To study the Elements of Infrastructure and Role of Transport in Urban and Regional Planning.</b>		
Objective:		
1.	<b>To study the Elements of Physical Infrastructure and its Management.</b>	
2.	<b>To study the Basic Principles of Urban Transport Planning and Infrastructure.</b>	
Pre-Requisites: --		
<b>Contents</b>		<b>Hrs</b>
Unit - 1	<b>Role of Infrastructure in Development</b> Elements of Infrastructure (physical, social, utilities and services); Basic definitions, concepts, significance and importance; Data required for provision and planning of urban networks and services; Resource analysis, provision of infrastructure, and land requirements; Principles of resource distribution in space; Types, hierarchical distribution of facilities, Access to facilities, provision and location criteria, Norms and standards, etc.	9
Unit - 2	<b>Planning and Management of Water, Sanitation and Storm Water</b> Water – sources of water, treatment and storage, transportation and distribution, quality, networks, distribution losses, water harvesting, recycling and reuse, norms and standards of provision, institutional arrangements, planning provisions and management issues; Sanitation – points of generation, collection, treatment, disposal, norms and standards, grey water disposal, DEWATS, institutional arrangements, planning provisions and management issues. Storm water – rainfall data interpretation, points of water stagnation, system of natural drains, surface topography and soil characteristics, ground water replenishment, storm water collection and disposal, norms and standards, institutional arrangements, planning provisions and management issues;	15
Unit - 3	<b>Planning and Management of Municipal Wastes, Power and Fire</b> Municipal and other wastes – generation, typology, quantity, collection, storage, transportation, treatment, disposal, recycling and reuse, wealth from waste, norms and standards, institutional arrangements, planning provisions and management issues. Power – Sources of power procurement, distribution networks, demand assessment, norms and standards, planning provisions and management issues. Fire – History of fire hazards, vulnerable locations, methods of fire fighting, norms and standards, planning provisions and management issues.	9
Unit - 4	<b>Transport Infrastructure Planning, Management and Design</b> Role of transport, types of transport systems, evolution of transport modes, transport problems and mobility issues; Urban form and Transport patterns, land use – transport cycle, concept of accessibility; Hierarchy, capacity and geometric design elements of roads and intersections; Basic principles of Transport infrastructure design; Traffic and transportation surveys and studies, traffic and travel characteristics; Urban transport planning process – stages, study area, zoning, data base, concept of trip generation Transport,	15

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	environment and safety issues; principles and approaches of traffic management, transport system management.	
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**Text / Reference Books:**

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Mohinder Singh and L.R. Kadiyali	Crisis in road transport	1989	Konark Publishers Pvt. Ltd. , New Delhi
2	L. R. Kadiyali	Traffic engineering and transportation planning	2007	Khanna Publishers, New Delhi
3	Mukerjee S. and Chakraborty D. (Eds)	Environmental scenario in India	2012	Routledge, London
4	Sameer Kochhar, Deepak B. Phatak, H. Krishnamurthy, Gursharan Dhanjal, (eds)	Infrastructure and Governance	2008	Academic Foundation, New Delhi

**List of Exercises / Practicals:**

1	Visit to a Local Body / Development Authority and submit report relevant with Infrastructure and Transport Planning.
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**List of Assignments/Tests:**

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 3 or Unit 4.

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

Name of the Subject: <b>HOUSING ENVIRONMENTS AND PLANNING</b>		
Subject Code: <b>MARPL1-105</b>	Semester: <b>First</b>	
Duration: <b>48 Hours</b>	Maximum Marks: <b>100</b>	Credits: <b>(3 + 0) = 3</b>
<b>Teaching Scheme</b>		<b>Examination Scheme</b>
Lecture : <b>3 hrs/week</b>	End Semester Exam: <b>Marks 50</b>	
Practical : <b>--</b>	Internal Assessment: <b>Marks 50</b>	
<b>Aim: To provide an Exposure to the Basic Housing and Planning Concepts and Issues.</b>		
Objective:		
1.	<b>To introduce the Basic Definitions, Concepts and Socio-economic Dimensions related to Housing.</b>	
2.	<b>To provide a basic understanding of Housing at the Neighborhood and City level and to appreciate the Housing Sector as an Integral Sector of Overall Town Planning System.</b>	
Pre-Requisites: --		
<b>Contents</b>		<b>Hrs</b>
Unit - 1	<b>Concepts and Definitions</b> Shelter as a basic requirement, determinants of housing form, Census of India definitions, Introduction to policies, housing need, demand and supply, dilapidation, structural conditions, materials of constructions, housing age, occupancy rate, crowding, housing shortage, income and affordability, poverty and slums, houseless population. Various housing typologies viz. traditional houses, plotted development, group housing, multi-storied housing, villas, chawls, etc.	12
Unit - 2	<b>Social and Economic Dimensions</b> Housing as social security, role of housing in development of family and community well-being, status and prestige related to housing, safety, crime and insecurity, deprivation and social vulnerability, ghettoism, gender issues, housing for the elderly. Contribution of housing to micro and macro economy, contribution to national wealth and GDP, housing taxation, national budgets, fiscal concessions, forward and backward linkages.	12
Unit - 3	<b>Housing and the City</b> Understanding housing as an important land use component of city plan / master plan, considerations for carrying out city level housing studies, projections, land use provisions; Suitability of land for housing, housing stress identification, projecting housing requirements, calculating housing shortages, housing allocation.	12

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Unit - 4	<b>Housing Environments</b> Slums and squatters, night shelters, public health issues related to housing, various theories of housing, concept of green housing, green rating of housing projects; basic services for housing neighborhoods. Approaches to neighborhood living in traditional and contemporary societies, elements of neighborhood structure, Planning and design criteria for modern neighborhoods, norms and criteria for area distribution, housing and area planning standards, net residential density and gross residential density, development controls and building byelaws, UDPFI guidelines, NBC 2005 provisions and Case studies of neighborhood planning.	12
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**Text / Reference Books:**

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Dwyer, D.J.	People and Housing in Third World Cities	1981	Orient Longman
2.	Beyer Glen H,	Housing : a factual analysis	1958	The Macmillan Co. NY
3.	Abrams, Charles	Man's Struggle for Shelter in an Urbanizing World	1964	MIT, Harvard
4.	Payne, Geoffrey	Urban Housing in the Third World	1977	Routledge and Keegan Paul, USA
5.	Al Nichols, Jason Laros	Inside the Civano Project (Green Source Books): A Case Study of Large-Scale Sustainable Neighborhood Development (Mcgraw-Hill's Green source Series)	2009	McGraw-Hill Professional
6.	Douglas Farr	Sustainable Urbanism: Urban Design With Nature	2007	John Wiley & Sons
7.	Aromar Revi	Shelter in India - Sustainable Development Series	1990	StosiusInc / Advent Books Division
8.	International Institute for Energy Conservation	Eco housing Assessment criteria Version II	2009	USAID

**List of Exercises / Practicals:**

1	Visit to Regional Office of HUDCO or State Housing Board and submit report.
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**List of Assignments/Tests:**

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 4.

**INSTRUCTIONS TO QUESTION PAPER SETTER**

- One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
- The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
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Name of the Subject: <b>BASIC PLANNING TECHNIQUES</b>		
Subject Code: <b>MARPL1-106</b>	Semester: <b>First</b>	
Duration: <b>48 Hours</b>	Maximum Marks: <b>100</b>	Credits: <b>(3 + 0) = 3</b>
<b>Teaching Scheme</b>	<b>Examination Scheme</b>	
Lecture : <b>3 hrs/week</b>	End Semester Exam: <b>Marks --</b>	
Practical : <b>-- hrs / week</b>	Internal Assessment: <b>Marks 100</b>	
Aim: <b>To study sources of demographic data and applications for GIS and remote sensing for Urban and Regional Planning.</b>		
Objective:		
1.	<b>To study GIS Applications and principles of remote sensing.</b>	
2.	<b>To study sources of demographic data and statistical applications.</b>	
Pre-Requisites: --		
<b>Contents</b>		<b>Hrs</b>
Unit - 1	<b>GIS Applications</b> Coordinate system and geo-coding, vector data structure and algorithms, raster data structure and algorithms, data bases for GIS – concepts, error modeling and data uncertainty, decision making through GIS, constructing spatial data infrastructure and spatial information system; National Urban Information system.	12
Unit - 2	<b>Remote Sensing</b> Why remote sensing, aerial and satellite remote sensing, principles of aerial remote sensing, Aerial photo-interpretation, photogrammetry, stereovision, measurement of heights / depths by relief displacement and parallax displacement. Principles of satellite remote sensing, spatial, spectral, temporal resolutions. Applications in planning, population estimation, identification of squatter / unauthorized areas, sources of pollution, etc., spatial resolution related to level of Planning	12
Unit - 3	<b>Demography</b> Sources of demographic data in India, Settlement type, growth pattern and structure: urban settlement analysis, Concentration: spatial, vertical and size, peri- urban sprawl, economic base; Rural Settlements – Size, occurrence and character, transformation, Policies towards various size class settlements. Population structure and composition – Age, sex, gender, marital status, caste, religion, literacy level, etc.; Age - sex ratio, structure, pyramid; dependency ratio; occupational structure; Fertility; mortality, migration analysis, natural growth of population, migration and its implications in spatial planning;	12
Unit - 4	<b>Statistical Applications</b> General concepts - statistical interference, population and samples variables, Sampling, simple statistical models, Measures of central Tendency, Measures of Dispersion, Measures of shape of distribution, Correlation and	12

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	regression.	
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**Text / Reference Books:**

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Longley Paul, A., et. al	Geographic Information Systems and Science	2001	John Wiley & Sons Ltd., New York.
2.	Bhatia, S.C.	Fundamentals of Remote Sensing	2008	Actantic Publishers, Delhi
3.	Sinha, V.C. and Acharia, E.	Elements of Demography	1984	Allied Pub., Delhi
4.	Dixon, W.J. and Massey, F.J.	Introduction to Statistical Analysis	1951	McGraw Hill, New York.

**List of Exercises / Practicals:**

1	Visit to NSO and Institute of Remote Sensing or Organizations using GIS and submit report.
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**List of Assignments/Tests:**

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 3 or Unit 4.

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).



**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

Name of the Subject: <b>PLANNING STUDIO</b>		
Subject Code: <b>MARPL1-107</b>	Semester: <b>First</b>	
Duration: <b>192 Hours</b>	Maximum Marks: <b>400</b>	Credits: (0 +8) = <b>8</b>
<b>Teaching Scheme</b>		<b>Examination Scheme</b>
Lecture : -- hrs/week	End Semester Exam: <b>Marks 150 (Viva-Voce only)</b>	
Practical : <b>12 hrs / week</b>	Internal Assessment: <b>Marks 250</b>	
Aim: <b>To provide Appreciation of Site Planning, Area Planning, and City Development Plan.</b>		
Objective:		
1.	<b>To understand Development Issues.</b>	
2.	<b>To appreciate Contextual location of Area in relation to City.</b>	
Pre-Requisites: --		
<b>Content</b>		
<b>First Assignment</b>		
<b>Film Appreciation (Individual Assignment)</b>		
Films related to city development and socio-economic issues will be screened for students. The purpose of these films is to educate the students' understanding of various development issues and to absorb them in the planning practice. At the end of the film, a discourse around the film will also be held.		
After viewing the films, each student is expected to write about its main focus, city / region context, its applicability to Indian environment by answering the given questions in not more than half a page.		
<b>Second Assignment</b>		
<b>Literature Review (Individual Assignment)</b>		
Each student is expected to read the article given from a journal / book and write a summary of not more than a page (250 words only) highlighting the problem, approach, methodology, analysis, how the author arrived at the conclusion and its relevance to Indian context. There will be a negative marking for writing the same text as in the original (that is copying from the original text given to them).		
<b>Third Assignment</b>		
<b>Area Appreciation (Individual Assignment)</b>		
The aim of the area appreciation exercise is to enable the students to understand and contextualize the location of the area in relation to the city, zone and area in which the particular place is situated. This is done in relation to the socio-economic, spatial and cultural characteristics of that city, zone, location, etc. The main purpose is to make the students appreciate the locational attributes of land parcels for future development in a city.		
Due to the size of the area, this exercise is done in groups of students being assigned to a particular area.		
The following planning issues at area level should be identified:		
<ul style="list-style-type: none"> <li>• Review of the Master Plan / Zonal / Area plan in relation to the selected areas.</li> <li>• Appreciation / Analysis of ward level data.</li> <li>• Perception of areas in terms of legal / illegal / authorized / unauthorized, Slums, Urban Aesthetics.</li> <li>• Social Categorizations of people - Type of population living, people's perception about area and its planning problems.</li> </ul>		

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- Land use including Agriculture land and land use conflicts, extent (%) of broad land use such as commercial, industrial, residential, institutional and recreational.
- Extent of formal / informal activities present in the area including their location and conflicts.
- General land tenure of the area and land value for different uses.
- Major types of transport, type of roads, hierarchy of roads, type of transport modes used.
- Amenities: Location of Social and Physical infrastructure and their problems as perceived by local population. Look for specific infrastructure such as Water supply, drainage (water logging areas), waste collection and disposal system, sanitation, etc.
- Environmental Issues: Open Spaces – Availability and extent of open space to built-up area, garbage disposal, encroachment (through photographic evidences and sketches).
- Locating the study area in the zone, city and regional context with respect to all the above aspects.

**Fourth Assignment**

**Site Planning (Individual Assignment)**

Site planning is a process whereby the optimum utilization of potential of site is considered recognizing the constraints the site has. It uses 3 dimensional space of the site and the associated locational advantages, human activities and the regulations that are assigned to a particular site.

The site is developed using a set of standards / norms in a given context which varies from location to location. A student is expected to understand the intricacies and interface between various variables such as soil conditions, topography, environmental dimensions, location, spatial standards applicable to the site, etc.

**Fifth Assignment**

**City Development Plan (Group Assignment)**

A City is a multi-dimensional, dynamic and a futuristic space. Understanding city involves appreciating this multi direction, and include them in the city making process. A job of physical planner does not merely understand the current conflict in development but to emerge out of this and to come out with a vision for the city. To arrive at this vision, a planner needs to understand the dynamics of various components of the city and how and what level interventions can be made to achieve that vision.

A group of students are expected to study a city in terms its present problems and issues and project a futuristic vision in terms of scenario building.

**Text / Reference Books:**

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Lynch, Kevin	Site Planning		
2.	Smith, Carl, et. al.,	Residential Landscape Sustainability – A Checklist Tool	2008	Blackwell Pub., Oxford
3.	Ministry of Urban Development	Revised Tool Kit for Preparation of CDP	2009	Government of India, New Delhi

**List of Exercises / Practicals:**

1	Visit to Local Planning Agency and Field Visit for Data Collection and submit Report.
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**List of Assignments/Tests:**

1	Marked Reviews on all Units.
2	Internal and External Jury.

**2<sup>nd</sup> SEMESTER**  
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**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

Name of the Subject: <b>CITY AND METROPOLITAN PLANNING</b>				
Subject Code: <b>MARPL1-201</b>		Semester: <b>Second</b>		
Duration: <b>48 Hours</b>		Maximum Marks: <b>100</b>	Credits: (3 + 0) = 3	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Lecture : 3 hrs/week		End Semester Exam: <b>Marks 50</b>		
Practical : --		Internal Assessment: <b>Marks 50</b>		
Aim: <b>To study the Growth of Metro and Mega Cities and their relationship with their respective Regions; and spatial planning approaches for their Planned Development.</b>				
Objective:				
1.	<b>To study City – Region Linkages and problems of Metro and Mega Cities.</b>			
2.	<b>To study Urban Development Policies and Problems.</b>			
Pre-Requisites: --				
<b>Contents</b>				<b>Hrs</b>
Unit – 1	<b>Urban Growth and System of Cities</b> Growth of cities scale, complexity and its impact on national development, cities as engines of growth, cities as ecosystems, resources in cities.			9
Unit – 2	<b>City – Region Linkages</b> City, fringe and the periphery - physical and functional linkages, peri-urban development.			9
Unit – 3	<b>Metro and Mega Cities: Problems and Issues</b> Growth trends and processes, characteristics, problems, concepts and concerns of urban sustainability, issues related to diversity and unintended growth, economic, social and environmental sustainability, quality of life, inclusivity and equity, climate change, transit oriented development, participatory planning. Inner city – issues and problems, approach to development.			15
Unit – 4	<b>Human Settlement Planning, Urban Development Policies and Programmes</b> Concepts, approaches, strategies and tools; Policies and programmes at various levels, impact on metro and mega city development.			15
<b>Text / Reference Books:</b>				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	ITPI	City and Metropolitan Planning and Design		ITPI, New Delhi
2.	Ramachandran, R	Urbanization and Urban Systems in India	1998	Oxford University Press, New Delhi
3.	Bawa, V. K.	Indian Metropolis: Urbanization, Planning and Management	1987	Inter-India Publications, New Delhi

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4	MMRDA	Madras 2011: A New Perspective for Metropolitan Management	1991	MMRDA, Chennai
5	NCRPB	Regional Plan 2021	2005	NCRPB, New Delhi
6	DDA	Master Plan for Delhi 2021	2010	DDA, New Delhi
7	Misra, R.P. & Misra, K.	Million Cities of India Vol. 1&2	1998	Sustainable Development Foundation, New Delhi

**List of Exercises / Practicals:**

1	Visit to a City / Metropolitan Planning and Development Agency and submit report.			
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**List of Assignments/Tests:**

1	Test on Unit 1 or Unit 2.			
2	Assignment on Unit 3 or Unit 4.			

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

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Name of the Subject: <b>INFRASTRUCTURE PLANNING</b>				
Subject Code: <b>MARPL1-202</b>		Semester: <b>Second</b>		
Duration: <b>48 Hours</b>		Maximum Marks: <b>100</b>	Credits: (3 + 0) = 3	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Lecture : <b>3 hrs/week</b>		End Semester Exam: <b>Marks 50</b>		
Practical : --		Internal Assessment: <b>Marks 50</b>		
<b>Aim: To study the Significance of Infrastructure in Urban and Regional Planning and Development.</b>				
Objective:				
1.	<b>The Role and Significance of Infrastructure in Habitat Planning and in inducing Peoples' Participation in the Planning Process.</b>			
2.	<b>To understand the importance of different Sectors and their Mutual Interdependence.</b>			
Pre-Requisites: --				
<b>Contents</b>				<b>Hrs</b>
Unit – 1	<b>Water Supply and Sanitation</b> Quantity and quality, source of supply, transmission and distribution, treatment methods, design guidelines. Sanitation – concepts, disposal systems, low cost sanitation options; engineering aspects of sewage disposal; Wastewater – generation, disposal system Storm water drainage – systems			12
Unit – 2	<b>Solid Waste Disposal and Management</b> Basic principles, generation, characteristics, collection, disposal, management.			12
Unit – 3	<b>Fire and Electrification, and Social Infrastructure</b> Planning for fire protection, services and space standards, location criteria; Planning for Education, health, civic, cultural infrastructure			12
Unit – 4	<b>Traffic and Transportation</b> Planning for infrastructure and facilities for transport			12
<b>Text / Reference Books:</b>				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Gathe Donald E.; Billings, R. Bruce; Buras, Nathan,	Managing urban water supply	2003	Dordrecht, Kulwer Academic Press.
2	Ghosh, G.K.	Water of India	2000	A.P.H.Publishing Corporation
3	Yadav, Satish	Water Problems and its Management,	2004	Hope India Publications
4	W'Mays Larry	Urban Water Supply Handbook	2002	McGraw Hill Handbook

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5	Butter, David	Urban Drainage	2004	David Butter & John W. Davis Spon Press (11nd Edition) London & New York, 2004.
6.	Nathanson, J.A.; John, P.E., Wiley & Sons, N.R. Brisbane	Basic Env. Technology: Water Supply, Waste Disposal & Pollution Control.	1986	
7.	Bandela, N.N.; Tare, D.G.	Municipal Solid Waste Management	2009	B.R. Publishing
8.	Holmes, J.R.	Manual on Municipal Solid Waste Management, , The Expert Committee Gol, MoUD, CPNEEO 2000 Managing Solid Waste in Developing Countries	1984	John Pub. John Wiley & Sons, Singapore.

**List of Exercises / Practicals:**

1	Visit to a Infrastructure Development Agency and submit report.
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**List of Assignments/Tests:**

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 4.

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

Name of the Subject: <b>URBAN HERITAGE CONSERVATION</b>		
Subject Code: <b>MARPL1-203</b>	Semester: <b>Second</b>	
Duration: <b>48 Hours</b>	Maximum Marks: <b>100</b>	Credits: (3 + 0) = 3
<b>Teaching Scheme</b>	<b>Examination Scheme</b>	
Lecture : 3 hrs/week	End Semester Exam: <b>Marks 50</b>	
Practical : --	Internal Assessment: <b>Marks 50</b>	
<b>Aim: To develop Understanding with relevance to Sustainable Urban Heritage Conservation.</b>		
Objective:		
1.	<b>To study Natural and Cultural Heritage Conservation.</b>	
2.	<b>To study Policies, Programmes and Legislation for Heritage Conservation.</b>	
Pre-Requisites: --		
<b>Contents</b>		<b>Hrs</b>
Unit - 1	<b>Introduction to Urban Heritage</b> Typology / classification, inventories, mapping; Human habitation in historical context; Heritage as a motivating force in sustainable urban conservation and development,	9
Unit - 2	<b>Heritage Conservation</b> Natural heritage conservation - typologies, policies for conservation, regulatory measures, community participation; Concept of Historic Urban Landscapes; Built heritage conservation - determinants of built form on heritage; Historic urban infrastructure and traditional water harvesting systems. Integration of historic monuments / areas / cores / urban systems in the developmental process and land use, regulatory measures and community involvement; Intangible cultural heritage and development: issues, conservation strategies. Preparation of conservation and heritage management plans.	15
Unit - 3	<b>Heritage and Tourism, Policies and Programmes, Legislation</b> Cultural and heritage based tourism - nature, potential and prospects, marketing aspects; Acts and laws recognizing conservation / regeneration; Heritage toolkit; Implications of 74th Constitution Amendment Act.	9
Unit - 4	<b>Design in Human Habitation</b> Social / cultural / ecological / energy determinants of design; Imagibility of the city; Structure of urban spaces – location criteria of activities and urban uses; Urban Regeneration, renewal, rehabilitation, revitalization, reconstruction and redevelopment - concepts, interventions, processes, approaches and methods, tools.	15

<b>Text / Reference Books:</b>				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher



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1.	Luigi Fusco Girard and Peter Nijkamp (editors)	Cultural Tourism and Sustainable Local Development	2009	Ashgate, Burlington
2.	Nirmala Rao Khadpekar	Urban revitalization : perspectives and initiatives /	2008	ICFAI University Press
3.	Richard Longstreth (editor)	Cultural Landscapes: Balancing Nature and Heritage in Preservation Practice	2008	University of Minnesota a Press
4.	Cohen, Naoum	Urban Planning Conservation and Preservation	2001	McGraw-Hill
5.	Ismailb Serageldin, Ephim Shluger, Joan Martin- Brown (editors)	<b>Historic Cities and Sacred Sites:</b> Cultural Roots for Urban Futures	2001	The World Bank

**List of Exercises / Practicals:**

1	Visit to a Heritage Conservation Site and submit report.
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**List of Assignments/Tests:**

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 4.

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS  
(UPDATED ON 16.10.2019)**

Name of the Subject: <b>ADVANCED PLANNING TECHNIQUES</b>				
Subject Code: <b>MARPL1-204</b>		Semester: <b>Second</b>		
Duration: <b>48 Hours</b>		Maximum Marks: <b>100</b>	Credits: (3 + 0) = 3	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Lecture : 3 hrs/week		End Semester Exam: <b>Marks 50</b>		
Practical : --		Internal Assessment: <b>Marks 50</b>		
<b>Aim: To study Advanced Planning Techniques.</b>				
<b>Objective:</b>				
1.	<b>To study Surveying Techniques and GIS Mapping.</b>			
2.	<b>To study Analytical Planning Techniques, Report Writing and Presentation.</b>			
Pre-Requisites: --				
<b>Contents</b>				<b>Hrs</b>
Unit - 1	<b>Survey Techniques</b> Data Base for Physical surveys (including land use / building use / density / building age, etc.) and Socio-economic surveys; Questionnaire formulation, Sampling and survey techniques, etc. Land use classification / coding.			9
Unit - 2	<b>GIS Mapping</b> Coordinate system, Geo-referencing and geo-coding; GIS data processing (Digitization, topology building and metadata creation), Data structures and modeling, GIS analysis (Buffer, proximity and overlay), Decision making through GIS, Information systems (Land Information system, Urban Information system for various activity sectors).			15
Unit - 3	<b>Research Design and implementation</b> Approaches in research, developing a method for research; Questionnaire Design, Types of data, sampling methods; developing aims, objectives, scope, limitations; and literature research – using library, accessing the Internet			9
Unit - 4	<b>Analytical Techniques, Presentation and Report Writing</b> Data tabulation; Interpretation of information; Graphical presentation of data; Spatial representation of data; Types of reports with specific focus on technical report writing; Organizing the report, structure chapter organization, Writing the report (analytical findings); Referencing in text, use of software in referencing			15
<b>Text / Reference Books:</b>				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Groves R.M., Fowler F.J., Couper M.P., Lepkowski J.M., Singer E., Tourangeau R.,	Survey Methodology	2009	John Wiley and Sons

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2	Easa S., Chan Y., (ed)	Urban Planning and Development, Application of GIS	2000	American Society of Civil Engineers,
3	John W. Creswel	Research Design	2003	Sage Publication, California
4	Glatthorn A. A, and Joyner R. L.	Writing the winning thesis	2005	Corwin Press, California

**List of Exercises / Practicals:**

1	Visit to a Division / Department of Local Bodies / Development Authority dealing with Surveying Techniques and submit report.
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**List of Assignments/Tests:**

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 4.

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

Name of the Subject: <b>URBAN PLANNING STUDIO - I</b>		
Subject Code: <b>MARPL1-205</b>	Semester: <b>Second</b>	
Duration: <b>240 Hours</b>	Maximum Marks: <b>500</b>	Credits (2 + 8) = <b>10</b>
<b>Teaching Scheme</b>		<b>Examination Scheme</b>
Lecture : <b>3 hrs/week</b>	End Semester Exam: <b>Marks 200</b>	
Practical : <b>12 hrs / week</b>	Internal Assessment: <b>Marks 300</b>	
<b>Aim: To carry out City Based Study focusing Planning and Design.</b>		
Objective:		
1.	<b>To Assess, Collect and Analyze the Information Requirements for the Study.</b>	
2.	<b>To understand the Characteristics of the City for Preparation of Sustainable Development Plan.</b>	
Pre-Requisites: --		
<b>Contents</b>		<b>Hrs</b>
Unit - 1	<b>Geo-Informatics Laboratory Training</b> The laboratory training will be conducted in accordance with the studio exercise. Introduction to Geo-informatics, introduction to Remote Sensing – Aerial and Satellite; introduction to GIS, Spatial data and Attribute data; Satellite images as input to GIS; Collection and presentation of baseline information.	75
Unit - 2	<b>Development Plan</b> The studio exercise focuses on the planning, development and design aspect (in line with the other core and elective courses offered in the semester). The exercise pertains to large cities and emerging metropolitan cities and ranges from preparation of sustainable development plans to sector specific themes pertaining to tourism, SEZs, etc. The studio exercise enables students to develop an approach/ framework for the task; it is field based as a database is generated that is analyzed and the plan and strategies are formulated. Initial study involves understanding of the exercise through theories, study of similar case studies, awareness of relevant norms and standards through extensive literature search. Students are required to prepare a comprehensive list of required data and identify probable sources before making a field visit to the case study town/city. Students are encouraged to translate learning from the core and elective subjects to the studio exercise. The introduction of GIS in the studio enables them to apply it in the studio exercise. Students are expected to analyze the data collected and come out with proposals and recommendations for planned development of the city. The entire exercise is also documented in the form of a technical report. The second exercise is a short and intensive exercise of one-month duration. It pertains to topical issues i.e. property tax reforms, informal sector, development of railway land, etc. The study is based on primary surveys and students are expected to analyze the information and arrive at recommendations.	165

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<b>Text / Reference Books:</b>				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Dellinger, A.	Validity and the Review of Literature, Review in the Schools	2005	
2.	Hart, C.	Doing a Literature Review, Releasing the Social Science Research Imagination	198	London: Sage and Open University.
3.	Taylor, G.	A Student's Writing Guide: How to Plan and Write Successful Essays	2009	Cambridge University Press
4.	Colin Neville, Neville, C.	The Complete Guide to Referencing and Avoiding Plagiarism	2007	McGraw-Hill International
5.	Punch, Keith	An Introduction to Social Research: Quantitative and Qualitative Approaches	2005	Sage
6.	Neuman, William	Basics of Social Research: Qualitative and Quantitative Approaches	2007	Pearson, Allen and Bacon
7.	Bryman, Alan	Social Research Methods	2008	Oxford University Press
8.	Finlay, B.	Statistical Methods for the Social Sciences	2009	Pearson Publisher University of Florida, US
<b>List of Exercises / Practicals:</b>				
1	Visit to the case study town and submit report.			
<b>List of Assignments/Tests:</b>				
1	Marked Reviews of Unit 1 and Unit 2.			
2	Internal and External Jury.			

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

<b>Name of the Subject: INCLUSIVE URBAN PLANNING (ELECTIVE)</b>				
Subject Code: <b>MARPL1-206</b>		Semester: <b>Second</b>		
Duration: <b>48 Hours</b>		Maximum Marks: <b>100</b>	Credits: (3 + 0) = 3	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Lecture : 3 hrs/week		End Semester Exam: <b>Marks 50</b>		
Practical : --		Internal Assessment: <b>Marks 50</b>		
<b>Aim: To study the various Forms, Arenas and Uses of Inclusion in the Processes of Urban and Regional Planning.</b>				
<b>Objective:</b>				
1.	<b>To study Significance of Inclusion in Planning and Development Process.</b>			
2.	<b>To study Policies, Programmes and Legislation for Participatory Planning.</b>			
Pre-Requisites: --				
<b>Contents</b>				<b>Hrs</b>
Unit - 1	<b>Understanding Inclusive Planning</b> Definitions and components			9
Unit - 2	<b>Stakeholders Profile and Needs, Access to Shelter, Services and Livelihoods</b> Urban Poor, Informal Sector, Gender, Children, Elderly, Disabled, Displaced people, etc.; Slums - dimensions, causative factors, determinants, location characteristics of settlements; Informal sector - growth, characteristics, functions, economic contributions, linkages with formal sector, impact on Urban Development			15
Unit - 3	<b>Participatory Planning Process and Policies, Programmes and Legislation</b> Methods, role of stakeholders (including civil society organizations), etc.; Related Acts, Five year plans, policies and programmes at various levels.			12
Unit - 4	<b>Planning interventions</b> Inclusive zoning, development and building regulations, Slum Improvement.			12
<b>Text / Reference Books:</b>				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Datta, A.	The Illegal City: Space, Law and Gender in a Delhi Squatter Settlement,	2012	Ashgate, Burlington.
2	Roy, A. and Ong, A. (Eds.)	Worlding Cities: Asian Experiments and the Art of Being Global	2011	Wiley Blackwell, London.
3	Eijk, G.V.	Unequal Networks: Spatial Segregation, Relationships and Inequality in the City	2010	IOS Press, Amsterdam.

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4	Harriss, J.	Antinomies of Empowerment: Observations on Civil Society, Politics and Urban Governance in India, Economic and Political Weekly, Vol.42, No.26, pp.2716-2724.	2007	
<b>List of Exercises / Practicals:</b>				
1	Visit to a Local Body / Authority and submit a Report with focus on Inclusive Planning being practiced by them.			
<b>List of Assignments/Tests:</b>				
1	Test on Unit 1 or Unit 2.			
2	Assignment on Unit 3 or Unit 4.			

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

Name of the Subject: <b>PLANNING FOR TOURISM (ELECTIVE)</b>				
Subject Code: <b>MARPL1-207</b>		Semester: <b>Second</b>		
Duration: <b>48 Hours</b>		Maximum Marks: <b>100</b>	Credits: (3 + 0) = 3	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Lecture : 3 hrs/week		End Semester Exam: <b>Marks 50</b>		
Practical : --		Internal Assessment: <b>Marks 50</b>		
Aim: <b>To study the Role of Tourism in Urban and Regional Planning.</b>				
<b>Objective:</b>				
1.	<b>To study Tourism and its Relevance in Urban Development</b>			
2.	<b>To study Policies and Programmes of Tourism so as to ascertain parameters for Planning for Tourism Sector.</b>			
Pre-Requisites: Basic awareness of the importance of tourism and its impact on urban development.				
<b>Contents</b>				<b>Hrs</b>
Unit - 1	<b>Introduction to Tourism</b> Definitions, scope, nature, classification and dimension, tourism as an industry, tourism in developed and developing world.			9
Unit - 2	<b>Tourism Sector – impacts</b> Relationship between Tourism and Urban Development, Tourism multiplier and forecasting methods: capacity building and carrying capacity planning for tourism projects, tourism and cultural and social change: Socio-cultural problems, environmental degradation.			15
Unit - 3	<b>Planning for Tourism</b> Nature and scope of a tourism plan- key issues and stages, data requirements, surveys, role of key players / stake holders in tourism policy and planning, sustainable tourism development planning; community planning and tourism; implementation and management, role of travel and tourism promoting agencies, monitoring the tourism development; Tourism marketing - concept, techniques and strategies.			15
Unit - 4	<b>Policies and Programmes</b> Tourism policies at various levels.			9
<b>Text / Reference Books:</b>				
<b>S. No.</b>	<b>Name of Authors</b>	<b>Titles of the Book</b>	<b>Edition</b>	<b>Name of the Publisher</b>
1.	Charles R. Goeldner , J.R. Brent Ritchie	Tourism: Principles, Practices, Philosophies	2009	John Wiley & Sons
2	A.Satish Babu	Tourism Development in India	2008	APH Publishing Corporation , New Delhi
3	Christopher MLaw	Urban Tourism: The Visitor Economy and the Growth of Large Cities	2009	Continuum
4.	K.K. Sharma	Planning for Tourism	2003	Sarup & Sons, New Delhi
5.	Planning Commission	Working Group Report on Tourism (2012-2017)	2012	Planning Commission,



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				Government of India
6.	Ministry of Tourism	Strategic Action Plan for Tourism in India	2011	Ministry of Tourism, Government of India
<b>List of Exercises / Practicals:</b>				
1	Visit to Ministry / Department of Tourism / ITDC / State Tourism Development Corporation / Tourism based City and Submit Report.			
<b>List of Assignments/Tests:</b>				
1	Test on Unit 1 or Unit 2.			
2	Assignment on Unit 3.			

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

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**3<sup>rd</sup> SEMESTER**

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Name of the Subject: <b>URBAN DEVELOPMENT AND MANAGEMENT</b>				
Subject Code: <b>MARPL1-301</b>		Semester: <b>Third</b>		
Duration: <b>48 Hours</b>		Maximum Marks: <b>100</b>	Credits: (3 + 0) = 3	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Lecture : 3 hrs/week		End Semester Exam: <b>Marks 50</b>		
Practical : --		Internal Assessment: <b>Marks 50</b>		
<b>Aim: To study the Processes and Management of Urban Planning and Development.</b>				
<b>Objective:</b>				
1.	<b>To comprehend the various Facets of Urban Development and Management.</b>			
2.	<b>To understand the how decisions pertaining to Supply of Land and Built Environment are taken.</b>			
Pre-Requisites: --				
<b>Contents</b>				<b>Hrs</b>
Unit - 1	<b>Introduction to Development Management</b> Concept, approaches, components, interfaces with national goals and political economic system.			9
Unit - 2	<b>Urban Development Management</b> Strategies, Tools and Techniques; organizations involved			12
Unit - 3	<b>Land and Real Estate Development</b> Economic concepts of land, Land Pricing / valuation; Economic principles of land use; demand forecasting for land use: factors affecting land supply and demand; Land development methods, Supply Management, Demand side Management; Real estate markets, type of property development and its impact on supply and demand, method of development, environmental considerations.			15
Unit - 4	<b>Information System and Urban Reforms</b> Spatial and Non - spatial information systems; Urban reforms and acts and policies.			12
<b>Text / Reference Books:</b>				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Rakodi, C.and Llyod-Jones, T.	Urban Livelihoods: A People- Centered Approach to Reducing Poverty.	2002	Earthscan, London
2	Datta, A.	The Illegal City: Space, Law and Gender in a Delhi Squatter Settlement	2012	Ashgate, Burlington
3	Roy, A. and Ong, A. (eds.)	Worlding Cities: Asian Experiments and the Art of Being Global	2011	Wiley Blackwell, London
<b>List of Exercises / Practicals:</b>				
1	Visit to development project undertaken by Local body and submit a report.			

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<b>List of Assignments/Tests:</b>	
1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 3 or Unit 4.

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

Name of the Subject: <b>PROJECT PLANNING AND MANAGEMENT</b>		
Subject Code: <b>MARPL1-302</b>	Semester: <b>Third</b>	
Duration: <b>48 Hours</b>	Maximum Marks: <b>100</b>	Credits: (3 + 0) = 3
<b>Teaching Scheme</b>	<b>Examination Scheme</b>	
Lecture : 3 hrs/week	End Semester Exam: <b>Marks 50</b>	
Practical : --	Internal Assessment: <b>Marks 50</b>	
<b>Aim: To study Project Planning, Management and Implementation Techniques.</b>		
<b>Objective:</b>		
1.	<b>To study relationship between Projects and Planning at various Levels.</b>	
2.	<b>To study Management, Implementation and Evaluation of Projects.</b>	
Pre-Requisites: --		
<b>Contents</b>		<b>Hrs</b>
Unit - 1	<b>Project planning</b> Introduction to Projects; Nature of planning projects; Project Life Cycle; Identification of projects	9
Unit - 2	<b>Project Formulation and Appraisal</b> Relationship between projects and planning issues including sectoral policy at: Local, State and National levels Project appraisal: Market analysis – Macro environment survey, survey methods, market characterization, demand forecasting; Technical Analysis – Magnitude, processes, materials, equipment, factors of production availability, implementation schedule; suitability of the plans, layout and design, location of the project; location analysis; supporting infrastructure requirements- Capital Budgeting – Estimation of costing of components; developing over project cost; Social cost benefit analysis – UNIDO, Merles, ZOPP/GOPP, etc.	15

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Unit - 3	<b>Project Management and Implementation, and Project Evaluation and Monitoring</b> Project characteristics - pitfalls in management of a project; Techniques of management; Planning milestones - responsibility charts and principle responsibility, principles of activity planning; Project Implementation – methods, hurdles, facilitative factors; Project culture: line management, steering committee, role of project manager; Project Control: cost and time, quality - ISI standards and its application to Indian context; Introduction to Project Management Software (Ms Projects) and its usage. Types of evaluation - concurrent, ex-ante and ex-post. Methods of evaluation, techniques of evaluation, end results, Presentation of evaluation findings, Techniques of Monitoring of Development Works.	12
Unit - 4	<b>Regulatory Frameworks Governing Projects</b> National Rehabilitation and Resettlement Policy (2007) - Social Impact mitigation; National Environmental Policy (2006) – Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP)	12

**Text / Reference Books:**

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Prasanna Chandra	Projects	2009	McGraw Hill, New Delhi.
2.	Barker, Stephen and Cole, Rob.	Brilliant Project Management	2007	Pearson Education Limited, UK

**List of Exercises / Practicals:**

1	Visit to a Local Body / Development Authority and submit report on the large scale project being undertaken by them.
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**List of Assignments/Tests:**

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 4.

**INSTRUCTIONS TO QUESTION PAPER SETTER**

- One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
- The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

Name of the Subject: <b>URBAN GOVERNANCE</b>				
Subject Code: <b>MARPL1-303</b>		Semester: <b>Third</b>		
Duration: <b>48 Hours</b>		Maximum Marks: <b>100</b>	Credits: (3 + 0) = 3	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Lecture : 3 hrs/week		End Semester Exam: <b>Marks 50</b>		
Practical : --		Internal Assessment: <b>Marks 50</b>		
<b>Aim: To study the Role of Government, Private Sector and the Third Sector for Governance of Cities and Regions.</b>				
<b>Objective:</b>				
1.	<b>To study the Role of the States in Urban and Regional Planning at National, State and Local levels.</b>			
2.	<b>To study the Decision Making Processes and Organizations Responsible for the Planning, Finance and Delivery.</b>			
Pre-Requisites: --				
<b>Contents</b>				Hrs
Unit - 1	<b>Overview of Urban Governance</b> Definition, concepts, components, government and governance, hierarchy and structure, forms of governance, process of inclusion and exclusion,			9
Unit - 2	<b>Legislations pertaining to Urban Governance</b> Institutional frame and mechanism for urban governance as envisaged in the 73rd and 74th Constitution Amendment Acts.			12
Unit - 3	<b>Institutions and Organizations</b> Differences between institutions and organizations; approaches to understanding organizations; types, structure and functions, their interface and conflicts, reach, and their effectiveness; Methods, process and evaluation; Present organizations and involved in urban governance.			15
Unit - 4	<b>Urban Local Governance and Participatory Processes</b> System, structure, functions, powers, process and resource, performance, interface with NGO's, other agencies. Stakeholders' participation, roles and responsibilities, access to government by various stakeholders.			12
<b>Text / Reference Books:</b>				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1	Rhodes, R.A.W.	Understanding Governance: policy networks, governance, reflexivity and accountability.	1997	Open University Press, Maidenhead,GB, Philadelphia
2	Jayal,N.G., Prakash, A. and Sharma, P.K.	Local Governance in India: decentralization and beyond.	2006	Oxford University Press, New Delhi
3	Baud, I.S.A. and Wit, J. de	New Forms of Urban Governance in India: shifts, models, networks and contestations	2008	Sage New Delhi.

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<b>List of Exercises / Practicals:</b>	
1	Visit to a Local Body and submit Report on their Decision Making Process.
<b>List of Assignments/Tests:</b>	
1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 4.

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

Name of the Subject: <b>POLITICS AND PLANNING</b>		
Subject Code: <b>MARPL1-304</b>	Semester: <b>Third</b>	
Duration: <b>48 Hours</b>	Maximum Marks: <b>100</b>	Credits: (3 + 0) = 3
<b>Teaching Scheme</b>	<b>Examination Scheme</b>	
Lecture : 3 hrs/week	End Semester Exam: <b>Marks 50</b>	
Practical : --	Internal Assessment: <b>Marks 50</b>	
<b>Aim: To understand the Two Way Relationship Between Politics and Planning.</b>		
<b>Objective:</b>		
1.	<b>To develop a Comprehension of the Interplay of Politics in the Planning Process.</b>	
2.	<b>To understand the Social, Economic and Cultural Contexts of Politics and Planning and how it influence Development / Provision / Financial / Management of Resources and other Basic Infrastructure.</b>	
Pre-Requisites: --		
<b>Contents</b>		<b>Hrs</b>
Unit - 1	<b>Interface between Politics and Planning</b> Social and economic context; State in India – political culture of the Indian State – Centre – State – Local political economy: 74 <sup>th</sup> Constitution Amendment Act, State Finance Commissions; Emergence of the State in the federal set up.	12
Unit - 2	<b>City and the State</b> State as a manager of resources – property rights, norms and standards – Government market and market by Government – Regulatory State, Reforming State, and Rent Seeking State – their spatial implications; Development planning and the Indian state – Centralization, powerlessness and decentralization; spatial politics and competition; Politics of the State and bureaucracy; New State spaces, invited and contested spaces – changing role of the state.	12

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

Unit - 3	<b>Politics related to Planning and Development</b> Politics related to land, shelter, urban infrastructure, resources; Regeneration and redevelopment politics; politics of provision, financing and pricing; decision-making and decision taking.	12
Unit - 4	<b>Politics and Civil Society</b> Politics and emergence of civil society – NGO, CBO and their role in planning, development and management, collective bargaining and collective action.	12

**Text / Reference Books:**

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Sarma, KSRN	Financing Urban Development in India	1979	IIPA, New Delhi
2.	Maarten, A.H.	City Politics	1989	Aldershot, Avebury
3.	Sharan, P.	Government and Politics of India	1984	New Delhi, Metropolitan Book
4.	Vettivel, Surendra, K.	Participation of Sustainable Development: Theory and Practice in Government and NGOs	1993	New Delhi, Vetri Publishers

**List of Exercises / Practicals:**

1	Visit to a NGO or CBO and submit report on their Role in Planning and Development.
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**List of Assignments/Tests:**

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 4.

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).



**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
**(UPDATED ON 16.10.2019)**

Name of the Subject: <b>URBAN PLANNING STUDIO - II</b>				
Subject Code: <b>MARPL1-305</b>		Semester: <b>Third</b>		
Duration: <b>240 Hours</b>		Maximum Marks: <b>500</b>	Credits: (0 + 10) = <b>10</b>	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Lecture : -- hrs/week		End Semester Exam: <b>Marks 200</b>		
Practical : <b>15 hrs / week</b>		Internal Assessment: <b>Marks 300</b>		
<b>Aim: To undertake City based study focusing on Management and Governance.</b>				
<b>Objective:</b>				
1.	<b>Introduction to Geo-informatics, satellite images and Remote Sensing.</b>			
2.	<b>To assess the status of the Case Study City, to prepare Management Plans, to identify and formulate Projects, to prepare DPR covering Physical, Environmental aspects, sequence of tasks, Cost Estimates, Project Benefits, and Institutional Framework for Project Implementation.</b>			
Pre-Requisites: --				
<b>Contents</b>				<b>Hrs</b>
Unit - 1	<b>Geo-Informatics Laboratory Training</b> The laboratory training will be conducted in accordance with the studio exercise. Introduction to Geo-informatics, introduction to Remote Sensing – Aerial and Satellite; introduction to GIS, Spatial data and Attribute data; Satellite images as input to GIS; Collection and presentation of baseline information.			75
Unit - 2	<b>Management and Governance Plans</b> The focus of the studio is on management and governance aspects (in line with the other core and elective courses offered in the semester). The exercise pertains to metropolitan cities and mega cities and ranges from preparing management plans and projects related to various sectors pertaining to infrastructure, disaster risk, riverfront development etc. Students are also required to identify and formulate projects, work out the appraisals and do the feasibility, viability and implementation mechanisms of the projects. Students work on a case study town/city and have to visit the field for collection of data and interaction with city officials and stakeholders. Although planning continues to be an important aspect of the exercise, students are also exposed to project identification, formulation, and appraisal, financing mechanisms and institutional framework. Students draw from the theoretical knowledge provided in the core and elective subjects related to management, finance and governance offered in the semester and translate them in their studio exercise. The culmination of the exercise is in the form of group presentations and studio report.			165
<b>Text / Reference Books:</b>				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher

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(UPDATED ON 16.10.2019)

1.	Goodman,L.T.; Love; Ralph N.	Project Planning and Management: an Integrated Approach	1980	Pergamon Press, NY
2.	Little, IMD, Mirrlees, J.A.	Project Appraisal and Planning for Development Countries	1974	London, Heinemann Educational Books
3.	Rougvie, Alexander	Project Evaluation and Development	1987	London, Mitchell Publishing
4.	Choudhury, S.	Project Management	1988	New Delhi, Tata McGraw- Hill
<b>List of Exercises / Practicals:</b>				
1	Visit to a Municipal Corporation and submit report on their approach for preparing of DPR.			
<b>List of Assignments/Tests:</b>				
1	Marked Reviews of Unit 1 and Unit 2.			
2	External and Internal Jury.			

Name of the Subject: <b>ENVIRONMENT, DEVELOPMENT AND DISASTER MANAGEMENT (ELECTIVE)</b>		
Subject Code: <b>MARPL1-306</b>	Semester: <b>Third</b>	
Duration: <b>48 Hours</b>	Maximum Marks: <b>100</b>	Credits: (3 + 0) = 3
<b>Teaching Scheme</b>	<b>Examination Scheme</b>	
Lecture : <b>3 hrs/week</b>	End Semester Exam: <b>Marks 50</b>	
Practical : --	Internal Assessment: <b>Marks 50</b>	
<b>Aim: To study Disaster Management Practices and Mitigation Measures and their Impact on Environment and Development</b>		
<b>Objectives:</b>		
1.	<b>To understand the Interface between Environment and Development with a focus on Disaster Management.</b>	
2.	<b>To study the Disaster Mitigation Measures and Related Legislation of Environment and Disaster Management / Mitigation.</b>	
Pre-Requisites: --		
<b>Contents</b>		<b>Hrs</b>
Unit - 1	<b>Environment, Development and Disaster Management – Interface</b> Resource use, exploitation and conservation; Impact of human activities on environment; Environment and economy interaction, introduction to environmental accounting.	12

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

Unit - 2	<b>Environmental Management</b> Environmental Impact Assessment, thresholds, indicators, audits, environmental certification, lifecycle analysis, environment and poverty links, environmental policy, Acts and regulations; Environmental education, participatory approaches, emerging concepts. Disaster classification, concepts, hazards, vulnerability, risks, human response to disaster, impacts	12
Unit - 3	<b>Disaster Mitigation and Management</b> Relevance of disaster management in development and environment, disaster preparedness, prevention, displacement and development, Role and responsibilities of government and non-government organizations, Disaster Education – awareness of individuals, communities and participation at various levels; Integrating disaster mitigation in the spatial planning process, provision of infrastructure for disaster mitigation.	15
Unit - 4	<b>Policies and Legislation Pertaining to Environment and Disaster Management</b> Policies and Legislation at various levels.	9

**Text / Reference Books:**

S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Rajib Shaw	Community, Environment and Disaster Risk Management	2010	Emerald Group Publishing Limited
2.	Rajib Shaw Hari Srinivas, Anshu Sharma	Urban Risk Reduction An Asian Perspective	2009	Emerald Group Publishing Limited
3.	P C Sinha	Introduction to Disaster Management	2007	Anmol Publications, New Delhi
4.	Pardeep Sahni, Alka Dhameja, Uma Medury	Disaster Mitigation: Experiences and Reflections	2008	PHI Learning Pvt. Limited, New Delhi
5.	Jegadish Gandhi P	Disaster Mitigation & Management PostTsunami Perspectives	2007	Deep & Deep Publications Pvt Ltd, New Delhi
6.	NDMA	Disaster Management Guidelines	2007-11	NDMA
7.	Ministry of Home Affairs	Model Amendment in Town and Country Planning Legislations, Regulation for Land Use Zoning and Building Byelaws for Structural Safety	2004	MHA
8.	Ministry of Home Affairs	National Policy on Disaster Management(NPDM)	2006	MHA

**List of Exercises / Practicals:**

1	Visit NDMA / NIDM and submit the report.
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**List of Assignments/Tests:**

1	Test on Unit 1 or Unit 2.
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**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS  
(UPDATED ON 16.10.2019)**

2	Assignment on Unit 3.
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**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

Name of the Subject: <b>ENERGY, CLIMATE CHANGE AND URBAN DEVELOPMENT (ELECTIVE)</b>				
Subject Code: <b>MARPL1-307</b>		Semester: <b>Third</b>		
Duration: <b>48 Hours</b>		Maximum Marks: <b>100</b>	Credits: (3 + 0) = 3	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Lecture : 3 hrs/week		End Semester Exam: <b>Marks 50</b>		
Practical : --		Internal Assessment: <b>Marks 50</b>		
Aim: <b>To study Interface between Energy, Climate Change and Urban Development.</b>				
Objective:				
1.	<b>To study the Determinants of Energy Supply and Demand.</b>			
2.	<b>To study relationship of Plans, Policies and Strategies with reference to Energy Planning.</b>			
Pre-Requisites: --				
<b>Contents</b>				Hrs
Unit - 1	<b>Introduction</b> Energy, Climate change and Urban Development – Interface.			9
Unit - 2	<b>Energy Generation and Consumption</b> Energy Supply and Demand, Energy Consumption in cities, determinants of energy demand, phenomenon of climate change, factors influencing climate change, impacts of climate change			12
Unit - 3	<b>Energy Planning and Management, and Mitigation and Adaptation to Climate Change</b> Energy efficient development, Compact city form, Transit oriented development. Mechanisms and measures for mitigating and adapting to climate change at various levels			15
Unit - 4	<b>Plans, Policies and Strategies</b> Related to energy planning, conservation, climate change mitigation and adaptation.			12
<b>Text / Reference Books:</b>				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	S.K Dash	Climate change: an Indian perspective, New Delhi	2007	Cambridge University Press
2.	Jenks, Mike; Burgess, Rod	Compact cities: Sustainable urban forms for developing countries	2000	Spon Press, London

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3.	Bicknell, Jane	Adapting cities to climate change: understanding and addressing the development Change	2009	Earthscan, London
4.	Andres Duany, Jeff Speck and Mike Lydon	The Smart Growth Manual	2009	McGraw-Hill
5.	David Owen	Green Metropolis: Why Living Smaller, Living Closer, and Driving Less are the Keys to Sustainability	2009	

**List of Exercises / Practicals:**

1	Visit to a Development Authority and submit report, with focus on energy planning.
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**List of Assignments/Tests:**

1	Test on Unit 1 or Unit 2.
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2	Assignment on Unit 3.
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**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

MRSPTU  
**4<sup>th</sup> SEMESTER**

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS  
(UPDATED ON 16.10.2019)**

Name of the Subject: <b>DEVELOPMENT FINANCE</b>				
Subject Code: <b>MARPL1-401</b>		Semester: <b>Fourth</b>		
Duration: <b>48 Hours</b>		Maximum Marks: <b>100</b>	Credits: (3 + 0) = 3	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Lecture : <b>3 hrs/week</b>		End Semester Exam: <b>Marks 50</b>		
Practical : --		Internal Assessment: <b>Marks 50</b>		
Aim: <b>To provide an Overview of Development Finance.</b>				
Objective:				
1.	<b>To study Development Finance covering State Finance and Municipal Finance.</b>			
2.	<b>To analyze Municipal Finance and Investment Planning in relation to Development Activities.</b>			
Pre-Requisites: --				
<b>Contents</b>				<b>Hrs</b>
Unit - 1	<b>Overview of Development Finance</b> Approaches, concepts, components, process, credit rating.			9
Unit - 2	<b>State Finance</b> Inter-governmental fiscal relationship between Central, State and Urban Local Government.			9
Unit – 3	<b>Municipal Finance</b> Urban fiscal reforms, municipal finance and urban inclusion, Sources of revenues and application of money; Equities; Loans; Debt financing; Municipal Bonds, land and non-land based sources; Structure of finances, fiscal problems and issues of financial management, implications of 74 <sup>th</sup> Constitution Amendment Act for municipal finance, expenditure pattern, Bilateral and multi lateral lending institutions mobilizing resources for a project - financial resources, land resources, project resources, and other resources.			15
Unit – 4	<b>Investment Planning and Financing Mechanism</b> Link with spatial plans, process, components, investment needs and budgeting for infrastructure and services. Financing of urban development, infrastructure and services – mechanisms and instruments, subsidy reduction, cost recovery, public private partnerships; Financial appraisal, investment appraisal; Financial Risk – Sources, Measures and perspectives on risk, Sensitivity analysis and pricing and cost recovery mechanism.			15
<b>Text / Reference Books:</b>				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Mathur, O.P. and Peterson, George	State Finance Commissions and Urban Fiscal Decentralization in India	2006	NIPFP

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**(UPDATED ON 16.10.2019)**

2.	Ministry of Finance	Report of 13 <sup>th</sup> Finance Commission	2011	Government of India, New Delhi
3.	Government of India	73rd and 74th Constitution Amendment, Acts	1992	Government of India, New Delhi
4.	Pandey, K.K.	Stimulating Revenue Base of ULBs in India	2010	IIPA

**List of Exercises / Practicals:**

1	Visit to Finance / Budget Section of Local Bodies and submit report.
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**List of Assignments/Tests:**

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 3.

**INSTRUCTIONS TO QUESTION PAPER SETTER**

1. One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

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**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

Name of the Subject: <b>LEGAL ISSUES AND PROFESSIONAL PRACTICE</b>				
Subject Code: <b>MARPL1-402</b>		Semester: <b>Fourth</b>		
Duration: <b>48 Hours</b>		Maximum Marks: <b>100</b>	Credits: (3 + 0) = 3	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Lecture : <b>3 hrs/week</b>		End Semester Exam: <b>Marks 50</b>		
Practical : --		Internal Assessment: <b>Marks 50</b>		
Aim: <b>To study Legislations related to Urban Planning and Development and to make students understand their role and responsibilities as professional planner, and equip them with the knowledge, procedures, and legal tools required for Professional Practice in Urban Planning.</b>				
Objective:				
1.	<b>To understand the Interface between Legislation and Urban Planning and to study Basic Concept of Law and Indian Constitution and the requirement of various Acts, Laws, Rules and Regulations related to Urban Planning.</b>			
2.	<b>To understand the Scope, Nature and Procedure of Professional Practice; prepare consultancy Proposals and Quote Fees and Charges for Professional Work.</b>			
Pre-Requisites: --				
<b>Contents</b>				<b>Hrs</b>
Unit - 1	<b>Introduction</b> Interface between policy and legislation pertaining to urban development.			9
Unit - 2	<b>Understanding of Law</b> Concepts, sources, terminologies, significance of law and its relationship to Urban Planning benefits of statutory backing for schemes - eminent domain and police powers; Indian Constitution: concept and contents; 73rd and 74th Constitution Amendment Act, provision regarding property rights.			9
Unit - 3	<b>Planning Legislation and Policy Formulation and Appraisal</b> Evolution; An over view of legal tools connected with Urban Planning and Development, Town and Country Planning Act, Improvement Trust Act, Urban Planning and Development Authorities Act – objectives, contents, procedures for preparation and implementation of Regional Plans, Master Plans and Town Planning Schemes. Various Acts related to urban governance, planning and development organizations, land resources, environment protection, and public participation in statutory planning process; Approaches of formulation of policies, appraisal of policies.			15
Unit - 4	<b>Professional Practice</b> Aims and objectives of professional Institutes, sister bodies, professional role and responsibility of planning consultants, professional ethics, code of conduct and scale of professional charges; Formulation of project proposal and outlines, consultancy agreements and contracts, managerial aspects; Role in inter disciplinary groups: Appreciation of the decision-making processes and the process in relation to varied consultancy assignments of planning.			15
<b>Text / Reference Books:</b>				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	ITPI	Planning Legislation and professional Practice		ITPI, New Delhi

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(UPDATED ON 16.10.2019)

2.	Bijlani, H.U. & Balachandran	Law and Urban Land	1978	IIPA, New Delhi
3.	Gol	UDPFI Guidelines Vol. 2A	1996	ITPI, New Delhi
4.	Gol	Indian Contract Act 1872; Indian Contract Act 1872; The Arbitration and Conciliation Act 1996. Constitution of India; Constitution (73rd & 74th Amendment) Acts 1992; Model Rent control Legislation; Slum (Improvement and Clearance) Act 1956; Land Acquisition Act 1894 and amendments thereof; NCR Planning Board Act, Environment (Protection) Act 1986; Model Town Planning and Regional Planning Development Law; and other acts		
5.	Government of Maharashtra	Maharashtra Regional and Town Planning Act 1966		
6.	Government of various States	State Acts related town planning, slum clearance, municipalities, development authorities, etc.		
7.	Kulshrestha, S. K.	Urban and Regional Planning in India: Handbook for Professional Practice	2012	Sage Publications, New Delhi
8.	ITPI	Conditions of Engagement of Professional Services and Scale of Professional Fee and Charges	2011	ITPI, New Delhi
9.	CPWD	CPWD Manual 2012	2012	CPWD, New Delhi

**List of Exercises / Practicals:**

1	Visit to the office of a Senior Planning Professional and submit report, on professional practice.
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**List of Assignments/Tests:**

1	Test on Unit 1 or Unit 2.
2	Assignment on Unit 3 or Unit 4.

**INSTRUCTIONS TO QUESTION PAPER SETTER**

- One compulsory question containing five questions of 2 marks (10 marks), each requiring short answers, are to be set from the entire syllabus.
- The examiner is required to set another six questions (atleast one from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

**MRSPTU M.PLANNING SYLLABUS 2019 BATCH ONWARDS**  
(UPDATED ON 16.10.2019)

Name of the Subject: <b>THESIS</b>				
Subject Code: <b>MARPL1-403</b>		Semester: <b>Fourth</b>		
Duration: <b>384 Hours</b>		Maximum Marks: <b>800</b>	Credits: (0 + 16) = <b>16</b>	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Lecture : -- hrs/week		End Semester Exam: <b>Marks 300</b>		
Practical : <b>24 hrs / week</b>		Internal Assessment: <b>Marks 500</b>		
Aim: <b>To undertake independent study in the field of Urban Planning.</b>				
Objective:				
1	<b>To develop a basic understanding of the area chosen for study (by carrying out a detailed literature review).</b>			
2	<b>To undertake detailed exploration of the topic (by way of surveys and studies).</b>			
3	<b>To identify issues and concerns those emerge out of the study and suggest recommendations.</b>			
Pre-Requisites: --				
<b>Contents</b>				Hrs
The students are required to carry out independent research and prepare a thesis on a topic on urban planning selected by them and approved the faculty under the supervision of a research guide allocated by the department.				384
<b>Text / Reference Books:</b>				
S. No.	Name of Authors	Titles of the Book	Edition	Name of the Publisher
1.	Brubaker, D.L. and Thomas, R.M.	Thesis and Dissertations: A Guide to Planning, Research and Writing.	-	-
2.	Rowena Murray	How to Write a Thesis (3 <sup>rd</sup> Edition)	-	Open University Press
3.	F. Abdul Rahim	Thesis Writing	2005	New Age International (P)Limited Publishers, New Delhi.
4.	Kastens, K.Pfirman, S., Stute, M., Abbott,D. and Scholz, C.	How to Write Your Thesis	-	Colombian University
5.	Bracken, I.	Urban Planning Methods, Research and Policy Analysis	2008	Routldge
6.	Wang, X., Von Hofpe, R.	Research Methods in Urban and Regional Planning	2007	Springer
7.	You Tube	Tools for Academic Research in Urban Design and Planning	2011	You Tube Video.
<b>List of Exercises / Practicals:</b>				
1	Field visit to Collect Data on selected Topic of Research.			
<b>List of Assignments/Tests:</b>				
1	Marked Reviews at different Stages of completion of Research work.			
2	Internal and External Jury.			

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**MRSPTU (B. SC. OPTOMETRY) SYLLABUS BATCH 2020 ONWARDS  
(4 YEARS COURSE)**

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Semester 1 <sup>ST</sup>		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
BOPTS1-101	Geometrical Optics (Optics I)	3	1	0	40	60	100	4
BOPTS1-102	Physiology (General)	3	1	0	40	60	100	4
BOPTS1-103	Anatomy (General)	3	1	0	40	60	100	4
BOPTS1-104	Basics of Biochemistry	3	1	0	40	60	100	4
BOPTS1-105	Professional communication in English	2	1	0	40	60	100	3
BOPTS1-106	Geometrical Optics-1 LAB	0	0	4	60	40	100	2
BOPTS1-107	Physiology (General)-LAB	0	0	2	60	40	100	1
<b>Total</b>		-	-	-	320	380	700	22

**MRSPTU (B. SC. OPTOMETRY) SYLLABUS BATCH 2020 ONWARDS  
(4 YEARS COURSE)**

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**GEOMETRICAL OPTICS-I**

**Subject Code: BOPTS1-101**

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

**Duration: 60 (Hrs.)**

**Course Objectives:**

- After completing this module students will be able to work problems involving the laws of reflection and refraction. Students will be able to use the mirror equation to predict the position and magnification of real and virtual images formed by flat, concave, and convex mirrors

**Course Outcomes:**

- The student will learn to use the geometrical approximation, including Fermat's principle, the ray equation and paraxial matrix formalism for refractive and reflective surfaces. The student will be introduced to the design of optical systems and aberrations, with an emphasis on image forming systems

**Unit:1.**

**(16 hrs)**

- What is light- dual nature- particle & wave nature, speed, wave length & frequency of light.
- Fermat's principle- laws of relation & refraction at a plane surface using Fermat's principle.
- Snell's law, relative and absolute refractive indices, total internal reflection and Critical angle, refraction by plane parallel slab of glass.
- Geometrical path length & optical path length of rays, Concept of wave fronts & rays, concept of vergence- divergence, convergence.

**Unit: 2.**

**(14 hrs)**

- Refraction by spherical surfaces- convex & concave, Derivation of vergence equation, focal points, decenter power, image point, lateral & axial magnification, simple numerical.
- Thin Lens- shapes, derivation of lens makers' formula, thin lens vergence equation, equivalent focal length of two thin lenses separated by a distance & placed in contact, lateral magnification of thin lenses in contact, simple numerical, concept of reduced systems.

**Unit: 3.**

**(16 hrs)**

- Thick Lens- Cardinal points & planes, front & back vertex power, matrix theory in paraxial Optics to locate positions of cardinal planes. Different types of aberrations & their effects
- Prism- Dispersion of prism, reflecting prisms, prisms diopters.
- Geometrical theory of optical fibers. Uses of optical fibers.
- Eye and Vision: Spectroradiometric curve-  $V_{\lambda}$  curve- photopic and scotopic vision CIE standard observer.

**Unit: 4.**

**(14 hrs)**

- Photometric quantities and units- Luminous Flux, Lumen- Illuminance, lux Luminous intensity, Candela Luminance, Candela/m<sup>2</sup>. Inverse square law and Cosine law of illumination (Illuminance).
- Calculation- Application of inverse square law and Cosine law- Matt surfaces.

**Reference books-**

1. Geometrical optics- r.s.longurst, optics- e.hech.

**MRSPTU (B. SC. OPTOMETRY) SYLLABUS BATCH 2020 ONWARDS  
(4 YEARS COURSE)**

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**PHYSIOLOGY (General)**

**Subject Code: BOPTS1-102**

**L T P C**

**Duration: 60 (Hrs.)**

**3 1 0 4**

**Course Objectives:**

- Human physiology aims to introduce the students to the Physiological concepts of homeostasis and control mechanisms.
- To study the functions of body systems- with emphasis on clinical relevance.

**Course Outcomes:**

- Demonstrate knowledge of general overall physiological principles associated with metabolic processes; musculoskeletal system; cardiovascular system; aerobic and anaerobic program design

**Unit: 1.**

**(15 Hrs.)**

- **Genetics:** Nucleic acids-structure of DNA and RNA, their types, properties, replication of DNA, genetic code. Chromosomal aberration-structural and numerical aberration, gene mutation-definition and classification c. Application-genetics of colour blindness, ocular albinism, practical application of mutation.
- **Blood vascular system:** Structures and functions of blood vessel types and their differences. Composition and functions of blood. Plasma proteins-types, origin, normal values, functions. Bone marrow-types and functions. Formed elements of blood-origin, formation, function, life span and fate, abnormalities of formed elements (both size and number) and related disease. Haemoglobin- structure, function and types of haemoglobin, abnormal haemoglobin and related diseases. Blood coagulation-factors, process, anticoagulants, CT and BT. Blood groups-ABO system, Rh factors, blood transfusion and consequences of incompatible blood transfusion. Terminologies-TC, DC, ESR, PCV, MCV, MCH, MCHC, ESR and their significances.

**Unit: 2.**

**(15 Hrs)**

- **Cardio vascular system:** Structure and functions of heart. blood circulation types. special junctional tissues of heart and their importance. ECG. Cardiac cycle. Heart sounds. Cardiac output. blood pressure-definition, types, measurement method, significance of blood pressure measurement, controlling factors and regulation of blood pressure.
- **Renal system:** Structure and functions of kidney. Structure and functions of nephron. Formation of urine (filtration, reabsorption, secretion). Anomalies of urine concentration. Counter current system of urine concentration.

**Unit: 3.**

**(15 Hrs)**

- **Neuro-physiology:** Structure and functions of neuron /nerve cell. Neuroglia. Myelinated and unmyelinated nerve fibre with their conduction velocity. Properties of nerve fibre. synapse-structure, types, synaptic transmission, synaptic. Potential, neurotransmitter. ANS- Introduction, types, comparison of autonomic and somatic nervous system. NMJ-structure and events in transmission.

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- **Muscular physiology:** Microscopic structure of skeletal, smooth and cardiac muscles and their differences. Properties of muscle. Red and white muscle. Single unit and multi unit smooth muscles. Motor point. Slow and fast muscle fibers. Isotonic and Isometric contractions. The Sarcotubular system. Muscle contraction-E.C.Coupling, Rigor mortis.

**Unit: 4.**

**(15 Hrs)**

- **Basic principles of Biology (Biophysical) and its application:** Diffusion-definition, factors affecting diffusion, biomedical or biological application of diffusion, Fick's law of diffusion.
- **Osmosis-** definition, factors affecting osmosis, biomedical or biological application of osmosis, laws of osmosis.
- Acids, Bases, Ph-general overview
- **Colloids:** Definition, classification, properties-optical and electro kinetics, biological application or significance of colloids.
- **Chromatography-** principles and application Electrophoresis-definition, principle, types and application g.Ultracentrifugation-definition, types Adsorption-Definition and types
- Gibb's – Donnan equilibrium
- **Radioactivity-** Definition, biological application, radio isotopes, Radio-Immuno-Assay (RIA).
- **Surface tension-** definition, factors affecting surface tension, biomedical application of surface tension. 1. Viscosity- definition, factors affecting viscosity, biomedical significance of viscosity.

**Reference books:**

- Human physiology: vol 1 and vol 2-c.c.chatterjee
- Principles of anatomy and physiology- tortora,



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**ANATOMY (General)**

**Subject Code: BOPTS1-103**

**L T P C**

**Duration: 60 (Hrs.)**

**3 1 0 4**

**Course Objectives:**

- The student will be able to identify the key concepts of the structure and function of human anatomy. The student will be able to build communication skills while involved in peer teaching of clinical anatomy.

**Course Outcomes:**

- The aim of this course is to provide students with a comprehensive overview of the morphology and functional anatomy of the human body. The course incorporates normal structure and function of the human body and provides an insight to the implications of disruption of normal structure and function.

**Unit: 1.**

**(15 hrs )**

- **Introduction of anatomy – gross human anatomy & their relations:** The skeleton – axial & appendicular (over view), Cavities of body- (cranial, thoracic, abdominal, pelvic). Structure of bone, Type & function of bone, Blood & nerve supply of the bone. Planes of the body. Anatomical terminology.
- **Skull** – General features, cranial bones (frontal, parietal, temporal, occipital, sphenoid, ethmoid). Facial bone– (nasal, maxilla, zygomatic, lacrimal, palatine, inferior nasal conchae, vomer, mandible). Special feature of the skull (sutures, paranasal sinuses, foramina, fontanelles, nasal septum).
- **Joints** – classification, fibrous joints, cartilaginous joints, synovial joints ( structure & types). Types of movement at sinovial joints.

**Unit: 2.**

**(15 hrs )**

- **Anatomy of muscular system:** Skeletal muscle structure, Important skeletal muscle (muscles of facial expression, mastication. Muscle that move the head). Over view of Trunk muscles, upper limb muscles, lower limb muscles.
- **Anatomy of nervous system:** spinal cord anatomy (external & internal anatomy). Connection & distribution of spinal nerves-overview (Branches, plexuses. Intercostal nerves). Overview of brain organization & blood supply. Brief anatomical idea on – brain stem, cerebellum, diencephalon, cerebrum. Cranial nerves.

**Unit:3.**

**(15 hrs )**

- **Embryology – general:** Gametogenesis(spermatogenesis & oogenesis) –Structure of testis,ovary &sperm –Phases of embryonic development – formation of three germ layers-derivatives of germ layers –Embryonic or Foetal membrane (chorion, amnion, allantois, yolk sac) &placenta & its functions.

**Unit:4.**

**(15 hrs )**

- **Cell Structure:** Ultra structure and functions of cell - Plasma membrane- Nucleus – Mitochondria- Centrosome-Ribosome -Endoplasmic reticulum- Golgi body & lysosome. Nucleus – Ultra structure & functions.

- **Cell Division**: Amitosis- Mitosis- Meiosis- Significance of mitosis & meiosis- Cell cycle.
- **Tissues**:- Structure, position and functions of epithelial, connective, muscular & nervous tissue.

**Reference books:**

- Principles of anatomy and physiology- tortora,
- Essentials of anatomy & physiology- martini, essentials of anatomy- i. Singh.
- Ross and wilson, 'anatomy & physiology.
- Clark, 'anatomy and physiology: understanding the human body'.

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**BASICS OF BIOCHEMISTRY**

**Subject Code: BOPTS1-104**

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

**Duration: 60 (Hrs.)**

**Course Objectives:**

- Biochemistry Majors will gain proficiency in basic laboratory techniques in both chemistry and biology, and be able to apply the scientific method to the processes of experimentation and hypothesis testing.

**Course Outcomes:**

- The course aims to provide an advanced understanding of the core principles and topics of Biochemistry and their experimental basis, and to enable students to acquire a specialized knowledge and understanding of selected aspects by means of a stem/branch lecture series and a research project.

**Unit:1.**

**(15 hrs )**

- **Carbohydrate and its metabolic pathways :** Definition, classification and functions of carbohydrate. Glycolysis, TCA cycle, Glycogenolysis, HMP shunt pathways with their significances

**Unit:2.**

**(15hrs)**

- **Amino acid, Protein and metabolic pathways :** Amino acid-definition, classification, function, properties. Protein-definition, classification and function. Primary, secondary, tertiary, quaternary structures of protein. Non protein nitrogen. Nitrogen balance. Transamination and Deamination.
- **Oxygen transporting protein:** Structure, types, compounds , derivatives and functions of haemoglobin. Myoglobin. Oxygen transporting mechanism of haemoglobin affinity for oxygen. Bohr's effect.

**Unit:3.**

**(15 hrs )**

- **Lipid:** Definition, classification, function. Fatty acid-definition, classification, function Process of beta oxidation of unsaturated fatty acids. Overview of alpha and omega oxidation.
- **Enzymes :** General characteristics, classification of enzyme. Factors affecting enzyme activity. Kinetics of enzyme-k<sub>m</sub>, Michaelis-Menten equation, Line Weaver Burk Plot. Enzyme inhibition-Reversible and Irreversible. Allosteric enzyme.

**Unit:4.**

**(15 hrs )**

- **Hormone :** Physical and chemical characteristics of hormone. types of hormone. general mechanism of hormone action. sources, functions and disorders for deficiency or excessive secretion(hypo/hyper secretions wherever applicable).

**Reference books:**

- Biochemistry- debajyoti das, biochemistry-u.satyanarayan and u. Chakrapani.
- Applied biochemistry professional publications; first edition.
- Fundamentals of applied biochemistry auris publishing.

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**PROFESSIONAL COMMUNICATION IN ENGLISH**

**Subject Code: BOPTS1-105**

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

**Duration: 45 (Hrs.)**

**Course Objectives:**

- Develop your confidence and fluency when speaking English for HR purposes as well as professional communication skills, such as presenting, participating in meetings and negotiating on HR topics

**Course Outcomes:**

- Students will develop knowledge, skills, and judgment around human communication that facilitate their ability to work collaboratively with others. Such skills could include communication competencies such as managing conflict, understanding small group processes, active listening, appropriate self-disclosure

**UNIT:1.**

**(15 Hours )**

- Grammar-structure of sentences etc.
- Business Communication Skills with focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.
- Essay- Descriptive-Comparative-Argumentative etc.
- Drafting of email & letter writing

**UNIT: 2.**

**(5 Hours )**

- Reading Comprehension from recommended text etc. biodata, Resume-curriculum vitae etc.
- Report writing-structure, types of reports etc.

**UNIT-3.**

**(15 Hrs)**

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

**UNIT-4.**

**(10 Hrs)**

- Special characteristics of health communication
- Types & process of communication
- Barriers of communication & how to overcome

**Reference books:**

- Communication (mark mccormack)
- How to write reports (john metchell)
- Business correspondence and report r.c. sharma & k.mohan (tata mc graw, new delhi 1984).

**GEOMETRICAL OPTICS-1 LAB**

**Subject Code: BOPTS1-106**

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

**Duration: 30 (Hrs.)**

**Course Objectives:**

- After completing this module students will be able to work problems involving the laws of reflection and refraction. Students will be able to use the mirror equation to predict the position and magnification of real and virtual images formed by flat, concave, and convex mirrors

**Course Outcomes:**

- The student will learn to use the geometrical approximation, including Fermat's principle, the ray equation and paraxial matrix formalism for refractive and reflective surfaces. The student will be introduced to the design of optical systems and aberrations, with an emphasis on image forming systems.

**Experiments:**

- Determination of the focal length & hence the power of a convex & Concave lens by displacement method.
- Determination of the refractive index of a transparent liquid by using a travelling microscope.
- Determination of the refractive index of the material of a convex lens measuring its focal length, using the lens & a plane mirror.
- Determination of refractive index of the material of a prism by minimum deviation method.
- To draw  $i-\delta$  curve of a prism by a spectrometer & hence to find out the angle of minimum deviation.
- Calibrate the given physical photometer consisting of a photocell & a micrometer for at least five luminous intensities & three external circuit resistances. Use the calibrated photometer to determine C.P. of the given lamp.

**PHYSIOLOGY (General) LAB**

**Subject Code: BOPTS1-107**

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

**Duration: 15 (Hrs.)**

**Course Objectives:**

- Human physiology aims to introduce the students to the Physiological concepts of homeostasis and control mechanisms and to study the functions of body systems- with emphasis on clinical relevance.

**Course Outcomes:**

- Demonstrate knowledge of general overall physiological principles associated with metabolic processes; musculoskeletal system; cardiovascular system; aerobic and anaerobic program design.

**Experiments:**

- Identification of fixed histological slides – nerve tissues (cerebellum, cerebral cortex, neurons, spinal cord, nodes of Ranvier, corneal cell space), renal tissues. Blood vessels (artery & vein), skin, Tongue, Liver.
- Identification of histological tissues: Epithelial tissue-squamous, columnar, cuboidal , Connective tissue-skeletal muscle, cardiac muscle, smooth muscle.
- Hemoglobin estimation.
- Determination of blood pressure.
- Determination of BT, CT, ESR
- Blood film making & identification of different blood corpuscle.
- ECG wave identification
- Measurement of TC of RBC & WBC & DC of WBC.
- Determination of Blood Group (ABO; Rh).

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Semester 2 <sup>nd</sup>		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
BOPTS1-201	Physical Optics (Optics II)	3	1	0	40	60	100	4
BOPTS1-202	Ocular Physiology & Nutrition	3	1	0	40	60	100	4
BOPTS1-203	Anatomy (Ocular)	3	1	0	40	60	100	4
BOPTS1-204	Environment & Ecology	3	1	0	40	60	100	4
BOPTS1-205	Computer Fundamentals	3	1	0	40	60	100	4
BOPTS1-206	Physical Optics (Optics II)-LAB	0	0	4	60	40	100	2
BOPTS1-207	Computer Fundamentals -Lab	0	0	2	60	40	100	1
Total		--	--	--	320	380	700	23

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**PHYSICAL OPTICS**

**Subject Code: BOPTS1-201**

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

**Duration: 60 (Hrs.)**

**Course Objectives:**

- The student should demonstrate fundamental knowledge and insight into physical optics in order for the candidate to be able to understand and solve problems related to the eye and optical instruments/lenses, their function and correction.

**Course Outcomes:**

- To learn the fundamental principles of classical physical optics. To learn the mathematical techniques employed in physical optics. To use these principles and techniques to solve problems in optics. To become familiar with the ray-tracing program BEAM-2 used in optical design.

**Unit:1.**

**(15 Hrs )**

- **HUYGENS' principle** – laws of reflection and refraction at plane and spherical surfaces. Wave velocity & group velocity; determination of velocity of light (any one method.)
- **Interference:** Coherence; path and phase difference; Theory of interference fringes intensity distribution in fringes; Young's double slit experiment- Fresnel's biprism, Lloyd's error experiments; visibility of fringes.
- **Interference in thin films due to reflected and transmuted light-** Interference in wedge shaped films; Newton's ring experiment ; Color of thin films; Thin film antireflection coating and filters.

**Unit:2.**

**(15 Hrs )**

- **Diffraction:** Diffraction by single slit; double slit, multiple slit- grating, circular aperture – amplitude & intensity distribution (final expressions only)
- **Circular aperture-** airy pattern, resolution by circular apertures.
- **Diffraction grating-** reflection, transmission , amplitude & phase gratings(definitions in brief) Grating dispersion & dispersive power, spectral resolution; zone plates.

**Unit:3.**

**(15 Hrs )**

- **Polarization & Crystal Optics:** Concept of polarization , polarizers, analyzers, Linear Scattering- Rayleigh & Mie Principles of LASER. Lumen method of lighting design utilization factor, light loss factor, Glare and glare index- disability glare- discomfort glare- control of glare-Daylight, its properties.

**Unit:4.**

**(15 Hrs )**

- **Color lamp** – Incandescent lamps - low pressure Hg-lamps- Low-pressure NA- lamp - Typical applications. Recommended level of illuminance for various including those in optometry and ophthalmology driving etc. VDU- Design of work station – Flicker color



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contrast- Regulations regarding the use of VDU Eye Protectors- their constructions standard relating to eye protection

## Reference books-

- Optics- e. Hecht
- Fundamentals of optics- jenkins.

## OCULAR PHYSIOLOGY & NUTRITION

Subject Code: BOPTS1-202

L T P C  
3 1 0 4

Duration: 60 (Hrs.)

### Course Objectives:

- Introduces the structure and function of the human visual system. Covers the anatomy and physiology of the eyeball, orbit, and ocular adnexa with an emphasis on ocular terminology

### Course Outcomes:

- A brief overview of the updated literature on the role of antioxidants and micronutrients in the prevention and treatment of ocular diseases is to be presented with an emphasis on cataract. PubMed search and individual papers from journals. The review discusses linkages of various micronutrients and antioxidants as well as oxidative stress with cataract. Dietary interventions as strategy for prevention of cataract and other ocular disorders are also reviewed

### Unit:1.

(15 Hrs )

- **Cornea:** Brief idea about ultra & histological structure of cornea. Corneal transparency & hydration, Regulation of corneal transparency & hydration. Corneal vascularization. Maurice theory & Goldman's theory. Biochemical composition of cornea. Sources of Nutrients-Oxygen, Glucose, Amino acid. Metabolic pathway in cornea – Glycolysis, HMP shunt.
- **Uveal tissue:** Brief idea about uvea. Uveal meshwork. Uveo-scleral drainage. Schlemm's canal switch.
- **Lens:** Basic idea about human lens. Function of lens. Lens transparency. Lens culture. Changes in ageing lens. Biochemical composition of lens. Lens protein – their types & characteristics. Lens Metabolism - Carbohydrate metabolism, protein metabolism. Antioxidant mechanism in the lens.
- **Aqueous humour:** Formation of Aqueous humour. Drainage & circulation of Aqueous Humor. Rates of production & flow. Functions of Aqueous humour.

### Unit:2.

(15 Hrs)

- **Vitreous Humour:** Composition & distribution of vitreous humour, Physiology & function of vitreous humour, Optical role of vitreous humour.
- **Retina:** Retinal structure-layers of retina. Brief idea about rod & cones. Organization of retina. Function of retina.

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- **Optic Nerve:** Physiology of optic nerve. Photopigments – Rhodopsin & Iodopsin. Chemical nature of Rhodopsin. Visual cycle (Bleaching of Rhodopsin, Transducin cycle, Role of Phosphodiesterases).
- **Ocular Circulation:** Vascular structure of the eye – ocular circulation, blood-ocular barrier (Blood-retinal, blood Vitreous & blood aqueous barrier). Regulation of ocular circulation.

## Unit:3.

(15 Hrs )

- **Protective Mechanism of the eye** –Blinking – muscles of lid closer & lid opening (orbicularis oculi, levator palpebre, Muller's muscle, blinking reflexes).
- **Lacrimation** –
  - i) Lacrimal glands
  - ii) Pre corneal tear film
  - iii) Chemistry of lachrymal secretion tear film
  - iv) Tear film dynamics (secretion of tear, formation of tear, retention & redistribution of tear, displacement phenomena, evaporation from tear film, drying & breakup of tear film, dynamic events during blinking, elimination of tear.)
  - v) Functions of Tear film. Different layers of Tear film. Chemical composition of tears. Tear film abnormalities. Tests for film Adequacy.
- **Intraocular pressure** :Features of normal IOP, Factors influencing the IOP, Control of IOP, Measurement of IOP.
- **Pupil – Normal pupil, Physiological changes in pupil size:** Isocoria, Pupillary unrest, Hippies. Pupillary reflex – Light reflex, Near reflex, Darkness reflex , Psycho sensory reflex, Lid closure reflex.

## Unit:4.

(15 Hrs )

- **Light & Dark adaptation:** Dark adaptation curve, Mechanism of dark adaptation, Factors influencing dark adaptation, Time course of light adaptation, Mechanism of light adaptation, Rod vs. cone light adaptation. Parkinje shift of spectral sensitivity.
- **Visual acuity:** visual angle, Components of Visual acuity ( Minimum visible, Resolution , Recognition Hyperacidity ), Factors affecting, Measurement of visual acuity.
- **Color vision:** Physiological, Photochemical & neurological basis of color vision Electrophysiology of color vision.
  - Granit's modulator and dominator theory, Purkinje phenomenon. Young-Helmholtz theory.
  - Types of color defects
  - Color blindness
  - Neural analysis

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**Reference books:**

- Anatomy and physiology of eye- a. k. khurana, indu khurana.
- Principles of anatomy and physiology- tortora,
- Essentials of anatomy & physiology- martini, essentials of anatomy- i. Singh.
- Ross and wilson, 'anatomy & physiology.

**ANATOMY (Ocular)**

**Subject Code: BOPTS1-203**

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

**Duration: 60 (Hrs.)**

**Course Objectives:**

- Introduces the structure and function of the human visual system. Covers the anatomy and physiology of the eyeball, orbit, and ocular adnexa with an emphasis on ocular terminology

**Course Outcomes:**

- Identify and describe the structures and functions of the visual system, eye, and adnexal structures.

**Unit:1.**

**(15 Hrs)**

- **Embryology –ocular:** Formation of optic vesicle & optic stalk, formation of lens vesicle, formation of optic cup, changes in associated mesoderm, development of various structure of eye ball – retina, optic nerve, crystalline lens, cornea, sclera, choroid, ciliary body, iris, vitreous. Development of accessory structures of eyeball – eyelids, lacrimal apparatus, extra-ocular muscles, orbit. Milestones in the development of the eye.
- **Orbit:** Bony orbit→ Size, shape & relations, walls of the orbit , Base of the orbit, Apex of orbit.
- **Orbital fascia** →Fascial bulbi, Fascial sheaths of extraocular muscles, intermuscular septa.
- **Spaces of orbit** → Orbit fat & reticular tissue - Apertures at the base of orbit- Contents of the orbit - Orbital nerve→ oculomotor , Trochler, Abducent, Trigeminal, facial nerves - their functional components, course & distribution, clinically applied aspects.

**Unit:2.**

**(15 Hrs )**

- **Uveal Tract & its vascular supply:**
  - i) Iris macroscopic & microscopic appearance .
  - ii) ciliary body – Macroscopic structure.
  - iii) chloride - Macroscopic structure.
  - iv) Blood supply to uveal structure- short & Long Posterior artery & Anterior Artery.

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- v) Venous drainage.
- **Vitreous:** Main masses of vitreous. Base of the vitreous. Hyaloidean vitreous. Vitreous cells.
- **Sclera :** Anterior, posterior & middle apertures. Episclera. Sclera proper. Lamina fusca. Blood supply of the sclera. Nerve supply of the sclera.
- **Anterior chamber and its angle-**Angle of the anterior chamber. Trabecular meshwork. Canal of Schlemm. Schwalbe's line. Drainage of aqueous humor.
- **Retina & its vascular supply:**
  - i) Gross anatomy,
  - ii) Microscopic structure of fovea centralize,
  - iii) Anatomy of optic nerve,
  - iv) Anatomy of optic nerve,
  - v) optic chiasma optic tracts,
  - vi) Lateral Geniculate body,
  - vii) optic radicalism
  - viii) visual cortex,
  - ix) Arrangement of nerve fibers
  - x) Blood supply of visual pathways (Arterial circle of willis & its branches).

**Unit:3.**

**(15 Hrs )**

- **The Ocular motor system :** Extra ocular muscles, nerve supply, motor nuclei, supra nuclear motor centers.
- **The pupillary & ciliary muscle :** Anatomy of sphincter & Dilator muscle. Ciliary muscle – Anatomy, types 12. The nerve supply of the eye ball.
- **The lachrymal apparatus:** Lachrymal gland, Palpebral part, Duets of lachrymal gland, structure of the lachrymal gland, Blood supply & nerve supply of the lachrymal gland, lachrymal passages.

**Unit:4.**

**(15 Hrs )**

- **Anatomy of the Ocular Adnexa & glands; Lids - a. Structures of the lids:** - Skin, Subcutaneous Areolar Layer, Layer of Striated muscle, Submuscular Areolar Tissue, Fibrous Layer, Conjunctiva. Glands of the Lids-Meibomian Glands, Glands of Zeis and Glands of Moll. Blood Supply of the Lids, Lymphatic Drainage of the Lids, Nerve Supply of the Lids.
- **Conjunctiva** - Palpebral Conjunctiva, Bulbar Conjunctiva, Conjunctival Fornix, Microscopic Structure of the conjunctiva- Epithelium, Substantia Propria. Conjunctival Glands→ Krause's Glands, Wofring's Glands, Henley's Glands, Manz Glands. Blood Supply of the Conjunctiva, Nerve Supply of the Conjunctiva, Caruncle, Plica Semilunaris.

**Reference books:**

1. Anatomy and physiology of eye- A.K.khurana,Indu khurana.

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**ENVIRONMENT & ECOLOGY**

**Subject Code: BOPTS1-204**

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

**Duration: 60 (Hrs.)**

**Course Objectives:**

- This course introduces students to environment concerns. Students are expected to learn about environment, factors affecting it, environmental ethics and its protection through lectures, presentations, documentaries and field visits

**Course Outcomes:**

- Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems

**Unit:1.**

**(15 Hrs )**

**General**

- Introduction, components of the environment, environment degradation.

**Ecology**

- Elements of Ecology; Ecological balance and consequences of change, principles of environmental impact assessment.

**Unit:2.**

**(15 Hrs )**

- **Air Pollution and Control:** Atmospheric composition, energy balance, climate, weather, dispersion, sources and effects of pollutants, primary and secondary pollutants, green house effect, depletion of ozone layer, standards and control measures.
- **Water Pollution and Control:** Hydrosphere, natural water, pollutants: their origin and effects, river/lake/ground water pollution, standards and control.

**Unit:3.**

**(15 Hrs )**

- **Land Pollution:** Lithosphere, pollution (municipal, industrial, commercial, agricultural, hazardous solid wastes); their origin and effects, collection and disposal of solid waste, recovery and conversion methods.

**Unit:4.**

**(15 Hrs )**

- **Noise Pollution:** Basics of acoustics and specification of sound; sound power, sound intensity and sound pressure levels; plane, point and line sources, multiple sources; outdoor and indoor noise propagation; psycho-acoustics and noise criteria, effects of noise on health, annoyance rating schemes; special noise environments: Infra-sound, ultrasound, impulsive sound and sonic boom; noise standards and limit values; noise instrumentation and monitoring procedure. Noise indices.

**Reference books:**

1. Environment & Ecology- Sunakar Panda

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**COMPUTER FUNDAMENTALS**

**Subject Code: BOPTS1-205**

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

**Duration: 60 (Hrs.)**

**Course Objectives:**

- Introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software, the Internet, networking and mobile computing

**Course Outcomes:**

- Bridge the fundamental concepts of computers with the present level of knowledge of the students. Understand binary, hexadecimal and octal number systems and their arithmetic. Understand how logic circuits and Boolean algebra forms as the basics of digital computer

**Unit.1.**

**(15 Hrs)**

- **Computer Fundamentals:** Block diagram of a computer, characteristics of computers and generations of computers. Categories of Computers - Supercomputer, mainframe computer, network server, Workstation, Desktop computers, notebook computer, Tablet PC, handheld PC, smart phone.
- **Input Devices:** Keyboard, Mouse, Joy tick, Track Ball, Touch Screen, Light Pen, Digitizer, Scanners, Speech Recognition Devices, Optical Recognition devices – OMR, OBR, OCR
- **Output Devices:** Monitors, Impact Printers – Dot matrix, Character and Line printer, Non Impact Printers – DeskJet and Laser printers, Plotter.

**Unit.2.**

**(15 Hrs)**

- **Memories:** Memory Hierarchy, Primary Memory – RAM, ROM, Cache memory. Secondary Storage Devices - Hard Disk, Compact Disk, DVD, Flash memory.
- **Software:** Types of Software- System Software, Application Software, Firmware. Type of System Software: Operating Systems, Language Translators, Utility Programs, Communications Software.
- **Commonly Used Application Software:** Word Processor, Spreadsheet, Database, Education, Entertainment Software.
- **Computer Languages:** Machine language, assembly language, high level language, 4GL.

**Unit: 3**

**(15Hrs)**

- **Number System:** Non-positional and positional number systems, Base conversion, Concept of Bit and Byte, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other. Binary Arithmetic: Addition, subtraction and multiplication, 1's complement, 2's complement, subtraction using 1's complement and 2's complement.
- **Computer Codes:** Weighted and non-weighted code, BCD, EBCDIC, ASCII, Unicode.
- **Computer Network:** Network types, network topologies.

**Unit: 4.**

**(15 Hrs)**

- **Internet Related Concepts:** Internet, World Wide Web, Hypertext, Uniform Resource Locator, Web Browsers, IP Address, Domain Name, Internet Services Providers, Internet Security, Web Search Engine, Net Surfing, web portal, Wiki, Blog.
- **Advanced Trends in IT :** Mobile Internet, GPS, 3G, 4G, Wi-Fi, Bluetooth, Cloud Technology, Virtual LAN Technology, Firewall, E-Commerce, M-Commerce, Nanotechnology, Virtual Reality, BPO and KPO, Online shopping, Social Media - YouTube, FaceBook, LinkedIn, Twitter, Google+.
- **Applications of IT:** IT in Business and Industry, IT in Education & training, IT in Science and Technology, IT and Entertainment, Current Trends in IT Application - AI, Virtual Reports, voice recognition, Robots, Multimedia Technology.

**Reference Books:**

- Peter Nortorn, Introduction to Computers, Seventh Edition
- V. Rajaraman, Fundamentals of Computers, PHI.
- Larry E. Long and Nancy Long, Computers: Information Technology in Perspective, PHI.
- N. Subramanian, Introduction to Computers, Tata McGraw-Hill.

**PHYSICAL OPTICS (Optics II)-LAB**

**Subject Code: BOPTS1-206**

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

**Duration: 30 (Hrs.)**

**Course Objectives:**

- The student should demonstrate fundamental knowledge and insight into **physical** optics in order for the candidate to be able to understand and solve problems related to the eye and optical instruments/lenses, their function and correction.

**Course Outcomes:**

- To learn the fundamental principles of classical physical optics. To learn the mathematical techniques employed in physical optics. To use these principles and techniques to solve problems in optics. To become familiar with the ray-tracing program BEAM-2 used in optical design.

**Experiments**

- To determine the wavelength of a monochromatic light source with the help of Fresnel's Biprism.
- To determine the radius of curvature of convex surface of a lens by Newton's ring method.
- To determine Planck's constant using photocell.
- To study the diffraction through a single slit & to determine its width.
- To determine the slit width & the separation between the slits of a double slit system from its Fraunhofer diffraction pattern.
- Determination of the wavelength of monochromatic light using diffraction grating.
- To calibrate a Polarimeter & hence to determine the unknown concentration of sugar solution.
- To determine the wavelength of the Laser source by forming diffraction pattern with transmission grating.
- Use a calibrated Luxmeter to measure the levels of illumination at least 15 working places in the college. Identify the locations & note the measured levels at each location, indicating whether the measured values agree with the prescribed values for comfortable vision. If there are considerable deviations,



**MRSPTU (B. SC. OPTOMETRY) SYLLABUS BATCH 2020 ONWARDS  
(4 YEARS COURSE)**

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**COMPUTER FUNDAMENTALS –LAB**

**Subject Code: BOPTS1-207**

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

**Duration: 15 (Hrs.)**

**Course Objectives:**

- Introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software, the Internet, networking and mobile computing

**Course Outcomes:**

- Bridge the fundamental concepts of computers with the present level of knowledge of the students. Understand binary, hexadecimal and octal number systems and their arithmetic. Understand how logic circuits and Boolean algebra forms as the basics of digital computer

**Experiment-**

- Design a questionnaire using a word processing package to gather information about a particular disease.
- Create a HTML web page to show personal information.
- Retrieve the information of a drug and its adverse effects using online tools.
- Creating mailing labels Using Label Wizard , generating label in MS WORD.
- Create a database in MS Access to store the patient information with the required fields Using access.
- Design a form in MS Access to view, add, delete and modify the patient record in the database.
- Generating report and printing the report from patient database.
- Creating invoice table using – MS Access.
- Drug information storage and retrieval using MS Access.
- Creating and working with queries in MS Access.
- Exporting Tables, Queries, Forms and Reports to web pages.
- Exporting Tables, Queries, Forms and Reports to XML pages.

**Recommended books (Latest edition):**

- Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
- Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
- Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA).

**MRSPTU (B. SC. RADIO MEDICAL IMAGING TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

<b>SEMESTER 1<sup>st</sup></b>		<b>Contact Hrs.</b>			<b>Marks</b>			<b>Credits</b>
<b>Subject Code</b>	<b>Subject Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Int.</b>	<b>Ext.</b>	<b>Total</b>	
BRMIS1-101	Human Anatomy & Physiology-I	3	1	0	40	60	100	4
BRMIS1-102	Applied Biochemistry	3	1	0	40	60	100	4
BRMIS1-103	Communication Skills	3	1	0	40	60	100	4
BRMIS1-104	Human Anatomy & Physiology Lab	0	0	4	60	40	100	2
BRMIS1-105	Applied Biochemistry Lab.	0	0	4	60	40	100	2
BRMIS1-106	Communication Skills-Lab	0	0	4	60	40	100	2
BRMIS1-107	Drug Abuse: Problem, Management and Prevention	3	0	0	40	60	100	3
<b>Total</b>		-	-	-	340	360	700	21

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**MRSPTU (B. SC. RADIO MEDICAL IMAGING TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

**HUMAN ANATOMY & PHSIOLOGY-I**

**Subject Code: BRMIS1 -101**

**L T P C**

**Duration: 60 (Hrs.)**

**3 1 0 4**

**Course Objectives:**

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

**Course Outcomes:**

- Demonstrate knowledge of general overall physiological principles associated with metabolic processes; musculoskeletal system; cardiovascular system; aerobic and anaerobic program design.

**Unit-1.**

**15 Hours**

- **Introduction:** Definition of anatomy and its divisions, Terms of location, positions and planes, Cell and its organelles, Tissues & its classification, Glands.
- **Musculoskeletal system:** Structure of Bone & its types, Joints- Classification of joints with examples; details of synovial joint. Bones & joints of upper limb, lower limb and their movements. Axial skeleton & appendicular skeleton. Skull, spine & its movements, intervertebral disc. Muscles & its types. Muscles of the upper limb, lower limb, trunk and neck. Classification of Muscle, structure of skeletal muscle - Neuromuscular Junction - Excitation Contraction Coupling

**Unit-2.**

**15 Hours**

- **Cardiovascular System:** Arteries & veins, Capillaries & arterioles, Red Blood Cells- Functions, count, Physiological variations. Erythropoiesis-stages - Hemoglobin- Functions, Physiological variations. - White Blood cells-Functions, count, morphology. - Platelets-count, morphology, functions.
- **Hemostasis- Definition:** Mechanism, clotting factors. - Blood groups-ABO system, Rh system, Blood transfusion- Indication, transfusion reactions. - Anaemias- classification, morphological and Etiological, effects of anaemia on body. Heart- size, location, chambers, blood supply of heart, pericardium, Systemic & pulmonary circulation, Major blood vessels of Heart- Aorta, pulmonary artery, common carotid artery, subclavian artery, axillary artery, brachial artery, common iliac artery, femoral artery. Inferior vena cava, portal circulation, great saphenous vein, Heart-Physiological Anatomy, Nerve supply, Properties of cardiac muscle.
- **Cardiac Cycle-Events** –systole, diastole - Cardiac Output-Definition and factors affecting it. - Heart sounds-normal heart sounds, its causes, areas of auscultations. - Blood Pressure-Definition, normal value, Physiological variations, its measurement. - ECG- normal waves. - Shock-Definition, Types.

**Unit-3.**

**15 Hours**

**1. Gastro-intestinal System:**

- Parts of GIT, structure of tongue, pharynx, salivary glands, Location & Gross structure of Oesophagus, stomach, intestine (small and large), liver, gall bladder, pancreas,

spleen. Physiological Anatomy, functions of GIT. Salivary Gland-functions of saliva. Stomach- structure and functions, Gastric secretions-composition, functions, Mechanism - Pancreas- structure, functions, composition of Pancreatic juice. Liver- Functions of liver.

- Bile-Composition, functions. - Jaundice-Types and its causes. - Gall Bladder-Functions - Intestine- Movements of small and large intestine. - Digestion and Absorption of Carbohydrates, Proteins, Fats. - Hormones of GIT- Functions of Gastrin, Secretin, CCKPz.

**Unit-4.**

**15 Hours**

- **Sensory Organs:** Skin & its appendages. Structure of eye & lacrimal apparatus, name of extraocular muscles. Structure of ear: external, middle & inner ear, functions of different parts, Visual acuity, Refractive errors Ear-structure, functions, General mechanism of hearing.
- **Lymphatic System:** Lymph & Lymph vessels. Structure of lymph node, names of regional lymphatics, axillary and inguinal lymph nodes.

**Recommended Text Books / Reference Books:**

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

APPLIED BIOCHEMISTRY

Subject Code: BRMIS1-102

L T P C  
3 1 0 4

Duration: 60 (Hrs.)

**Course Objectives:**

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

**Course Outcomes:**

- Applied Biochemistry is the part of biochemistry where knowledge and methods related to biochemistry are applied to real world problems like to investigate cause of diseases in medicine, to study effect of nutritional deficiencies, to find ways for pest control, improve productivity and storage in agriculture.

**Unit- 1.**

**15 Hours**

- **Cell:** Morphology, structure & functions of cell, cell membrane, Nucleus, chromatin, Mitochondria, Endoplasmic Reticulum, Ribosomes.
- **Carbohydrates:** Definition, chemical structure, functions, sources, classifications, Monosaccharide's, Disaccharides, Polysaccharides, muco-polysaccharide and its importance, glycoprotein
- **Lipids:** Definition, function, sources, classification, simple lipid, compound lipid, derived lipid, unsaturated and saturated fatty acid. Essential fatty acids and their importance, Blood lipids and their implications, cholesterol with its importance.
- **Proteins :** Definition, sources, amino acids, structure of protein, their classification, simple protein, conjugated protein, derived proteins and their properties.
- **Enzymes:** Definitions, mechanism of action, factors affecting enzyme action, enzyme of clinical importance.

**Unit- 2.**

**15 Hours**

- **Nutrition:** Vitamins types, functions and role, Principal minerals and their functions (Ca, P, Mg, Na, K, Cl). Balanced diet, Diet for Chronically and terminally ill patients, post operative patients
- **Bioenergetics:** Energy rich compounds, Respiratory chain and Biological oxidation.

**Unit-3**

**15 Hours**

- **Carbohydrate Metabolism:** Glycolysis, TCA cycle, Glycogen metabolism, Gluconeogenesis, Maintenance of Blood Glucose. Diabetes Mellitus and its complications.
- **Lipid Metabolism:** Beta oxidation, Ketone bodies, Cholesterol and atherosclerosis, obesity.
- **Protein Metabolism:** Transamination, Deamination, Fate of ammonia, urea synthesis and its inborn errors.

**Unit-4-**

**15 Hours**

- **Water and Electrolyte, Fluid compartment, daily intake and output sodium and potassium balance**
- **Nerve tissue:** Neuro transmitters and nerve activity.
- **Hormones:** Actions of Hormone Insulin, Glucagon, Thyroid and Parathyroid hormones, Cortical hormones.
- **Biophysics: Concepts of pH and buffers, osmotic pressure and its physiological applications.**
- Acid Base Balance , role of lungs and kidneys,– Regulation of blood pH, acidosis, Alkalosis
- **Physical Chemistry:** Osmosis, Dialysis, Donann membrane equilibrium
- **Organ function Tests:** Renal and Liver Function Tests.

**Recommended Text Books / Reference Books:**

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

**COMMUNICATION SKILLS**

**Subject Code: BRMIS1-103**

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

**Duration: 60 (Hrs.)**

**Course Objective:**

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

**Course Outcomes:**

- These skills can include social graces, communication abilities, language skills, personal habits, cognitive or emotional empathy, and leadership traits.
- The organizations with trained soft skill staff are more successful. Hence in addition to standard qualification the students trained with this course will be able to deal with patients, their fellows and seniors, face to face, in a better way.

**UNIT-1**

**(15Hrs)**

- Basic Language Skills: Grammar and Usage.
- Business Communication Skills with focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.

**UNIT-2**

**(15 Hrs)**

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

**UNIT-3**

**(15 Hrs)**

- Special characteristics of health communication
- Types & process of communication
- Barriers of communication & how to overcome.

**UNIT-4**

**(15 Hrs)**

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

**Recommended Text Books / Reference Books:**

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

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**HUMAN ANATOMY AND PHYSIOLOGY – I (PRACTICAL)**

**Subject Code: BRMIS1-104**

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

**Duration: 30 (Hrs.)**

**Human Anatomy & Physiology – Practical**

- Demonstration of various parts of body
- Demonstration of cell and tissues of body
- Demonstration of parts of Digestive system.
- Demonstration of various parts of circulatory system
- Examination of blood film for various blood cells from stained slides
- Blood pressure estimation
- Demonstration of structural differences between skeletal, smooth and cardiac muscles
- Demonstration of various bones and joints.
- To study circulatory system from charts and transverse section (TS) of artery and vein.

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**APPLIED BIOCHEMISTRY (PRACTICAL)**

**Subject Code: BRMIS1-105**

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

**Duration: 30 (Hrs.)**

- To visit Clinical biochemistry laboratory observe and learn about various tests are being performed in clinical biochemistry laboratory.
- To practice Blood sample collection as per sample draw pattern.
- Basics of various routine laboratory tests performed e.g. determination of blood sugar levels, Liver function tests, renal function tests, and Urine sugar and protein level.
- To understand briefly the interpretation of various tests report to know about critical alerts.
- To visit Blood Gas Analysis laboratory and learn to analyse blood gases.

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**COMMUNICATION SKILLS (PRACTICAL)**

**Subject Code: BRMIS1-106**

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

**Duration: 30 (Hrs.)**

- Précis writing and simple passage from a prescribed text books. Atleast100 words should be chosen and few questions from the passage may be said to answer.
- Speaking skill testing: Giving as small topic and to speak for at least two minutes on it.
- Group discussion on profession related topics
- To practice all forms communication i.e. drafting report, agenda notes, précis writing, E. mail drafting, circular, representations, press release, telephonic communication, practice of writing resume and Writing application of employment.
- Organising a mock interview.
- Locate a specified book in the library Find out some words in the dictionary Pronunciation, stress and intonation Give abbreviations of particular words and vice-versa Give meaning of some words Spell some words Practice of handling some communication system like telephone and noting down and conveying message.

**MRSPTU (B. SC. RADIO MEDICAL IMAGING TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

**DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION**

**Subject Code: BRMIS1-107**

**L T P C**

**Duration: 45 (Hrs.)**

**3 0 0 3**

**Course Objectives:**

- To make students understand the concept of drug abuse and their impact on public health.
- To make students understand the types of drugs.
- To make them aware of the impact of drugs addiction on families and peers.
- To make students understand the management and prevention of drug abuse.

**Course Outcomes:**

- Students gain knowledge about detrimental impacts of drug on health and relations.
- Students become aware about the physiological and sociological causes of drug abuse.
- Students acquire knowledge about types of drugs.
- Students acquire knowledge about management and prevention of drug abuse.

**UNIT-1**

**(13 Hours)**

- **Problem of Drug Abuse:** Concept and Overview; Types of Drug Often Abused
- **Concept and Overview**
  - i. What are drugs and what constitutes Drug Abuse?
  - ii. Prevalence of menace of Drug Abuse
  - iii. How drug Abuse is different from Drug Dependence and Drug Addiction?
  - iv. Physical and psychological dependence- concepts of drug tolerance
- **Introduction to drugs of abuse: Short Term, Long term effects & withdrawal symptoms**
- **Stimulants:** Amphetamines, Cocaine, Nicotine
- **Depressants:** Alcohol, Barbiturates- Nembutal, Seconal, Phenobarbital Benzodiazepines Diazepam, Alprazolam, Flunitrazepam
- **Narcotics:** Opium, morphine, heroin
- **Hallucinogens:** Cannabis & derivatives (marijuana, hashish, hash oil), Steroids and inhalants.

**UNIT-2**

**(11 Hours)**

- **Nature of the Problem:** Vulnerable Age Groups, Signs and symptoms of Drug Abuse
  - i. Physical indicators.
  - ii. Academic indicators.
  - iii. Behavioral and Psychological indicators.

**UNIT-3**

**(11 Hours)**

- **Causes and Consequences of Drug Abuse**
- **Causes**
  - (a) Physiological
  - (b) Psychological
  - (c) Sociological
- **Consequences of Drug Abuse**

- (a) For individuals
- (b) For families
- (c) For society & Nation

**UNIT-IV**

**(10 Hours)**

- **Management & Prevention of Drug Abuse**
  - a) Management of Drug Abuse
  - b) Prevention of Drug Abuse
  - c) Role of Family, School, Media, Legislation & Deaddiction Centers

**Recommended Text Books / Reference Books:**

1. Kapoor. T., Drug Epidemic among Indian Youth, Mittal Pub, New Delhi, 1985.
2. Modi, Ishwar and Modi, Shalini, Drugs: Addiction and Prevention, Rawat Publication, Jaipur, 1997.
3. Ahuja, Ram, Social Problems in India, Rawat Publications, Jaipur, 2003.
4. National Household Survey of Alcohol and Drug Abuse. New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
5. World Drug Report , United Nations Office of Drug and Crime, 2011
6. World Drug Report, United nations Office of Drug and Crime, 2010.
7. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
8. The Narcotic Drugs and Psychotropic Substances Act, 1985, New Delhi: Universal, 2012.

**MRSPTU (B. SC. RADIO MEDICAL IMAGING TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

Total Credits = 23

SEMESTER 2 <sup>nd</sup>		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BRMIS1-201	Human Anatomy & Physiology- II	3	1	0	40	60	100	4
BRMIS1-202	Microbiology	3	1	0	40	60	100	4
BRMIS1-203	Quality Management, Patient Safety & Disaster Management	1	1	0	40	60	100	2
BRMIS1-204	Applied Physics	2	1	0	40	60	100	3
BRMIS1-205	Computer Applications in Pharmacy (Theory)	3	1	0	40	60	100	4
BRMIS1-206	Human Anatomy & Physiology- II Lab	0	0	4	60	40	100	2
BRMIS1-207	Microbiology Lab	0	0	4	60	40	100	2
BRMIS1-208	Computer Applications in Pharmacy (Practical)	0	0	4	60	40	100	2
Total		--	--	--	380	420	800	23

MRSPTU

**HUMAN ANATOMY & PHYSIOLOGY- II**

**Subject Code: BRMIS1-201**

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

**Duration: 60 (Hrs.)**

**Course Objectives:**

- Students will be able to learn the terminology of the subject and basic knowledge of the cell structure and function of organs, organ systems and body fluids in normal human body.

**Course Outcomes:**

- Demonstrate knowledge of general overall physiological principles associated with metabolic processes; musculoskeletal system; cardiovascular system; aerobic and anaerobic program design

**UNIT-I**

**(15 Hrs)**

**1. Respiratory system:**

- Parts of Respiratory system structure of nose, nasal cavity, larynx, trachea, lungs, pleura, bronchopulmonary segments, Physiological Anatomy, Functions of the respiratory system.
- Types of respiration, respiratory membrane. - Lung volumes and capacities, vital capacity and factors affecting it.
- Transport of Oxygen-Forms of transportation, Oxy-hemoglobin dissociation curve and factors affecting it. - Transport of Carbon-Dioxide- Forms of transportation.
- Hypoxia-Definition, types, effects of hypoxia.
- Cyanosis-Definition and types.
- Artificial Respiration- CPR

**UNIT-II**

**(15 Hrs)**

**2. Nervous System.**

- Neuron, classification of Nervous System. Meninges, ventricles, CSF, Gross features of cerebrum, midbrain, pons, medulla oblongata, cerebellum, name of basal nuclei. Blood supply of brain, cranial nerves. Spinal cord and spinal nerves. Visual & auditory pathways, Structure of neuron, functions of nervous system.
- Classification and properties of nerve fibres Synapse structure and types Receptors. Definition, classification, properties, Reflex Arc Ascending and Descending tracts names and functions, Functions of Hypothalamus. Functions of Cerebellum and Basal Ganglia Functions of Cerebral Cortex, Autonomic Nervous System, Actions of sympathetic and parasympathetic system and their comparison.

**UNIT-III**

**(15 Hrs)**

**3. Urinary System:**

- Parts of Urinary system, location and gross structure of kidney, ureter, urinary bladder, urethra. Kidneys structure of nephron, functions of kidney, Glomerular filtration Rate (GFR) and factors affecting it , Counter Current Mechanism , Bladder-its innervation, micturition reflex.

**4. Reproductive system:**

- Parts of male reproductive system, gross structure of testis, vas deferens, epididymis, prostate. Parts of female reproductive system, gross structure of uterus, ovary, fallopian tube, mammary gland.
- Male Reproductive System-Stages of spermatogenesis, function of Testosterone - Female Reproductive System-Ovulation, menstrual cycle, functions of Estrogen and progesterone

**UNIT-IV**

**(15 Hrs)**

**4. Endocrine glands:**

- Name of all endocrine glands, gross structure & functions of pituitary gland, adrenal gland, thyroid gland and parathyroid gland.
- Classification of Endocrine glands and their hormones. -Thyroid Gland-Physiological Anatomy, hormones secreted, functions, disorders Hypo and hyper secretion of hormone. -Adrenal Gland-Adrenal Cortex-Physiological Anatomy, its hormones and functions. - Adrenal Medulla-Hormones, functions. - Pituitary Gland- Anterior and posterior pituitary hormones and their functions, disorders.-Pancreas- Hormones and their functions, Diabetes Mellitus-types, pathophysiology, signs and symptoms. - Parathyroid Gland- Hormones and their functions.

**Recommended Text Books / Reference Books:**

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

**MICROBIOLOGY**

**Subject Code: BRMIS1-202**

**L T P C**

**Duration: 60 (Hrs.)**

**3 1 0 4**

**Course Objectives:**

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

**Course Outcomes:**

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



**MRSPTU (B. SC. RADIO MEDICAL IMAGING TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

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**Unit-1** **10 Hours**

**1. Introduction and History of Microbiology**

- Classification-Prokaryotes, Eukaryotes, Viruses, Fungi.
- Morphology-size, shape, arrangement
- Special characteristics–spores, capsules, enzymes, mortality, reproduction
- Gram staining, ZN staining (e) Different types of microscopes

**Unit-2** **20 Hours**

**1. Sterilization:**

- Definition and different methods of sterilization including – Gaseous sterilization Plasma sterilization.
- Advantage and disadvantage of various methods and their controls.
- Sterilization of different instruments used in patients.
- Preparation of materials for Autoclaving: packing, loading, holding time, unloading

**2. Disinfection:**

- Definition and different type of methods including High level disinfectants
- Disinfection of patient care unit and rooms(O.T., Wards, ICUs & Laboratories)
- Central supply department Areas and floor plan for instrument cleaning high level disinfection & sterilizing area.

**3. Asepsis:**

- Universal Precautions
- Use of aseptic precautions to prevent infection,
- Safety mechanisms including vaccination in prevention of blood borne infections

**Unit-3** **20 Hours**

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

**Unit-4** **10 Hours**

**1. Virology.**

- With special reference to hepatitis, poliomyelitis, HIV & Influenza.
- Viruses relevant in dialysis patients including their modes of transmission.

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BATCH 2020 ONWARDS**

- Diseases communicable to healthcare workers in hospital set up and their prevention.
- Prevention measures to combat spread of these infections by monitoring and control.

**2. Microbial surveillance and sampling.**

- Bacteriology of air, water and food.
- Hospital infection Control & Influenza.
- Viruses relevant in dialysis patients including their modes of transmission.
- Diseases communicable to healthcare workers in hospital set up and their prevention.
- Prevention measures to combat spread of these infections by monitoring and control.
- Microbial surveillance and sampling.
  - a) Bacteriology of air, water and food
  - b) Hospital infection Control.

**Recommended Text Books / Reference Books:**

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

**QUALITY MANAGEMENT, PATIENT SAFETY AND DISASTER MANAGEMENT**

**Subject Code: BRMIS1-203**

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

**Duration: 30 (Hrs.)**

**Course Objective:**

- The course will help students to understand the basic concepts of quality health Care and develop skills to implement sustainable quality assurance, Quality control and Quality improvement program in the healthcare system particularly in Operation theatre services.
- They shall be prepared to work in healthcare system primarily taking care of patient safety.

**Course Outcomes:**

- By learning Biomedical Waste management they will help prevent harm to workers, property, the environment and the general public from hazardous and infectious waste.
- While living on this earth humans and all other living creatures may face many types of natural and manmade disasters. Some contents of this subject are focused on preparing the students to deal with healthcare requirement during these disasters and help the life.

**Unit -1** **(10 Hrs)**

**1. Quality management system (QMS):**

- Understanding Quality and components of QMS i.e. Quality assurance, Quality control and Quality improvement.
- The basic concepts of quality in health Care.
- Standards and Norms.
- Quality Improvement Tools.
- Introduction to NABH guidelines.
- Implementation of QMS in Operation theatres.

**Unit -2.** **(5 Hrs)**

**1. Basics of emergency care and life support skills:**

- Vital signs and primary assessment.
- Basic emergency care – first aid and triage.
- Basic life support (BLS) following cardiac arrest.

**Unit -3.** **(10 Hrs)**

**1. Fundamental aspects of BLS:**

- immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system,
- Initial recognition and response to heart attack and stroke.
- Ventilations including use of bag-valve-masks (BVMs) d. Choking, rescue breathing methods e. One- and Two-rescuer CPR.

**Unit -4.** **(5Hrs)**

**1. Fundamental aspects of BLS:**

- Early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED).
- Managing an emergency including moving a patient
- Testing student's skills with focus on airways management and chest compressions.

**Recommended Text Books / Reference Books:**

1. Hospital Emergency Management Dr Robbert D.Mullar
2. Gis In Hospital And Healthcare Emergency Mangement Edited By Ricskinner
- 3.Handbook Of Disaster & Emergencuy Management Aarimkhoram & Mahesh

**MRSPTU (B. SC. RADIO MEDICAL IMAGING TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

**APPLIED PHYSICS**

**Subject Code: BRMIS1-204**

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

**Duration: 45 (Hrs.)**

**Objective:**

- The subject will make them capable of understanding the physics involved in working of various instruments used in operation theatres.

**UNIT-1**

**(10 Hrs)**

- Energy: Potential energy and Kinetic energy, Mechanical efficiency, Energy and mass.
- Density of Gases: Molecular weight, Gram molecular weight. Avogadro number, Molecular agitation, Density.

**UNIT-2**

**(10 Hrs)**

- Heat: Thermometry, Thermistor, Thermocouple. Heat capacity of gases. Newton's Law of cooling, Convection, Conduction, Thermal Conductivity and Specific heat capacity.

**UNIT-3**

**(10 Hrs)**

- Pressure: Dalton's Law of partial pressure, Pressure gauges vapour pressure and ambient pressure.
- Compressed gases, Gas laws and their applications, filling of compressed gases and Filling ration.

**UNIT-4**

**(15 Hrs)**

- Flow of fluids: Viscosity, Law and laminar flow rate. Turbulent flow pressure loss due to abrupt change in bore of tube. Bernoulli's principle and clinical application of Bernoulli theorem,
- Diffusion, Osmosis, Law of diffusion, Isotonic solution. Oxidation, combustion, flames, deflagrations. Prevention of explosions

**Recommended Text Books / Reference Books:**

1. A Textbook of Fluid Mechanics R.K. Bansal
2. Schaum's Easy Outline of Applied Physics, Revised Edition
3. Optical Propagation in Linear Media.

**MRSPTU (B. SC. RADIO MEDICAL IMAGING TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

**COMPUTER APPLICATIONS IN PHARMACY (Theory)**

**Subject Code: BRMIS1-205**

**L T P C**

**Duration: 60(Hrs.)**

**3 1 0 4**

**Course Objectives:** Upon completion of the course the student shall be able to

- know the various types of application of computers in pharmacy
- know the various types of databases
- know the various applications of databases in pharmacy.

**Course Outcomes:**

- This subject deals with the introduction Database, Database Management system,
- computer application in clinical studies and use of databases.

**UNIT -1.**

**(10 hours)**

**1. Number system:**

- Binary number system, Decimal number system, Octal number system, Hexadecimal number systems, conversion decimal to binary, binary to decimal, octal to binary etc, binary addition, binary subtraction – One's complement ,Two's complement method, binary multiplication, binary division.
- Concept of Information Systems and Software : Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the products.

**UNIT-2.**

**(10 hours)**

**1. Web technologies:**

- Introduction to HTML, XML,CSS and Programming languages, introduction to web servers and Server Products

**2. Introduction to databases:**

- MYSQL, MS ACCESS, Pharmacy Drug Database.

**Unit-3.**

**(15 Hours)**

**1. Computer networks:**

- introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
- Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer
- Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.

**Unit-4.**

**(25 Hours)**

**1. Introduction to MS-Word:**

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

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**2. Introduction to Excel:**

- introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.

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

**4. Introduction of Operating System:**

- introduction, operating system concepts, types of Operating system.

**5. Computers as data analysis in Preclinical development.**

- Chromatographic data analysis (CDS), Laboratory Information management System (LIMS) and Text Information Management System (TIMS).

**LAB HUMAN ANATOMY & PHYSIOLOGY II**

**Subject Code: BRMIS1-206**

**L T P C**

**Duration: 30 Hrs**

**0 0 4 2**

**Objective:** Demonstrations can be done with the help of models, charts and histological slides.

1. Demonstration of parts of excretory system
2. Demonstration of various parts of nervous system (brain and spinal cord)
3. Demonstration of reflex action
4. Demonstration of various parts of human reproductive system
5. To study digestive system from charts and TS of liver, spleen and pancreas from permanent slides.
6. Study of Urinary system
7. Study of Genital system (male & female) from charts and TS of testis and ovaries.
8. To study nervous system
9. To study various body fluids.

**MICROBIOLOGY PRACTICAL LAB**

**Subject Code: BRMIS1-207**

**L T P C**

**Duration: 30 Hrs**

**0 0 4 2**

**EXPERIMENTS**

1. To prepare cleaning agents & to study the technique for cleaning & sterilization of glassware.
2. To demonstrate the working & handling of Compound microscope.
3. To demonstrate the method of sterilization by autoclave, hot air oven.
4. To demonstrate the method of sterilization of media/solution by filtration.
5. To prepare working dilution of commonly used disinfectants.
6. To demonstrate the different morphological types of bacteria.

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BATCH 2020 ONWARDS**

7. Preparation of culture media from each type.
8. To demonstrate aerobic culture and anaerobic culture.
9. To demonstrate biomedical waste segregation.
10. To plot growth curve of bacteria.

**COMPUTER APPLICATIONS IN PHARMACY (Practical)**

**Subject Code: BRMIS1-208**

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

**Duration: 30(Hrs.)**

1. Design a questionnaire using a word processing package to gather information
2. About a particular disease.
3. Create a HTML web page to show personal information.
4. Retrieve the information of a drug and its adverse effects using online tools.
5. Creating mailing labels Using Label Wizard , generating label in MS WORD.
6. Create a database in MS Access to store the patient information with the required fields Using access.
7. Design a form in MS Access to view, add, delete and modify the patient record in the database.
8. Generating report and printing the report from patient database.
9. Creating invoice table using – MS Access.
10. Drug information storage and retrieval using MS Access.
11. Creating and working with queries in MS Access.
12. Exporting Tables, Queries, Forms and Reports to web pages.
13. Exporting Tables, Queries, Forms and Reports to XML pages.

**Recommended books (Latest edition):**

1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
2. Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
3. Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
4. Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi – 110002.

**MRSPTU (B. SC. OPERATION THEATER TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

<b>SEMESTER 1<sup>st</sup></b>		<b>Contact Hrs.</b>			<b>Marks</b>			<b>Credits</b>
<b>Subject Code</b>	<b>Subject Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Int.</b>	<b>Ext.</b>	<b>Total</b>	
BOTTS1-101	Human Anatomy & Physiology-I	3	1	0	40	60	100	4
BOTTS1-102	Applied Biochemistry	3	1	0	40	60	100	4
BOTTS1-103	Communication Skills	3	1	0	40	60	100	4
BOTTS1-104	Human Anatomy & Physiology Lab	0	0	4	60	40	100	2
BOTTS1-105	Applied Biochemistry Lab.	0	0	4	60	40	100	2
BOTTS1-106	Communication Skills-Lab	0	0	4	60	40	100	2
BOTTS1-107	Drug Abuse: Problem, Management and Prevention	3	0	0	40	60	100	3
<b>Total</b>		-	-	-	340	360	700	21

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**MRSPTU (B. SC. OPERATION THEATER TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

**HUMAN ANATOMY & PHSIOLOGY-I**

**Subject Code: BOTTS1 -101**

**L T P C**

**Duration: 60 (Hrs.)**

**3 1 0 4**

**Course Objectives:**

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

**Course Outcomes:**

- Demonstrate knowledge of general overall physiological principles associated with metabolic processes; musculoskeletal system; cardiovascular system; aerobic and anaerobic program design.

**Unit-1.**

**15 Hours**

- **Introduction:** Definition of anatomy and its divisions, Terms of location, positions and planes, Cell and its organelles, Tissues & its classification, Glands.
- **Musculoskeletal system:** Structure of Bone & its types, Joints- Classification of joints with examples; details of synovial joint. Bones & joints of upper limb, lower limb and their movements. Axial skeleton & appendicular skeleton. Skull, spine & its movements, intervertebral disc. Muscles & its types. Muscles of the upper limb, lower limb, trunk and neck. Classification of Muscle, structure of skeletal muscle - Neuromuscular Junction - Excitation Contraction Coupling

**Unit-2.**

**15 Hours**

- **Cardiovascular System:** Arteries & veins, Capillaries & arterioles, Red Blood Cells- Functions, count, Physiological variations. Erythropoiesis-stages - Hemoglobin- Functions, Physiological variations. - White Blood cells-Functions, count, morphology. - Platelets-count, morphology, functions.
- **Hemostasis- Definition:** Mechanism, clotting factors. - Blood groups-ABO system, Rh system, Blood transfusion- Indication, transfusion reactions. - Anaemias- classification, morphological and Etiological, effects of anaemia on body. Heart- size, location, chambers, blood supply of heart, pericardium, Systemic & pulmonary circulation, Major blood vessels of Heart- Aorta, pulmonary artery, common carotid artery, subclavian artery, axillary artery, brachial artery, common iliac artery, femoral artery. Inferior vena cava, portal circulation, great saphenous vein, Heart-Physiological Anatomy, Nerve supply, Properties of cardiac muscle.
- **Cardiac Cycle-Events** –systole, diastole - Cardiac Output-Definition and factors affecting it. - Heart sounds-normal heart sounds, its causes, areas of auscultations. - Blood Pressure-Definition, normal value, Physiological variations, its measurement. - ECG- normal waves. - Shock-Definition, Types.

**Unit-3.**

**15 Hours**

**1. Gastro-intestinal System:**

- Parts of GIT, structure of tongue, pharynx, salivary glands, Location & Gross structure of Oesophagus, stomach, intestine (small and large), liver, gall bladder, pancreas,

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spleen. Physiological Anatomy, functions of GIT. Salivary Gland-functions of saliva. Stomach- structure and functions, Gastric secretions-composition, functions, Mechanism - Pancreas- structure, functions, composition of Pancreatic juice. Liver- Functions of liver.

- Bile-Composition, functions. - Jaundice-Types and its causes. - Gall Bladder- Functions - Intestine- Movements of small and large intestine. - Digestion and Absorption of Carbohydrates, Proteins, Fats. - Hormones of GIT- Functions of Gastrin, Secretin, CCKPz.

## Unit-4.

15 Hours

- **Sensory Organs:** Skin & its appendages. Structure of eye & lacrimal apparatus, name of extraocular muscles. Structure of ear: external, middle & inner ear, functions of different parts, Visual acuity, Refractive errors Ear-structure, functions, General mechanism of hearing.
- **Lymphatic System:** Lymph & Lymph vessels. Structure of lymph node, names of regional lymphatics, axillary and inguinal lymph nodes.

## Recommended Text Books / Reference Books:

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

**MRSPTU (B. SC. OPERATION THEATER TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

**APPLIED BIOCHEMISTRY**

**Subject Code: BOTTS1-102**

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

**Duration: 60 (Hrs.)**

**Course Objectives:**

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

**Course Outcomes:**

- Applied Biochemistry is the psart of biochemistry where knowledge and methods related to biochemistry are applied to real world problems like to investigate cause of diseases in medicine, to study effect of nutritional deficiencies, to find ways for pest control, improve productivity and storage in agriculture.

**Unit- 1.**

**15 Hours**

- **Cell:** Morphology, structure & functions of cell, cell membrane, Nucleus, chromatin, Mitochondria, Endoplasmic Reticulum, Ribosomes.
- **Carbohydrates:** Definition, chemical structure, functions, sources, classifications, Monosaccharide's, Disaccharides, Polysaccharides, muco-poloysaccharide and its importance, glycoprotein
- **Lipids:** Definition, function, sources, classification, simple lipid, compound lipid, derived lipid, unsaturated and saturated fatty acid. Essential fatty acids and their importance, Blood lipids and their implications, cholesterol with its importance.
- **Proteins :** Definition, sources, amino acids, structure of protein, their classification, simple protein, conjugated protein, derived proteins and their properties.
- **Enzymes:** Definitions, mechanism of action, factors affecting enzyme action, enzyme of clinical importance.

**Unit- 2.**

**15 Hours**

- **Nutrition:** Vitamins types, functions and role, Principal minerals and their functions (Ca, P, Mg, Na, K, Cl). Balanced diet, Diet for Chronically and terminally ill patients, post operative patients
- **Bioenergetics:** Energy rich compounds, Respiratory chain and Biological oxidation.

**Unit-3**

**15 Hours**

- **Carbohydrate Metabolism:** Glycolysis, TCA cycle, Glycogen metabolism, Gluconeogenesis, Maintenance of Blood Glucose. Diabetes Mellitus and its complications.
- **Lipid Metabolism:** Beta oxidation, Ketone bodies, Cholesterol and atherosclerosis, obesity.
- **Protein Metabolism:** Transamination, Deamination, Fate of ammonia, urea synthesis and its inborn errors.

**Unit-4-**

**15 Hours**

- **Water and Electrolyte, Fluid compartment, daily intake and output sodium and potassium balance**
- **Nerve tissue:** Neuro transmitters and nerve activity.
- **Hormones:** Actions of Hormone Insulin, Glucagon, Thyroid and Parathyroid hormones, Cortical hormones.
- **Biophysics: Concepts of pH and buffers, osmotic pressure and its physiological applications.**
- Acid Base Balance , role of lungs and kidneys,– Regulation of blood pH, acidosis, Alkalosis
- **Physical Chemistry:** Osmosis, Dialysis, Donann membrane equilibrium
- **Organ function Tests:** Renal and Liver Function Tests.

**Recommended Text Books / Reference Books:**

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

**MRSPTU (B. SC. OPERATION THEATER TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

**COMMUNICATION SKILLS**

**Subject Code: BOTTS1-103**

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

**Duration: 60 (Hrs.)**

**Course Objective:**

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

**Course Outcomes:**

- These skills can include social graces, communication abilities, language skills, personal habits, cognitive or emotional empathy, and leadership traits.
- The organizations with trained soft skill staff are more successful. Hence in addition to standard qualification the students trained with this course will be able to deal with patients, their fellows and seniors, face to face, in a better way.

**UNIT-1**

**(15Hrs)**

- Basic Language Skills: Grammar and Usage.
- Business Communication Skills with focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.

**UNIT-2**

**(15 Hrs)**

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

**UNIT-3**

**(15 Hrs)**

- Special characteristics of health communication
- Types & process of communication
- Barriers of communication & how to overcome.

**UNIT-4**

**(15 Hrs)**

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

**Recommended Text Books / Reference Books:**

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

MRSPTU

**HUMAN ANATOMY AND PHYSIOLOGY – I (PRACTICAL)**

**Subject Code: BOTTS1-104**

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

**Duration: 30 (Hrs.)**

**Human Anatomy & Physiology – Practical**

- Demonstration of various parts of body
- Demonstration of cell and tissues of body
- Demonstration of parts of Digestive system.
- Demonstration of various parts of circulatory system
- Examination of blood film for various blood cells from stained slides
- Blood pressure estimation
- Demonstration of structural differences between skeletal, smooth and cardiac muscles
- Demonstration of various bones and joints.
- To study circulatory system from charts and transverse section (TS) of artery and vein.

MRSPTU

**APPLIED BIOCHEMISTRY (PRACTICAL)**

**Subject Code: BOTTS1-105**

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

**Duration: 30 (Hrs.)**

- To visit Clinical biochemistry laboratory observe and learn about various tests are being performed in clinical biochemistry laboratory.
- To practice Blood sample collection as per sample draw pattern.
- Basics of various routine laboratory tests performed e.g. determination of blood sugar levels, Liver function tests, renal function tests, and Urine sugar and protein level.
- To understand briefly the interpretation of various tests report to know about critical alerts.
- To visit Blood Gas Analysis laboratory and learn to analyse blood gases.

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BATCH 2020 ONWARDS**

**COMMUNICATION SKILLS (PRACTICAL)**

**Subject Code: BOTTS1-106**

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

**Duration: 30 (Hrs.)**

- Précis writing and simple passage from a prescribed text books. Atleast100 words should be chosen and few questions from the passage may be said to answer.
- Speaking skill testing: Giving as small topic and to speak for at least two minutes on it.
- Group discussion on profession related topics
- To practice all forms communication i.e. drafting report, agenda notes, précis writing, E. mail drafting, circular, representations, press release, telephonic communication, practice of writing resume and Writing application of employment.
- Organising a mock interview.
- Locate a specified book in the library Find out some words in the dictionary Pronunciation, stress and intonation Give abbreviations of particular words and vice-versa Give meaning of some words Spell some words Practice of handling some communication system like telephone and noting down and conveying message.

**MRSPTU (B. SC. OPERATION THEATER TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

**DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION**

**Subject Code: BOTT1-107**

**L T P C**

**Duration: 45 (Hrs.)**

**3 0 0 3**

**Course Objectives:**

- To make students understand the concept of drug abuse and their impact on public health.
- To make students understand the types of drugs.
- To make them aware of the impact of drugs addiction on families and peers.
- To make students understand the management and prevention of drug abuse.

**Course Outcomes:**

- Students gain knowledge about detrimental impacts of drug on health and relations.
- Students become aware about the physiological and sociological causes of drug abuse.
- Students acquire knowledge about types of drugs.
- Students acquire knowledge about management and prevention of drug abuse.

**UNIT-1**

**(13 Hours)**

- **Problem of Drug Abuse:** Concept and Overview; Types of Drug Often Abused
- **Concept and Overview**
  - i. What are drugs and what constitutes Drug Abuse?
  - ii. Prevalence of menace of Drug Abuse
  - iii. How drug Abuse is different from Drug Dependence and Drug Addiction?
  - iv. Physical and psychological dependence- concepts of drug tolerance
- **Introduction to drugs of abuse: Short Term, Long term effects & withdrawal symptoms**
- **Stimulants:** Amphetamines, Cocaine, Nicotine
- **Depressants:** Alcohol, Barbiturates- Nembutal, Seconal, Phenobarbital Benzodiazepines Diazepam, Alprazolam, Flunitrazepam
- **Narcotics:** Opium, morphine, heroin
- **Hallucinogens:** Cannabis & derivatives (marijuana, hashish, hash oil), Steroids and inhalants.

**UNIT-2**

**(11 Hours)**

- **Nature of the Problem:** Vulnerable Age Groups, Signs and symptoms of Drug Abuse
  - i. Physical indicators.
  - ii. Academic indicators.
  - iii. Behavioral and Psychological indicators.

**UNIT-3**

**(11 Hours)**

- **Causes and Consequences of Drug Abuse**
- **Causes**
  - (a) Physiological
  - (b) Psychological
  - (c) Sociological
- **Consequences of Drug Abuse**

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- (a) For individuals
- (b) For families
- (c) For society & Nation

**UNIT-IV**

**(10 Hours)**

- **Management & Prevention of Drug Abuse**
  - a) Management of Drug Abuse
  - b) Prevention of Drug Abuse
  - c) Role of Family, School, Media, Legislation & Deaddiction Centers

**Recommended Text Books / Reference Books:**

1. Kapoor. T., Drug Epidemic among Indian Youth, Mittal Pub, New Delhi, 1985.
2. Modi, Ishwar and Modi, Shalini, Drugs: Addiction and Prevention, Rawat Publication, Jaipur, 1997.
3. Ahuja, Ram, Social Problems in India, Rawat Publications, Jaipur, 2003.
4. National Household Survey of Alcohol and Drug Abuse. New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
5. World Drug Report , United Nations Office of Drug and Crime, 2011
6. World Drug Report, United nations Office of Drug and Crime, 2010.
7. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
8. The Narcotic Drugs and Psychotropic Substances Act, 1985, New Delhi: Universal, 2012.

**MRSPTU (B. SC. OPERATION THEATER TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

Total Credits = 23

SEMESTER 2 <sup>nd</sup>		Contact Hrs.			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BOTTS1-201	Human Anatomy & Physiology- II	3	1	0	40	60	100	4
BOTTS1-202	Microbiology	3	1	0	40	60	100	4
BOTTS1-203	Quality Management, Patient Safety & Disaster Management	1	1	0	40	60	100	2
BOTTS1-204	Applied Physics	2	1	0	40	60	100	3
BOTTS1-205	Computer Applications in Pharmacy (Theory)	3	1	0	40	60	100	4
BOTTS1-206	Human Anatomy & Physiology- II Lab	0	0	4	60	40	100	2
BOTTS1-207	Microbiology Lab	0	0	4	60	40	100	2
BOTTS1-208	Computer Applications in Pharmacy (Practical)	0	0	4	60	40	100	2
Total		--	--	--	380	420	800	23

MRSPTU

**HUMAN ANATOMY & PHYSIOLOGY- II**

**Subject Code: BOTTS1-201**

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

**Duration: 60 (Hrs.)**

**Course Objectives:**

- Students will be able to learn the terminology of the subject and basic knowledge of the cell structure and function of organs, organ systems and body fluids in normal human body.

**Course Outcomes:**

- Demonstrate knowledge of general overall physiological principles associated with metabolic processes; musculoskeletal system; cardiovascular system; aerobic and anaerobic program design

**UNIT-I**

**(15 Hrs)**

**1. Respiratory system:**

- Parts of Respiratory system structure of nose, nasal cavity, larynx, trachea, lungs, pleura, bronchopulmonary segments, Physiological Anatomy, Functions of the respiratory system.
- Types of respiration, respiratory membrane. - Lung volumes and capacities, vital capacity and factors affecting it.
- Transport of Oxygen-Forms of transportation, Oxy-hemoglobin dissociation curve and factors affecting it. - Transport of Carbon-Dioxide- Forms of transportation.
- Hypoxia-Definition, types, effects of hypoxia.
- Cyanosis-Definition and types.
- Artificial Respiration- CPR

**UNIT-II**

**(15 Hrs)**

**2. Nervous System.**

- Neuron, classification of Nervous System. Meninges, ventricles, CSF, Gross features of cerebrum, midbrain, pons, medulla oblongata, cerebellum, name of basal nuclei. Blood supply of brain, cranial nerves. Spinal cord and spinal nerves. Visual & auditory pathways, Structure of neuron, functions of nervous system.
- Classification and properties of nerve fibres Synapse structure and types Receptors. Definition, classification, properties, Reflex Arc Ascending and Descending tracts names and functions, Functions of Hypothalamus. Functions of Cerebellum and Basal Ganglia Functions of Cerebral Cortex, Autonomic Nervous System, Actions of sympathetic and parasympathetic system and their comparison.

**MRSPTU (B. SC. OPERATION THEATER TECHNOLOGY) SYLLABUS  
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**UNIT-III**

**(15 Hrs)**

**3. Urinary System:**

- Parts of Urinary system, location and gross structure of kidney, ureter, urinary bladder, urethra. Kidneys structure of nephron, functions of kidney, Glomerular filtration Rate (GFR) and factors affecting it , Counter Current Mechanism , Bladder-its innervation, micturition reflex.

**4. Reproductive system:**

- Parts of male reproductive system, gross structure of testis, vas deferens, epididymis, prostate. Parts of female reproductive system, gross structure of uterus, ovary, fallopian tube, mammary gland.
- Male Reproductive System-Stages of spermatogenesis, function of Testosterone - Female Reproductive System-Ovulation, menstrual cycle, functions of Estrogen and progesterone

**UNIT-IV**

**(15 Hrs)**

**4. Endocrine glands:**

- Name of all endocrine glands, gross structure & functions of pituitary gland, adrenal gland, thyroid gland and parathyroid gland.
- Classification of Endocrine glands and their hormones. -Thyroid Gland-Physiological Anatomy, hormones secreted, functions, disorders Hypo and hyper secretion of hormone. -Adrenal Gland-Adrenal Cortex-Physiological Anatomy, its hormones and functions. - Adrenal Medulla-Hormones, functions. - Pituitary Gland- Anterior and posterior pituitary hormones and their functions, disorders.-Pancreas- Hormones and their functions, Diabetes Mellitus-types, pathophysiology, signs and symptoms. - Parathyroid Gland- Hormones and their functions.

**Recommended Text Books / Reference Books:**

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

**MICROBIOLOGY**

**Subject Code: BOTT1-202**

**L T P C**

**Duration: 60 (Hrs.)**

**3 1 0 4**

**Course Objectives:**

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

**Course Outcomes:**

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

**MRSPTU (B. SC. OPERATION THEATER TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

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**Unit-1**

**10 Hours**

**1. Introduction and History of Microbiology**

- Classification-Prokaryotes, Eukaryotes, Viruses, Fungi.
- Morphology-size, shape, arrangement
- Special characteristics–spores, capsules, enzymes, mortality, reproduction
- Gram staining, ZN staining (e) Different types of microscopes

**Unit-2**

**20 Hours**

**1. Sterilization:**

- Definition and different methods of sterilization including – Gaseous sterilization Plasma sterilization.
- Advantage and disadvantage of various methods and their controls.
- Sterilization of different instruments used in patients.
- Preparation of materials for Autoclaving: packing, loading, holding time, unloading

**2. Disinfection:**

- Definition and different type of methods including High level disinfectants
- Disinfection of patient care unit and rooms(O.T., Wards, ICUs & Laboratories)
- Central supply department Areas and floor plan for instrument cleaning high level disinfection & sterilizing area.

**3. Asepsis:**

- Universal Precautions
- Use of aseptic precautions to prevent infection,
- Safety mechanisms including vaccination in prevention of blood borne infections

**Unit-3**

**20 Hours**

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

**Unit-4**

**10 Hours**

**1. Virology.**

- With special reference to hepatitis, poliomyelitis, HIV & Influenza.
- Viruses relevant in dialysis patients including their modes of transmission.

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- Diseases communicable to healthcare workers in hospital set up and their prevention.
- Prevention measures to combat spread of these infections by monitoring and control.

## 2. Microbial surveillance and sampling.

- Bacteriology of air, water and food.
- Hospital infection Control & Influenza.
- Viruses relevant in dialysis patients including their modes of transmission.
- Diseases communicable to healthcare workers in hospital set up and their prevention.
- Prevention measures to combat spread of these infections by monitoring and control.
- Microbial surveillance and sampling.
  - a) Bacteriology of air, water and food
  - b) Hospital infection Control.

### Recommended Text Books / Reference Books:

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

## QUALITY MANAGEMENT, PATIENT SAFETY AND DISASTER MANAGEMENT

Subject Code: BOTT1-203

L T P C

Duration: 30 (Hrs.)

1 1 0 2

### Course Objective:

- The course will help students to understand the basic concepts of quality health Care and develop skills to implement sustainable quality assurance, Quality control and Quality improvement program in the healthcare system particularly in Operation theatre services.
- They shall be prepared to work in healthcare system primarily taking care of patient safety.

### Course Outcomes:

- By learning Biomedical Waste management they will help prevent harm to workers, property, the environment and the general public from hazardous and infectious waste.
- While living on this earth humans and all other living creatures may face many types of natural and manmade disasters. Some contents of this subject are focused on preparing the students to deal with healthcare requirement during these disasters and help the life.



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**Unit -1**

**(10 Hrs)**

**1. Quality management system (QMS):**

- Understanding Quality and components of QMS i.e. Quality assurance, Quality control and Quality improvement.
- The basic concepts of quality in health Care.
- Standards and Norms.
- Quality Improvement Tools.
- Introduction to NABH guidelines.
- Implementation of QMS in Operation theatres.

**Unit -2.**

**(5 Hrs)**

**1. Basics of emergency care and life support skills:**

- Vital signs and primary assessment.
- Basic emergency care – first aid and triage.
- Basic life support (BLS) following cardiac arrest.

**Unit -3.**

**(10 Hrs)**

**1. Fundamental aspects of BLS:**

- immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system,
- Initial recognition and response to heart attack and stroke.
- Ventilations including use of bag-valve-masks (BVMs) d. Choking, rescue breathing methods e. One- and Two-rescuer CPR.

**Unit -4.**

**(5Hrs)**

**1. Fundamental aspects of BLS:**

- Early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED).
- Managing an emergency including moving a patient
- Testing student's skills with focus on airways management and chest compressions.

**Recommended Text Books / Reference Books:**

1. Hospital Emergency Management Dr Robbert D.Mullar
2. Gis In Hospital And Healthcare Emergency Mangement Edited By Ricskinner
- 3.Handbook Of Disaster & Emergency Management Aarimkhoram & Mahesh

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**APPLIED PHYSICS**

**Subject Code: BOTTTS1-204**

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

**Duration: 45 (Hrs.)**

**Objective:**

- The subject will make them capable of understanding the physics involved in working of various instruments used in operation theatres.

**UNIT-1**

**(10 Hrs)**

- Energy: Potential energy and Kinetic energy, Mechanical efficiency, Energy and mass.
- Density of Gases: Molecular weight, Gram molecular weight. Avogadro number, Molecular agitation, Density.

**UNIT-2**

**(10 Hrs)**

- Heat: Thermometry, Thermistor, Thermocouple. Heat capacity of gases. Newton's Law of cooling, Convection, Conduction, Thermal Conductivity and Specific heat capacity.

**UNIT-3**

**(10 Hrs)**

- Pressure: Dalton's Law of partial pressure, Pressure gauges vapour pressure and ambient pressure.
- Compressed gases, Gas laws and their applications, filling of compressed gases and Filling ration.

**UNIT-4**

**(15 Hrs)**

- Flow of fluids: Viscosity, Law and laminar flow rate. Turbulent flow pressure loss due to abrupt change in bore of tube. Bernoulli's principle and clinical application of Bernoulli theorem,
- Diffusion, Osmosis, Law of diffusion, Isotonic solution. Oxidation, combustion, flames, deflagrations. Prevention of explosions

**Recommended Text Books / Reference Books:**

1. A Textbook of Fluid Mechanics R.K. Bansal
2. Schaum's Easy Outline of Applied Physics, Revised Edition
3. Optical Propagation in Linear Media.

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**COMPUTER APPLICATIONS IN PHARMACY (Theory)**

**Subject Code: BOTT1-205**

**L T P C**

**Duration: 60(Hrs.)**

**3 1 0 4**

**Course Objectives:** Upon completion of the course the student shall be able to

- know the various types of application of computers in pharmacy
- know the various types of databases
- know the various applications of databases in pharmacy.

**Course Outcomes:**

- This subject deals with the introduction Database, Database Management system,
- computer application in clinical studies and use of databases.

**UNIT -1.**

**(10 hours)**

**1. Number system:**

- Binary number system, Decimal number system, Octal number system, Hexadecimal number systems, conversion decimal to binary, binary to decimal, octal to binary etc, binary addition, binary subtraction – One's complement ,Two's complement method, binary multiplication, binary division.
- Concept of Information Systems and Software : Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the products.

**UNIT-2.**

**(10 hours)**

**1. Web technologies:**

- Introduction to HTML, XML,CSS and Programming languages, introduction to web servers and Server Products

**2. Introduction to databases:**

- MYSQL, MS ACCESS, Pharmacy Drug Database.

**Unit-3.**

**(15 Hours)**

**1. Computer networks:**

- introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
- Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer
- Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.

**Unit-4.**

**(25 Hours)**

**1. Introduction to MS-Word:**

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

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**2. Introduction to Excel:**

- introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.

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

**4. Introduction of Operating System:**

- introduction, operating system concepts, types of Operating system.

**5. Computers as data analysis in Preclinical development.**

- Chromatographic data analysis (CDS), Laboratory Information management System (LIMS) and Text Information Management System (TIMS).

**LAB HUMAN ANATOMY & PHYSIOLOGY II**

**Subject Code: BOTTS1-206**

**L T P C**

**Duration: 30 Hrs**

**0 0 4 2**

**Objective:** Demonstrations can be done with the help of models, charts and histological slides.

1. Demonstration of parts of excretory system
2. Demonstration of various parts of nervous system (brain and spinal cord)
3. Demonstration of reflex action
4. Demonstration of various parts of human reproductive system
5. To study digestive system from charts and TS of liver, spleen and pancreas from permanent slides.
6. Study of Urinary system
7. Study of Genital system (male & female) from charts and TS of testis and ovaries.
8. To study nervous system
9. To study various body fluids.

**MICROBIOLOGY PRACTICAL LAB**

**Subject Code: BOTTS1-207**

**L T P C**

**Duration: 30 Hrs**

**0 0 4 2**

**EXPERIMENTS**

1. To prepare cleaning agents & to study the technique for cleaning & sterilization of glassware.
2. To demonstrate the working & handling of Compound microscope.
3. To demonstrate the method of sterilization by autoclave, hot air oven.
4. To demonstrate the method of sterilization of media/solution by filtration.
5. To prepare working dilution of commonly used disinfectants.
6. To demonstrate the different morphological types of bacteria.

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7. Preparation of culture media from each type.
8. To demonstrate aerobic culture and anaerobic culture.
9. To demonstrate biomedical waste segregation.
10. To plot growth curve of bacteria.

**COMPUTER APPLICATIONS IN PHARMACY (Practical)**

**Subject Code: BOTTs1-208**

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

**Duration: 30(Hrs.)**

1. Design a questionnaire using a word processing package to gather information
2. About a particular disease.
3. Create a HTML web page to show personal information.
4. Retrieve the information of a drug and its adverse effects using online tools.
5. Creating mailing labels Using Label Wizard , generating label in MS WORD.
6. Create a database in MS Access to store the patient information with the required fields Using access.
7. Design a form in MS Access to view, add, delete and modify the patient record in the database.
8. Generating report and printing the report from patient database.
9. Creating invoice table using – MS Access.
10. Drug information storage and retrieval using MS Access.
11. Creating and working with queries in MS Access.
12. Exporting Tables, Queries, Forms and Reports to web pages.
13. Exporting Tables, Queries, Forms and Reports to XML pages.

**Recommended books (Latest edition):**

1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
2. Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
3. Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
4. Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi – 110002.

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**SEMESTER-VI**

Subject Code	Course Title	Hrs per week			Max. Marks		Total Marks	Credits
		Lecture	Tutorial	Practical	Int.	Ext.		
BMECS1-601	Manufacturing Technology & Processes	4	0	0	40	60	100	4
BMECS1-602	Design of Machine Elements	3	1	0	40	60	100	4
YYYYY	Department Elective-II	3	0	0	40	60	100	3
YYYYY	Department Elective-III	3	0	0	40	60	100	3
XXXXX	Open Elective	3	0	0	40	60	100	3
BMECS1-603	Mechanical Lab- V(MP)*	0	0	2	60	40	100	1
BMECS1-604	Mechanical Lab- VI (MSM)**	0	0	2	60	40	100	1
BMECS1-605	Minor Project	0	0	2	60	40	100	1
<b>Total</b>		<b>16</b>	<b>1</b>	<b>6</b>	<b>380</b>	<b>420</b>	<b>800</b>	<b>20</b>

**Department Elective –II (Chose any one from the following)**

1. Internal Combustion Engines - BMECD1-611
2. Gas Dynamics and Jet Propulsion - BMECD1-612
3. Power Plant Engineering - BMECD1-613

**Department Elective – III (Chose any one from the following)**

1. Mechatronic Systems - BMECD1-621
2. Microprocessors in Automation- BMECD1-622
3. Automation in Manufacturing- BMECD1-623

\* MP- Manufacturing Processes Lab

\*\* Materials Science & Metallurgy Lab

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**MANUFACTURING TECHNOLOGY & PROCESSES**

**Subject Code: BMECS1-601**

**L T P C**

**Duration: 60 Hrs**

**4 0 0 4**

**Course Objectives**

1. To expose the students to the principles of different manufacturing techniques and learn advanced operations of machining.
2. To understand Procedure or methodologies for conducting the casting and welding processes.
3. To understand working of various machine tools.
4. To understand innovative conceptual idea about latest manufacturing processes and their industrial applications.

**UNIT I**

Casting Processes, Pattern making, pattern materials, Types of pattern, Removable and disposable pattern, pattern allowances, properties of moulding sand. Moulding: Types of Moulds, Procedure for making moulds, Cores: Properties of cores, types of cores, core making and chaplets.

Elements of gating system, Types of gating, risering, Melting and pouring of metals, Electric arc furnace, Induction furnace. Solidification principles, Advantages and limitations of casting processes, selection of casting process. Defects in sand casting. Special casting Processes; Investment casting. shell mould casting, investment casting, permanent mould casting, full mould casting, vacuum casting, die casting, centrifugal casting, and continuous casting.

**15 Hrs**

**UNIT- II**

Welding Processes: manual metal arc welding, MIG welding, TIG welding, plasma arc welding, submerged arc welding. Resistance welding: principle and their types, friction welding, friction stir welding, ultrasonic welding, thermit welding, and electro slag welding.

Mechanical Working of Metals: Hot rolling, hot spinning, wire drawing. Metal Forming Process: Rolling Processes, rolling operation, terminology used in rolling, rolling mills, thread rolling, Extrusion Process: Types of extrusion, extrusion pressure in direct and indirect extrusion.

**15 Hrs**

**UNIT-III**

Machine Tools: Lathe: classification, description and operations, Shaping and planing machine: classification, description and operations. Milling machine: classification, description and operations, indexing devices, up milling and down milling. Drilling and Boring machine: classification,

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description and operations. Grinding machines: classification, description and operations.

**15 Hrs**

**UNIT- IV**

Manufacturing of plastics & ceramics: Basic manufacturing processes for processing of plastics & ceramics. Powder Metallurgy; Introduction to Micro manufacturing process, Additive Manufacturing.

Fundamentals of CAD: Design process with and without computer; CAD/CAM system and its evaluation criteria, brief treatment of input and output devices, Graphics standard GKS, IGES and STEP; Modeling and viewing; Application areas of CAD/CAM

**15 Hrs**

**Course Outcomes:** On completion of this course, students will be

1. Able to apply knowledge of manufacturing processes and the skills to develop and manipulate the operating parameters for a given process.
2. Able to understand processing of plastic and ceramic materials.
3. Ability to understand the latest technologies in casting and welding processes will get increased.
4. Students will be able to come up with innovative conceptual idea about latest manufacturing processes and their industrial applications.

**Recommended Books:**

1. Manufacturing Engineering and Technology; SeropeKalpakjian and Steven R.Schmid-4th edition, Pearson Edition.
2. Principles of Manufacturing Materials and Processes; Campbell-Tata Mc.Graw Hill.
3. Degarmo,E.P, Kohser, Ronald A. and Black J.T.; Material and Processes in Manufacturing, Prentice Hall of India



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**DESIGN OF MACHINE ELEMENTS**

**Subject code: BMECS1-602**

**L T P C**

**Duration : 60 hours**

**3 1 0 4**

**Course Objectives:** This course seeks to provide an introduction to the design of machine elements commonly encountered in mechanical engineering practice, through

1. An understanding of the origins, nature and applicability of empirical design and rational design principles based on safety considerations.
2. An overview of codes, standards and design guidelines for different elements
3. An appreciation of parameter optimization and design iteration
4. An appreciation of the relationships between component level design and overall machine system design and performance

**UNIT-I**

**Basics of machine Design**-Definition, Types of design, Asimov's cycle, Design considerations - limits, fits and standardization, Selection of material.

**Design of shafts**- Design of shafts under static loadings – Pure torsion, Pure bending, Combined bending and torsion, Shaft under combination of torsion, bending and axial loading.

**12 Hrs**

**UNIT-II**

**Bearings** -Analysis and design of sliding contact bearing- theory of sliding contact bearings, design of Journal bearing, Theory of Rolling contact bearings, design of Ball bearings and Roller bearings

**Transmission elements** - Design of transmission elements: spur, helical, bevel and worm gears; Design of flat belt, V belt and chain drives.

**18 Hrs**

**UNIT-III**

**Springs**- Design of springs: basic terms, design of helical compression and tension springs, Design of leaf springs.

**Joints**- Design of joints: Riveted joints, threaded joints and welded joints under static loading.

**14 Hrs**

**UNIT-IV**

**Keys and couplings**- Different type of keys- Design of square and rectangular keys. Design of couplings- Muff coupling, split muff coupling, pin type rigid flange coupling and pin type flexible coupling

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**Clutches and Brakes** - Analysis of clutches-plate clutch and cone clutch.Design of brakes – block brake and band brakes.

**Design Software**– Utility of the software for the purpose of design, Different type of design software, carrying out the design of some machine components by the use of software.

**16 Hrs**

**Course Outcomes:**

Upon completion of this course, students will get the knowledge of

1. Concept of machine design and procedure for selection of materials
2. An overview of the design methodologies employed for the design of various machine components.
3. Understand the relationship between component level design and overall machine design
4. Understand the concept of design software and their utility/ application for designing of different machine components

**Note:** Use of design data hand book by Mahadevan,Balaveera Reddy of CBS publisher is allowed.

**Reference Books:**

1. Shigley, J.E. and Mischke, C.R., Mechanical Engineering Design, McGraw-Hill International.
2. Deutschman, D., Michels, W.J. and Wilson, C.E., Machine Design Theory and Practice, Macmillan.
3. Juvinal, R.C., Fundamentals of Machine Component Design, John Wiley.
4. Spottes, M.F., Design of Machine elements, Prentice-Hall India.
5. R. L. Norton, Mechanical Design – An Integrated Approach, Prentice Hall
6. P C Sharma , D K Aggarwal , Machine Design , S K Kataria and Sons
7. R S Khurmi, J K GuptaA text book of Machine Design, Eurasia Publishing Company.

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**INTERNAL COMBUSTION ENGINES**

**Subject Code: BMECD1-611**

**L T P C**

**Duration 45 Hrs**

**3 0 0 3**

**Course Objectives:**

1. To understand basics of IC engine and Air standard cycles.
2. To understand the fuel supply system and in IC engines.
3. To learn about engine cooling and lubrication system in IC engines.
4. To understand engine testing and control of engine emissions.

**UNIT-I**

**Introduction:** Basic components and terminology of IC engines, working of four stroke/two stroke - petrol/diesel engine, classification and application of IC engines, engine performance and emission parameters.

**Fuel Air Cycles and Actual Cycles:** Assumptions for fuel-air cycles, Reasons for variation of specific heats of gases, change of internal energy and enthalpy during a process with variable specific heats, isentropic expansion with variable specific heats, effect of variable specific heats on Otto, Diesel and Dual cycle, dissociation, comparison of air standard and fuel air cycles, effect of operating variables, comparison of air standard and actual cycles, effect of time loss, heat loss and exhaust loss in Petrol and Diesel engines, valve and port timing diagrams.

**13 Hrs**

**UNIT-II**

**Combustion:** Combustion equations, stoichiometric air fuel ratio, enthalpy of formation, adiabatic flame temperature, determination of calorific values of fuels – calorimeter- Bomb and Junkers gas calorimeter.

**Fuels Supply System for SI and CI Engine:** Important qualities of IC engine fuels, rating of fuels, Carburation, mixture requirement for different loads and speeds, simple carburetor and its working, types of carburetors, MPFI, types of injection systems in CI engine, fuel pumps and injectors, types of nozzles, spray formation.

**Combustion in S.I. and CI Engine:** Stages of combustion in SI engines, abnormal combustion and knocking in SI engines, factors affecting knocking, effects of knocking, control of knocking, combustion chambers for SI engines, Stages of combustion in CI engines, detonation in C.I. engines,

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factors affecting detonation, controlling detonation, combustion chamber for SI and CI engine.

**12 Hrs**

**UNIT-III**

**Engine Lubrication and Cooling:** Lubrication of engine components, Lubrication system – wet sump and dry sump, crankcase ventilation, Types of cooling systems – liquid and air cooled, comparison of liquid and air cooled systems.

**Supercharging:** Introduction, purpose of supercharging, type of superchargers, analysis of superchargers, performance of superchargers, Arrangement of Supercharger and its installation, Turbo charged engines, supercharging of S.I. & C.I. Engines. Limitations of supercharging.

**10 Hrs**

**UNIT-IV**

**Measurement and Testing:** Measurement of friction horse power, brake horse power, indicated horse power, measurement of speed, air consumption, fuel consumption, heat carried by cooling water, heat carried by the exhaust gases, heat balance sheet, governing of I.C. Engines, performance characteristics of I.C. Engines: Performance parameters, performance of S.I. Engines, performance of C.I. Engine, Engine performance maps.

**Engine Emission and Control:** Air pollution due to IC engines, Euro I to VI norms, HC, CO and NOx emission, catalytic convertor, Hybrid Electric Vehicles.

**10 Hrs**

**Course Outcomes:**

Students who have done this course will have a good idea of:

1. The basics of IC engines
2. Fuel supply and combustion in IC Engine
3. Engine cooling and lubrication
4. Testing and control of engine emissions.

**Reference Books:**

1. V. Ganesan, Internal Combustion Engines, Tata Mcgraw-Hill.
2. Mathur. R.B. and R.P. Sharma, "Internal Combustion Engines"., DhanpatRai
3. H.N. Gupta, "Fundamentals of Internal Combustion Engine" PHI Publications
4. John B. Heywood, "Internal Combustion Engine Fundamentals" McGraw-Hill
5. V. M. Damundwar, A Course in Internal Combustion Engines, DhanpatRai.
6. Richard Stone, Introduction to Internal Combustion Engines Society of Automotive Engineers.

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**GAS DYNAMICS AND JET PROPULSION**

**Subject code: BMECD1-612**

**L T P C**

**Duration: 45 Hrs**

**3 0 0 3**

**Course Objectives:**

1. To understand the basics of compressible flow.
2. To understand basics of Shock Waves
3. To provide basics of jet propulsion.
4. To provide basics of rocket engine and propellants.

**UNIT-I**

Compressible flow, definition, Mach waves and Mach cone, stagnation states, Mass, momentum and energy equations of one-dimensional flow, Isentropic flow through variable area ducts, nozzle s and diffusers, subsonic and supersonic flow, variable area ducts, choked flow, Area-Mach number relations for isentropic flow. **15 Hrs**

**UNIT-II**

Non-isentropic flow in constant area ducts, Rayleigh and Fanno flows, Normal shock relations, oblique shock relations, isentropic and shock tables **10 Hrs**

**UNIT-III**

Theory of jet propulsion, thrust equation, thrust power and propulsive efficiency, Operating principle and cycle analysis of ramjet, turbojet, turbofan and turboprop engines. **10 Hrs**

**UNIT-IV**

Types of rocket engines, propellants & feeding systems, ignition and combustion, theory of rocket propulsion, performance study, staging, terminal and characteristic velocity, space flights. **10 Hrs**

**Course Outcomes:**

Upon completion of this course, the students will be able:

1. To apply the concepts of compressible flow.
2. To understand the phenomenon of Shock Waves.
3. To apply gas dynamics principles to jet propulsion.
4. To understand the working of rocket engine and propellants.

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**Reference Books:**

1. Ahmed F. El-Sayed, Aircraft Propulsion and Gas Turbine Engines, CRC Press
2. H.S. Mukunda, "Understanding Aerospace Chemical Propulsion", Interline Publishing
3. Hill P. and Peterson C., Mechanics & Thermodynamics of Propulsion, Addison Wesley
4. Zucrow N. J., Aircraft and Missile Propulsion, Vol.I& II, John Wiley
5. Sutton G.P., Rocket Propulsion Elements, John Wiley, New York

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**POWER PLANT ENGINEERING**

**Subject code: BMECD1-613**

**L T P C**

**Duration: 45 Hrs**

**3 0 0 3**

**Course Objectives:**

1. Basic knowledge of Different types of Power Plants, site selection criteria of each one of them.
2. Understanding of Thermal Power Plant Operation, turbine governing, different types of high-pressure boilers including supercritical and supercharged boilers, Fluidized bed combustion systems.
3. Design of chimney in thermal power plants, knowledge of cooling tower operation, numerical on surface condenser design.
4. Basic knowledge of Different types of Nuclear power plants including Pressurized water reactor, Boiling water reactor, gas cooled reactor, liquid metal fast breeder reactor.

**UNIT-I**

**Generators, Boilers, Turbines and Condensers:** Classification of steam generators, Types of Boilers: Babcock Wilcox, Cochran boilers, Types of condensers, effect of air in condensers, Dalton's law of partial pressure, cooling water calculations, steam nozzles, types of steam turbines, efficiencies, compounding, governing and control. Draught system and its types Combined Power Cycles— Comparison and Selection, Load Duration Curves. Fluidized Bed combustion system. Energy conservation and management.

**05 Hrs**

**UNIT-II**

**Thermal Power Plant:** Layout and working of Modern Thermal Power Plant, Fuel characteristics and storage, Coal beneficiation, blending and desulphurization, Liquid and Gaseous fuels, Slurry or Emulsion type fuels, Coal handling, Storage, Preparation and Feeding, Ash handling and Dust collection, Scrubber technology, selection of site, Description of Rankin cycle, Regenerative cycle, Reheat-Regenerative Cycle, Binary Vapour Cycle, High Pressure and Super Critical Boilers. Different systems of thermal power plant: fuel, air and flue gas systems, pulverizers, Condensate and feed water treatment system, Construction and functioning of condenser, de-aerator and closed feed water heaters, HP - LP By-pass systems, Auxiliary Steam System, Turbine gland steam system. Cooling water system, Cooling Ponds and Cooling Towers—principle of operation and types, Advantages and Disadvantages of Thermal Power Plants.

**12 Hrs**

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**UNIT- III**

**Hydro-Electric Power Plants:** Layout of Hydro Power Plant, selection of site, classification of Hydro power plants, Design, Construction and Operation of Different components of Hydro-Electric Power stations, Hydrology, Hydraulic Turbines, Governing of Turbines-Micro Hydel developments, Calculation of available Hydro Power, Combined operation of Hydro and Thermal Power Plants, Advantages and Disadvantages of Hydro Power Plants.

**Nuclear Power Plants:** Energy– Fission, Fusion Reaction, Radioactivity, Nuclear reactions, Components of Nuclear Power Plant, selection of site, Layout of Nuclear Power Plant, Types and classification of Reactors, General problems of Reactor operation, Pressurized Water Reactor (PWR), Boiling Water Reactor (BWR), CANDU type reactor, Gas cooled reactors, Liquid Metal-cooled reactors, Organic moderated and cooled reactors, Breeder reactors Waste Disposal and safety, Advantages and Disadvantages of Nuclear Power Plants. Comparison of Nuclear and Thermal power plants.

**14 Hrs**

**UNIT-IV**

**Diesel and Gas Turbine Power Plant:** Diesel power plant- Layout, Selection of site, Types of Diesel Plants, Components, Diesel Cycle, Engine Types and different systems of diesel power plant. Performance and advantages and disadvantages over thermal plants

Gas Power Plant- Layout, Gas Turbine cycle, Fundamental concept of gas turbine control and monitoring system, Applications of Gas Turbine Power Plant–Fuels- Gas Turbine Material–Open, Closed Cycles and Combined Cycle, Efficiency, Components of gas turbine plants, Gas and steam turbine combined cycles, Waste heat recovery system, Advantages and Disadvantages of diesel and gas turbine power plant.

**Non-Conventional Power Generation:** Power from Renewables(Solar, wind, Biomass and small Hydro), Geothermal power plant, Tidal power plants, Wind power plants, Solar power plants, Direct Energy conversion system, Magneto Hydrodynamic System(MHD). Combined Operation of Different Power Plants.

**14 Hrs**

**Course Outcomes:**

Students successfully completing this module will be able to:

1. Describe sources of energy and types of power plants.
2. Analyze different types of steam cycles and it's efficiencies in a steam power plant,
3. Describe basic working principles of gas turbine and diesel engine power plants.
4. Define the performance characteristics and components of such power plants.



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**ReferenceBooks:**

1. EI-Wakil M.M., 'Power Plant Technology', McGraw Hill.
2. S.C. Arora, 'A course in Power Plant Engineering', Dhanpat Rai & Sons.
3. P.K. Nag, 'Power Plant Engineering', Tata McGraw Hill.
4. G.R. Nagpal, 'Power Plant Engineering', Hanna Publishers.
5. K.K. Ramalingam, 'Power Plant Engineering', Scitech Publications.
6. G.D. Rai, 'Introduction to Power Plant Technology', Khanna Publishers
7. R.K. Rajput, 'Power Plant Engineering', Laxmi Publications

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**MECHATRONIC SYSTEMS**

**Subject Code: BMECD1-621**

**L T P C**

**Duration 45 Hrs**

**3 0 0 3**

**Course Objective:**

1. Mechatronics system design and simulation, ergonomics and safety
2. Theoretical and practical aspects of computer interfacing, real time data acquisition and control
3. Design of motion control, motion converter and temperature control.
4. To understand the construction, operation and installation of PLCs.

**UNIT-I**

**Introduction:** Overview: Mechanical Actuation System – Kinematic Chains, Cam, Gear, Train Ratchet Mechanism, Belt, Bearing.

**Hydraulic and Pneumatic Actuation Systems:** Overview: Pressure Control Valves, Cylinders, Direction Control Valves, Rotary Actuators, Accumulators, Amplifiers, and Pneumatic Sequencing Problems. **11Hrs**

**UNIT-II**

**Electrical Actuation Systems:** Switching Devices, Mechanical Switches – SPST, SPDT, DPDT, Debouncing keypads; Relays, Solid State Switches, Diodes, Thyristors, Transistors, Solenoid, Types Devices: Solenoid Operated Hydraulic and Pneumatic Valves, Electro-Pneumatic Sequencing Problems. Control of DC Motors, Permanent Magnet DC Motors, Control of DC Motors, Bush less Permanent Magnet DC Motors, AC Motors, Stepper Motors, Stepper Motor Controls, Servo Motors.

**Interfacing controllers:** Interfacing, Buffers, Darlington Pair, I/O Ports, Interface Requirements, Handshaking, Serial and Parallel Port Interfacing, Peripheral Interface, Adapters.

**Digital logic:** Number Systems, Binary Mathematics, Boolean Algebra, Gates and Integrated Circuits Like 7408, 7402, Karnaugh Maps, Application of Logic Gates as: Parity Generators, Digital Comparators, BCD to Decimal Decoders, Flip Flops. Introduction to Microcontroller – Intel 8051, Selecting a Microcontroller.

**Sensors and transducers and application:** Performance Terminology, Static and Dynamic Characteristics, Displacement, Position and Proximity Sensors, Potentiometer Sensors, Strain Gauge Element, LVDT, Optical Encoders, Pneumatic Sensors, Hall Effect Sensors, Tach generators, Strain Gauge Load Cell, Thermostats, Photo Darlington. Interfacing Sensors in Mechatronic System as – Temperature Switch Circuit, Float Systems. **12Hrs**

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**UNIT-III**

**Introduction to signal conditioning:** Signal Conditioning Processes, Inverting Amplifiers, Non Inverting Amplifiers, Summing, Integrating, Differential, Logarithmic Amplifiers, Comparators, Amplifiers Error, Filtering, Wheatstone Bridge, Temperature Compensation, Thermocouple Compensation, Analog to Digital Conversion, Digital To Analog Conversion, Sample and Hold Amplifiers, Multiplexers, Time Division Multiplexing, Data Acquisition, Digital Signal Processing, Pulse Modulation.

**System models:** Mechanical System Models Applications like – Machine on a floor, Car Wheel Moving along a road etc. Model Development of an Electrical Systems, Fluid System, and Thermal Systems: Rotational – Translation Systems, DC Motors, Speed Control and Hydraulic – Mechanical Systems. **11Hrs**

**UNIT-IV**

Programmable logic controllers (plc):PLC Structure, Input / Output Processing, Programming, Language (Ladder Diagram), Logic Functions, Latching, Sequencing, Timers, Internal Relays and Counters, Shift Registers, Master and Jump Controls, Jumps, Data Movement, Code Conversion, Ladder Circuits.

**Case studies:** Auto-Focus Camera, Printer, Domestic Washing Machine, Optical Mark Reader, Bar Code Reader and Pick and Place robot Arm. **11Hrs**

**Course Outcome:**

Students will be able to understand the mechatronics design

1. Understand the basics and key elements of Mechatronics design process
2. Familiar with basic system modelling
3. Understand the concepts of engineering system and dynamic response of the system
4. Realize the concepts of real time interfacing and data acquisition

**Reference Books:**

1. W. Bolton, “Mechatronics”, Pearson Education Ltd.
2. Mohammad Ali Mazidi Janice GillispierMazidi, “The 8051 Microcontroller”, Pearson Education Inc.
3. Gary Dunning, “Introduction to Programmable Logic Controllers”, Thomson Asia P. Ltd., Singapore.
4. Gopal K. Dubey, “Fundamentals of Electrical Drives”, Narosa Publishing House.
5. Charles H. Roth, “Jr. Fundamentals of Logic Design”, Jaico Publishing House.
6. "HMT Mechatronics", Tata McGraw Hill Publishing Co. Ltd..

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7. DevdasShetty, Richard A. Kolk “Mechatronics System Design”, Thomson Asia Pvt. Ltd., Singapore.
8. A.K. Tayal, “Instrumentation & Mechanical Measurements”, Galgotia Publication Pvt.Ltd.
9. NitaigourPremchandMahalik, “Mechatronics Principles, Concepts & Application”, Tata McGraw Hill Publishing Co.Ltd..
10. Mikell P. Groover, “Automation, Production Systems and Computer-Integrated Manufacturing”, Prentice Hall.

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**MICROPROCESSORS IN AUTOMATION**

**Subject code: BMECD1-622**

**L T P C**

**Duration: 45 Hrs**

**3 0 0 3**

**Course Objectives:**

1. To introduce the basic concepts of Digital circuits.
2. To understand the concept of interrupt, interrupt controller and interfacing peripherals.
3. To understand the working of ADC/DAC and data communication.
4. To understand concept of Microprocessor system and digital controller.

**UNIT-I**

Number Systems, codes, digital electronics: Logic Gates, combinational circuits design, Flip-flops, Sequential logic circuits design: Counters, Shift registers.

Introduction to 8085 Functional Block Diagram, Registers, ALU, Bus systems, Timing and control signals.

Machine cycles, instruction cycle and timing states, instruction timing diagrams, Memory interfacing.

**13 Hrs**

**UNIT-II**

Assembly Language Programming: Addressing modes, Instruction set, simple programs in 8085; Concept of Interrupt, Need for Interrupts, Interrupt structure, Multiple Interrupt requests and their handling, Programmable interrupt controller; Interfacing peripherals: Programmable peripheral interface (8255).

**12 Hrs**

**UNIT-III**

Interfacing Analog to Digital Converter & Digital to Analog converter, Multiplexed seven segments LED display systems, Stepper Motor Control, Data Communication: Serial Data communication (8251), Programmable Timers (8253); 8086/8088 Microprocessor and its advanced features.

**11 Hrs**

**UNIT-IV**

Introduction to Digital Control: Sampling theorem, Signal conversion and Processing, Z-Transform, Digital Filters, Implementation of Digital Algorithm.

**09 Hrs**

**Course Outcomes:**

The students will be able to

1. Define Microprocessor and Microcontroller family and working of 8085 Microcontroller Architecture and Programming model.

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2. Understand the programming of 8085 and 8255 microprocessors.
3. Understand the concept of Timer, Interrupt, I/O Port interfacing with 8251/8253 microcontroller and advanced features of 8086/8088.
4. Understand the concept of digital control interfacing with Real time system.

**Reference Books:**

1. Digital Electronics: An Introduction to Theory and Practice, William H. Gothmann, PHI Learning Private Limited
2. Digital Computer Electronics: An Introduction to Microcomputers, Albert Paul Malvino, Tata McGraw-Hill Publishing Company Ltd.
3. Microprocessor Architecture, Programming, and Applications with the 8085, Ramesh Gaonkar, PENRAM International Publishers.
4. Digital Control Systems, Benjamin C. Kuo, Oxford University Press ( 2/e, Indian Edition.
5. Microcomputer Experimentation with the Intel SDK-85, Lance A. Leventhal, Prentice Hall.

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**AUTOMATION IN MANUFACTURING**

**Subject code: BMECD1-623**

**L T P C**

**Duration: 45 Hrs**

**3 0 0 3**

**Course Objectives:**

1. To understand the design and operation of hydraulic and pneumatic components and systems and their application in manufacturing and mechanical systems.
2. To understand the construction, operation and installation of PLCs.
3. To understand the concepts of DCS and SCADA systems.
4. To provide the knowledge on interfacing the PLCs and field devices with communication protocols and advanced process controls.

**UNIT-I**

**Hydraulic and Pneumatic System:** Hydraulic and Pneumatic Actuators: Cylinders- Types and construction, Application, Hydraulic and Pneumatic cushioning – Hydraulic and pneumatic motors, Control Components: Direction control, Flow control and Pressure control valves-Types, Construction and Operation- Servo and Proportional valves – Applications – Types of actuation. Accessories: Reservoirs, Pressure Switches- Applications- Fluid Power ANSI Symbols

**11 Hrs**

**UNIT-II**

**PLC:** Introduction; Timer instructions – On delay, Off delay, Cyclic and Retentive timers, Up /Down Counters, control instructions – Data manipulating instructions, math instructions; Applications of PLC – Motor start and stop, Simple materials handling applications, Automatic water level controller, Automatic lubrication of supplier Conveyor belt, Automatic car washing machine, Bottle label detection and process control application.

**11 Hrs**

**UNIT-III**

**Scada System and Architecture:** Data acquisition systems, Evolution of SCADA, Communication technologies, Monitoring and supervisory functions, SCADA applications in Utility Automation, Industries – SCADA System Components: Schemes- Remote Terminal Unit (RTU), Intelligent Electronic Devices (IED), Communication Network, SCADA Server, SCADA/HMI Systems Various SCADA architectures, advantages and disadvantages of each system.

**12 Hrs**

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**UNIT-IV**

**Industrial Process Control:** Study of Advanced Process control blocks: Statistical Process Control, Model Predictive Control, Fuzzy Logic Based Control, Neural-Network Based Control, PID Control.

**11 Hrs**

**Course Outcome:**

On the successful completion of the course, students will be able to

1. Understanding operating principles and constructional features of hydraulic and pneumatic systems.
2. Choose appropriate PLC and explain the architecture, installation procedures and trouble shooting. And can develop PLC programs using various functions of PLCs for a given application.
3. Explain the application development procedures in SCADA and manage data, alarm, storage and can explain the architecture of DCS
4. Describe the advanced controller elements and program methods.

**Reference Books:**

1. Gary Dunning, Introduction to Programmable Logic Controllers, 3rd India edition, Cengage Learning
2. John Webb, Programmable Logic Controllers: Principles and Applications, 5th edition Prentice Hall of India.
3. Krishna Kant Computer Based Process Control, Prentice Hall of India.
4. Michael P. Lukas, Distributed Control Systems: Their Evaluation and Design, Van Nostrand Reinhold Co.
5. Anthony Esposito, Fluid Power with Applications, Prentice Hall.





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**MECHANICAL ENGINEERING LABORATORY-V  
(Manufacturing Processes Lab)**

**Subject code: BMECS1-603**

**L T P C**

**0 0 2 1**

**Course Objectives:**

1. To understand lathe and its working
2. To understand different advanced manufacturing technique
3. To acquire knowledge of various casting processes
4. To understand different welding techniques.

**Contents:**

**To prepare different types of jobs which include**

1. Advanced exercises on Lathe where the students will work within specified tolerances, cutting of V- threads and square threads (internal as well as external).
2. Production of machined surfaces on shaper and planner.
3. Generation of plane surfaces, production of spur gears/helical involute gears, use of end mill cutters on milling machine.
4. Drilling, boring, tapping operations on drilling machine.
5. Exercises of different types of advanced casting processes like investment casting, centrifugal casting etc.
6. Exercises on MIG/TIG welding by making weld joints with these processes.
7. Exercises of various Resistance Welding Techniques(Spot , seam and butt)
8. Exercises of different plastic processing techniques like extrusion, blow moulding.

**Course Outcomes:**

Students who have undergone the course will be able to

1. Understand the different manufacturing and fabrication processes which are commonly employed in the industry, to fabricate components using different materials.
2. Fabricate components with their own hands.
3. Acquire the practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.

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**MECHANICAL ENGINEERING LABORATORY-VI  
(Materials Science & Metallurgy Lab)**

**Subject code: BMECS1-604**

**L T P C**

**0 0 2 1**

**Course Objectives:**

- To analyse the microstructure of different ferrous and non-ferrous samples.
- To explore the effect of heat treatment on various engineering materials by analysing its microstructure and hardness.

**EXPERIMENTS**

1. Preparation and study of crystal models for simple cubic, body centered cubic, face centered cubic and hexagonal close packed structured.
2. Annealing the steel specimen and study the effect of annealing time and temperature on hardness of steel.
3. Hardening the steel specimen and study the effect of quenching medium on hardness of steel.
4. Determination of chemical composition of commercial alloys by optical emission spectroscopy.
5. Study of metallurgical microscope.
6. Practice of specimen preparation (cutting, mounting, polishing and etching) of mild steel, aluminum and hardened steel specimens.
7. Microscopic examination of pure metals like Iron, Cu and Al.
8. Identification of ferrite and pearlite constituents in given specimen of mild steel.
9. Harden ability of Steels by Jominy end quench test.
10. To find out the hardness of various heat treated and untreated plain carbon steels.

**Course Outcomes:**

Students who have undergone the course will be able to

- Analyse the microstructure of different ferrous and non-ferrous samples.
- Explore the effect of heat treatment on various engineering materials by analysing its microstructure and hardness.

**MINOR PROJECT**

**Subject code: BMECS1-605**

**L T P C**

**0 0 2 1**

**Course Objectives:**

No study is to be undertaken in the project . The project should be such that the theoretical knowledge acquired by the students so far during the course of degree is implemented in the practical form. The steps to be covered in the minor project

1. The survey for the project which includes the novelty of the project and the study of its practical applications.
2. Make a written statement and assess the viability of the project
3. Schematic diagram and working mechanism of the project
4. Design of all the components of the project
5. Report writing

Note : The minor project may be carried out by a group of 3 to 5 students

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**Total Credits= 20**

Semester-IV (B. Tech Civil Engg.)		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name							
BCIES1-421	Structural Analysis-I	3	0	0	40	60	100	3
BCIES1-422	Design of Concrete Structures-I	3	0	0	40	60	100	3
BCIES1-423	Transportation Engineering-I	3	0	0	40	60	100	3
BCIES1-424	Environmental Engineering-I	3	0	0	40	60	100	3
BCIES1-425	Engineering Geology	2	0	0	40	60	100	2
<b>Departmental Elective-I (Select any one)</b>								
BCIED1-451	Geomatics Engineering							
BCIED1-452	Numerical Methods in Civil Engineering	3	0	0	40	60	100	3
BCIED1-453	Concrete Construction Technology							
BCIES1-426	Concrete Technology Lab-I	0	0	2	60	40	100	1
BCIES1-427	Structural Analysis Lab	0	0	2	60	40	100	1
BCIES1-428	Transportation Engineering Lab	0	0	2	60	40	100	1
<b>Total</b>		-	-	-	<b>420</b>	<b>480</b>	<b>900</b>	<b>20</b>

\*There will be 4-weeks Internship as per AICTE Internship Policy after 4th semester.

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<b>STRUCTURAL ANALYSIS-I</b>		
<b>Subject Code: BCIES1-421</b>	<b>L T P C</b>	<b>Duration: 45 Hrs.</b>
	3 0 0 3	
<b>Course Objectives:</b> <ol style="list-style-type: none"> <li>1. To provide students with a solid background on principles of structural analysis by exposing them to the theories and concepts of analyzing the civil engineering structures.</li> <li>2. To cover the analysis of statically determinate structures.</li> </ol>		
<b>Course Outcomes:</b> <ol style="list-style-type: none"> <li>1. The students will possess the skills to solve statically determinate problems of structural analysis dealing with different loads.</li> <li>2. They will be able to apply their knowledge of structural analysis to address structural design problems.</li> </ol>		
<b>UNIT-I (12 Hours)</b>		
<p><b>1. Slope &amp; Deflection of Beams &amp; Frames:</b> Review of Double Integration Method and Macaulay's Method, Moment Area Method, Conjugate Beam Method, Strain Energy / Real Work Method, Virtual Work / Unit Load Method, Castigliano's Method &amp; Maxwell's Reciprocal Theorem.</p> <p><b>2. Structural Stability:</b> Introduction, Stability of Columns, Axially loaded Columns, Euler's Theory of Long Columns and Euler's Formula, End Conditions &amp; Effective Length Factor, Equivalent Length, limitations of Euler's Theory, Columns with Eccentric and Lateral Load, Rankine Gordon Formula.</p>		
<b>UNIT-II (11 Hours)</b>		
<p><b>3. Analysis of Determinate Trusses:</b> Introduction, determination of forces in member of trusses by method of joints, method of sections, Tension Coefficient Method, Deflection of Joints of plane frames by Castigliano's first theorem and unit load method, Effect of Lack of Fit &amp; Temperature Change.</p> <p><b>4. Analysis of Dams, Chimneys and Retaining Walls:</b> Introduction, limit of eccentricity for no tension in the section, core of the section, middle third rule, wind pressure on chimneys.</p>		
<b>UNIT-III (11 Hours)</b>		
<p><b>5. Simple Cable &amp; Arch Structures:</b> Introduction, shape of a loaded cable, cable carrying point loads and UDL, cables with ends at different level, cable subjected to temperature stresses, Analysis of Cables, Analysis of three hinged (Parabolic and Circular) Arches for Horizontal Thrust, Bending Moment, Normal Thrust and Radial Shear.</p> <p><b>6. Suspension Bridges:</b> Introduction, Analysis of suspension bridges with two hinged and three hinged stiffening girders, Temperature Stresses in Three Hinged and Two Hinged Stiffening Girders.</p>		
<b>UNIT-IV (11 Hours)</b>		
<p><b>7. Rolling Loads:</b> Introduction to rolling loads and influence lines, Determination of shear force, bending moment at a section and absolute shear force and bending moment due to single point</p>		

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load, uniformly distributed load, several point loads etc.
<b>8. Influence Lines:</b> Construction of Influence lines for reaction, shear forces and bending moment for beams, influence lines for girders with floor beams, Influence lines for forces in members of frames. Influence lines for Three Hinged Arches & Stiffening Girders.
<b>Recommended Text Books / Reference Books:</b>
1. C.S. Reddy, 'Basic Structural Analysis'.
2. Vazirani & Ratwani, 'Analysis of Structures', Vol. - I, -II.
3. C.K. Wang, 'Intermediate Structural Analysis'.

<b>DESIGN OF CONCRETE STRUCTURES-I</b>			
<b>Subject Code: BCIES1-422</b>	<b>L T P C</b>	<b>Duration: 45 Hrs.</b>	
	3 0 0 3		
<b>Course Objectives:</b>			
1. Learn the behaviour of structural concrete components and Ability to perform analysis and design of concrete members.			
<b>Course Outcomes:</b>			
1. Identify the different failure modes and determine their design strengths.			
2. Select the most suitable section shape and size for beams according to specific design criteria.			
<b>Note: 1. IS 456, Indian Standard. Plain and Reinforced Concrete -Code of practice is permitted in examination.</b>			
<b>2. Examiner requested to provide requisite data for Mix Design Problems; if any.</b>			
<b>UNIT-I (05 Hours)</b>			
<b>Concrete Mix Design:</b> Introduction, Selection of mix proportions, Durability of concrete, Quality Control of concrete, Introduction of various mix proportion methods, Proportioning of concrete mixes by BIS method of mix design.			
<b>UNIT-II (07 Hours)</b>			
<b>RCC Design Philosophies:</b> Introduction, Objectives & methods of analysis & Design, Properties of Concrete and Steel. Philosophies of Working Stress Methods (WSM) & Limit State Method (LSM) in RCC design.			
<b>Shear, Torsion &amp; Bond (Only Theory/Concept):</b> Types of shear & torsion, importance in RCC Design Structures, IS Provisions for Shear & Torsion, Bond-types of bonds, Anchorage Bond, Development length & its determination.			
<b>UNIT-III (21 Hours)</b>			
<b>RCC Beams:</b> Types of beams, Behaviour in Flexure-Singly reinforced beam, Doubly reinforced beam, Flanged beam, Cantilever beam, Neutral Axis, Neutral Axis Depth, Moment of Resistance, Design of beams- Singly reinforced beam, Doubly reinforced beam, Flanged beam, Cantilever beam.			
<b>UNIT-IV (12 Hours)</b>			
<b>RCC Slabs:</b> Types of slab systems, Guidelines for Design, Design of One Way and Two Way			

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Slab. <b>Columns:</b> Classifications (According to Shape, Length and Loading Conditions), Assumptions, Behaviour and Design of Axially Loaded Columns.
<b>Recommended Text Books / Reference Books:</b> 1. M.S. Shetty, 'Concrete Technology', S. Chand & Co. 2. A.M. Neville, 'Properties of Concrete', Prentice Hall. 3. M.L. Gambhir, 'Concrete Technology', Tata McGraw Hill Publishers, New Delhi. 4. Pillai & Menon, 'Reinforced Concrete Design', Tata McGraw Hill Education. 5. N. Krishna Raju, 'Advanced Design of Structures'.

<b>TRANSPORTATION ENGINEERING-I</b>					
<b>Subject Code: BCIES1-423</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Duration: 45 hrs.</b>
	3	0	0	3	
<b>Course Objectives:</b>					
1. The objective of this course is to acquaint the students about highway planning and development in India.					
2. The course will cover selection of highway alignment, design of geometric elements of highways, carry out traffic studies and implement traffic regulation and control measures and intersection design.					
3. The characteristic properties of road construction materials and design of flexible and rigid pavements as per IRC guidelines shall also be covered in this course.					
<b>Course Outcomes:</b>					
1. The student will learn about essentials of highway planning and features of highway development in India.					
2. The student will learn how to do selection of highway alignment and design the geometric elements of highways.					
3. The student will learn how to carry out traffic studies and implement traffic regulation and control measures and intersection design.					
4. The student will know about characteristic properties of road construction materials and design the flexible and rigid pavements as per IRC guidelines.					
<b>UNIT-I (12 Hours)</b>					
<b>Highway Development and Planning:</b> Classification of roads, road development in India, current road projects in India, highway alignment and project preparation.					
<b>Geometric Design of Highways:</b> Highway cross section elements, sight distance, design of horizontal alignment, design of vertical alignment.					
<b>UNIT-II (11 Hours)</b>					
<b>Traffic Characteristics &amp; Studies:</b> Road user characteristics, driver characteristics, vehicular characteristics. Volume studies, speed studies, O-D survey, parking study.					
<b>Traffic Safety and Control Measures:</b> Traffic signs, markings, islands, signals, cause and type of accidents, use of intelligent transport system.					
<b>UNIT-III (11 Hours)</b>					

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**Pavement Materials:** Materials used in highway construction- soils, stone aggregates, bituminous binders, desirable properties, tests, requirements for different types of pavements.

**Paving Mixes:** Marshall method of bituminous mix design, Super pave and Concrete mix design for rigid pavements.

**UNIT-IV (11 Hours)**

**Design of Pavements:** Pavement types, factors affecting design and performance of pavements, flexible pavements- components and functions, stresses in flexible pavements, design of flexible pavements as per IRC.

**Rigid Pavements-** components and functions, stresses in rigid pavements, design of cement concrete pavements as per IRC.

**Recommended Text Books / Reference Books:**

1. Khanna, S.K., Justo, C.E.G and Veeraragavan, A, 'Highway Engineering', Nem Chand & Bros., Roorkee.
2. Kadiyali, L.R., 'Traffic Engineering and Transport Planning', Khanna Publishers, Delhi.
3. Partha Chakraborty, 'Principles of Transportation Engineering, PHI Learning, New Delhi.
4. S.K. Sharma, 'Principles, Practice & Design of Highway Engineering', S. Chand & Company Ltd., New Delhi.
5. Fred L. Mannering, Scott S. Washburn, Walter P. Kilareski, 'Principles of Highway Engineering and Traffic Analysis', John Wiley & Sons, USA.
6. Paul H. Wright and Karen K. Dixon, 'Highway Engineering', Wiley Student Edition, USA.
7. C.A.O. Flaherty, 'Highway Engineering', Vol. 2, Edward Arnold, London.

**ENVIRONMENTAL ENGINEERING-I**

**Subject Code: BCIES1-424**

**L T P C**

**Duration: 45 Hrs.**

3 0 0 3

**Course Objectives:**

The course should enable the students to:

1. Inculcate the basics of water demand, supply, source & future demand estimation.
2. The applicability of concepts of water quality & its examinations.
3. Inculcate the basic concepts of water treatment, its design and management.
4. Extensive knowledge of sources, conversion, distribution & maintenance of water supply system.
5. Modern low cost water treatment techniques for rural supply system.

**Course Outcomes:**

1. An ability to design a system, component, or process to meet desired needs.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, welfare, and environmental factors.
3. An ability to develop and conduct appropriate experimentation, analyze and interpret data for future demand & supply.



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**UNIT-I (11 Hours)**

**Introduction:** Beneficial uses of water, water demand, per capita demand, variations in demand, water demand for firefighting, population forecasting and water demand estimation.

**Water sources and development:** Surface and ground water sources; Selection and development of sources; intakes and transmission systems.

**UNIT-II (11 Hours)**

**Pumps and pumping stations:** Types of pumps and their characteristics and efficiencies; Pump operating curves and selection of pumps; pumping stations.

**Quality and Examination of Water:** Impurities in water, sampling of water, physical, chemical and bacteriological water quality parameters, drinking water quality standards and criteria.

**UNIT-III (12 Hours)**

**Water treatment:** Water treatment schemes; Basic principles of water treatment; Design of Plain sedimentation, coagulation and flocculation, filtration – slow, rapid and pressure; Disinfection units; Fundamentals of water softening, fluoridation and defluoridation, water desalination and demineralization, taste and odour removal.

**UNIT-IV (11 Hours)**

**Water Supply Systems:** Pipes for transporting water and their design, water distribution systems and appurtenances; Water supply network design and design of balancing and service reservoirs; operation and maintenance of water supply systems.

**Rural water supply:** Principles, selection of source, rain water harvesting, quantitative requirements, low cost treatment techniques.

**Recommended Text Books / Reference Books:**

1. Water Supply Engineering- Environmental Engg. (Vol. – I) by B.C. Punmia, Ashok Jain, Arun Jain, Laxmi Publications, New Delhi.
2. Environmental Engg. - A design Approach by Arcadio P. Sincero and Gregoria P. Sincero, Prentice Hall of India, New Delhi
3. "Environmental Engg." By Howard S. Peavy, Donald R. Rowe & George Tchobanoglous, McGraw Hill, International Edition
4. Water Supply Engineering- Environmental Engg. (Vol. – I) by S.K. Garg, Khanna Publishers, Delhi
5. Water Supply and Sewerage by Steel EW and McGhee, Terence J.; McGraw Hill.

**ENGINEERING GEOLOGY**

**Subject Code: BCIES1-425**

**L T P C**

**Duration: 30 Hrs.**

2 0 0 2

**Course Objectives:**

1. The principal objective of the engineering geologist is the protection of life and property against damage caused by various geological conditions.
2. Engineering geologists provide geological and geotechnical recommendations, analysis, and design associated with human development and various types of structures.

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**Course Outcomes:**

1. It will provide the students with basic knowledge and understanding in the most central part of engineering geology, rock and soil.
2. The course will give students an overview & an understanding of the engineering properties of rock and soil materials, debris generation and distribution, engineering geological investigations, slope stability, geological factors affecting the stability of a facility on and in the soil, engineering, stability and protection of underground facilities, etc.
3. Students will develop the ability to perform basic engineering geological assessments and analyses, and to understand the relevance of engineering geology in complex projects in and on solid rock.

**UNIT-I (07 Hours)**

**General Geology:** Scope of geology in Civil Engineering - the earth, its structure and environment - Standard geological time scale, unit & fossils, physiographic, stratigraphic and tectonic divisions of India - geomorphologic (surface) processes – weathering – types , weathered products, Fluvial processes, Glacial Deposits, wind action, and their significance in Civil Engineering.

**UNIT-II (08 Hours)**

**Mineralogy and Petrology:** Physical properties of minerals – classification - study of important rock forming minerals – Quartz family, feldspar family, Mica family, calcite, Iron oxide minerals, Clay minerals and their behaviour and significance in the field of Civil Engineering. Classification of rock - mode of formation - distinction between igneous, sedimentary and metamorphic rocks. Characteristic of rocks. Study of important rocks: granite, syenite, diorite, gabbro, pegmatite, dolerite, basalt, sand stone, limestone, shale, quartzite, marble, slate.

**UNIT-III (07 Hours)**

**Structural Geology and Geophysical Methods:** Attitude of beds - out crops, study of structures such as folds, faults, joints, unconformities, in-lier and out-lier - their brief classification and their bearing on engineering construction. Principles of geophysical methods, electrical resistivity method, seismic method and its applications in civil engineering.

**UNIT-IV (08 Hours)**

**Geology and Construction:** Role of geology in site investigation, Geotechnical classification of rock, geological considerations in open excavation, tunnels and dam site, reservoir site, buildings, road cuttings, landslides and land subsidence its causes, classification and preventive measures, groundwater- types of aquifers, properties of geological formations affecting groundwater and its role as a geological hazard.

**Recommended Text Books / Reference Books:**

1. Engineering and General Geology, Parbin Singh, 8th Edition (2010), S K Kataria & Sons
2. A Text Book of Engineering Geology, N. ChennaKesavulu, 2nd Edition (2009), Macmillan Publishers India.
3. Reddy D.,” Engineering Geology for Civil Engineers”, Oxford & IBH , 1995
4. Blyth, F.G.M., “A Geology for Engineers”, Arnold, Londo, 2003.
5. Bell. F.G, “Fundamentals of Engineering Geology” Butterworth, 1983.

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<b>GEOMATICS ENGINEERING</b>			
<b>Subject Code: BCIED1-451</b>	<b>L T P C</b>	<b>Duration: 45 Hrs.</b>	
	3 0 0 3		
<b>Course Objectives:</b>			
<ol style="list-style-type: none"> <li>1. Have the basic math &amp; science knowledge and technical skills of the Geomatics Engineering Technology discipline appropriate to enter careers in the geospatial community, for example, boundary surveying and legal principles, route and construction surveying, survey measurement analysis and adjustments, Global Positioning System (GPS), Photogrammetry, geodesy, land/Geographic Information Systems (GIS), and 3D scanning.</li> <li>2. Have the ability to execute Geomatics project activities for delivery in response to the needs of private and public industry.</li> <li>3. Have appropriate understanding of standards and specifications of Geomatics practices in analyzing positional accuracy of measurement systems and in preparing land records and plats by meeting legal requirements.</li> <li>4. Have the knowledge to pass the national Fundamentals of Surveying and PS exams, and after gaining experience, be qualified to take the Professional Surveying License Exams with an understanding of continued lifelong learning.</li> <li>5. Have an understanding of the professional, ethical and social issues with commitment to quality and dependability.</li> </ol>			
<b>Course Outcomes:</b>			
<ol style="list-style-type: none"> <li>1. An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline.</li> <li>2. An ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;</li> <li>3. An ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature.</li> <li>4. An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and an ability to function effectively as a member as well as a leader on technical teams.</li> </ol>			
<b>UNIT-I (12 Hours)</b>			
<p><b>Photogrammetry:</b> Introduction, Basic Principles, Photo-Theodolite, Elevation of a Point by Photographic Measurement, Aerial Camera, Vertical Photograph, Tilted Photograph, Scale, Crab and Drift, Flight Planning for Aerial Photography, Ground Control for Photogrammetry, Photomaps and Mosaics, Stereoscopic Vision, Stereoscopic parallax, Stereoscopic Plotting Instruments, Applications.</p>			
<b>UNIT-II (11 Hours)</b>			
<p><b>Remote Sensing:</b> Introduction, Basic Principles, Electromagnetic Energy Spectrum, Interaction of EM Energy with Matter, Effect of Atmosphere on EMR, Interaction of EM radiations with Earth's Surface, Remote sensing Sensor systems, Remote Sensing Observation Platforms, Ideal and Real Remote Sensing Systems, Data Acquisition and Interpretation, Resolution Concept, Applications</p>			

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of Remote Sensing. Methodology for Land Use /Land Cover Analysis and Mapping, Remote Sensing in India. Satellite Data products.
<b>UNIT-III (11 Hours)</b>
<b>Geographical Information System (GIS):</b> Introduction, Sub system of GIS, Hardware of GIS, Data and Data structure for GIS, Representation of features, Vector data & Raster data structure, Data format conversions, Capabilities/Functionalities of GIS, Neighborhood Functions, Map Overlay Analysis, Data Quality, Sources of Errors, Applications of GIS, GIS Software.
<b>UNIT-IV (11 Hours)</b>
<b>Global Positioning System (GPS):</b> Introduction, GLONASS system, GALILEO System, NAVIC system, GPS over view, Space Segment, Control segment, User segment, Principle of position determination, Determining Satellite-to-User Range, Calculation of user position, GPS system time, Carrier phase measurement techniques, Indian Coordinate system for using GPS, Uses and Applications of GPS.
<b>Recommended Text Books / Reference Books:</b>
<ol style="list-style-type: none"> <li>1. Arora, K.R., 2007: Surveying Vol.-III, Standard Book House.</li> <li>2. Duggal, S.K Higher.; Surveying Vol.-II, Tata McGraw Hill.</li> <li>3. Campbell, J.B.2002: Introduction to Remote Sensing. Taylor Publications.</li> <li>4. Chang,T.K. 2002: Geographic Information Systems, Tata McGraw Hill.</li> <li>5. Joseph George, 2003: Fundamentals of Remote Sensing. Universities Press.</li> <li>6. Punmia, B.C., Jain A.K., 2005: Higher Surveying, Luxmi Publications.</li> </ol>

<b>NUMERICAL METHODS IN CIVIL ENGINEERING</b>					
<b>Subject Code: BCIED1-452</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Duration: 45 Hrs.</b>
	3	0	0	3	
<b>Course Objectives:</b>					
The course should enable the students to:					
<ol style="list-style-type: none"> <li>1. Provide the numerical methods of solving the linear, non-linear &amp; transcendental equations, interpolation, integration and differential equations.</li> <li>2. Improve the student's skills in numerical methods by using the numerical analysis facilities.</li> <li>3. Help in solving complex mathematical problems using only simple arithmetic operations.</li> <li>4. Approach involves formulation of mathematical models of physical situations that can be solved with arithmetic operations.</li> <li>5. Approach for fitting the polynomials using raw data.</li> <li>6. Ability to implement the basic principles of numerical techniques in day to day application of Civil Engineering.</li> </ol>					
<b>Course Outcomes:</b>					
Upon successful completion of this course, student will be able to:					
<ol style="list-style-type: none"> <li>1. Identify the application potential of numerical methods</li> <li>2. Solve Civil engineering problems using numerical methods</li> </ol>					

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3. Demonstrate application of numerical methods to civil engineering problems
4. Apply differential equations and integration to solve civil engineering problems
5. Outline and Propose the finite difference techniques
6. Apply the concept of partial differential equations and Solve practical problems

**UNIT-I (12 Hours)**

**Equation:** Roots of algebraic transcendental equations using bisection, Regula-Falsi, Secant & Newton's method, Solution of linear simultaneous equations by different methods using Elimination, Iteration (Gauss Seidal & Gauss Jacobi), Gauss-Jordan method, Homogeneous and Eigen Value problem, Non-linear equations.

**UNIT-II (11 Hours)**

**Finite Difference Technique:** Initial and Boundary value problems of ordinary and partial differential equations, Solution of Various types of plates and other civil engineering related problems.

**UNIT-III (11 Hours)**

**Numerical Integration:** Numerical Integration by trapezoidal and Simpson's rule.

**Statistical Methods:** Method of correlation and Regression analysis for fitting a polynomial equation by least square.

**UNIT-IV (11 Hours)**

**Initial Value problem:** Galerkin's method of least square, Initial Value problem by collocation points, Runge-Kutta Method for first and higher order differential equations.

**Interpolation:** Newton's Backward, Forward and Lagrange's Interpolation methods.

**Recommended Text Books / Reference Books:**

1. Numerical Methods by B.S. Grewal, Khanna Publishers.
2. Numerical Mathematical Analysis: James B. Scarborough Oxford and IBH Publishing
3. Introductory Methods of Numerical Analysis: S.S. Sastry, PHI Learning (2012).
4. Introduction to Computer Programming and Numerical Methods by Xundong Jia and Shu Liu, Dubuque, Iowa: Kendall/Hunt Publishing Corporation.
5. Numerical Methods, J.B Dixit, USP Laxmi publication.
6. Numerical Methods by C.P. Gandhi.

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<b>CONCRETE CONSTRUCTION TECHNOLOGY</b>		
<b>Subject Code: BCIED1-453</b>	<b>L T P C</b>	<b>Duration: 45 Hrs.</b>
	3 0 0 3	
<p><b>Course Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Understand properties of concrete and types of concrete</li> <li>2. Know the procedure to determine the properties of fresh and hardened of concrete.</li> <li>3. Understand properties of cement and aggregate and types of cement.</li> <li>4. Gives ideas on the construction and inspection requirements the buildings</li> </ol> <p><b>Course Outcomes:</b> Based on this course, the students will understand/evaluate/develop</p> <ol style="list-style-type: none"> <li>1. To understand the behaviour of fresh and hardened concrete.</li> <li>2. To make aware the recent developments in concrete technology.</li> <li>3. To understand factors affecting the strength, workability and durability of concrete.</li> <li>4. To impart the methods of proportioning of concrete mixtures.</li> </ol>		
<b>UNIT-I (11 Hours)</b>		
<p><b>Introduction of Concrete materials:</b> Admixtures, Fly Ash, Polymers, Early Age Properties, Strength, Permeability &amp; Durability. Principles of Concrete mix design, Concrete Mix Design procedure by: IS/ACI/British Standards.</p>		
<b>UNIT-II (11 Hours)</b>		
<p><b>Concreting Operations:</b> Practices and Equipment, batching; Mixing; Transporting; Placing and Compacting; curing. Properties and technique of construction for concrete, Fibre reinforced concrete, light weight concrete, Heavy weight concrete, High performance Concrete.</p>		
<b>UNIT-III (12 Hours)</b>		
<p><b>Special Concrete Operations:</b> Shot Crete, grouting, Grunting, under water concreting, hot and cold weather concrete, pump able concrete. Construction techniques for reinforced concrete elements, design and fabrication of form work for R.C.C. elements.</p>		
<b>UNIT-IV (11 Hours)</b>		
<p><b>Introduction to Pre-stressed concrete Construction:</b> Principle, methods, materials, Tools and equipment used in Pre-stressed construction.</p> <p>Inspection and Quality Control of Concrete Construction: Stages, Principles, Checklist, Statistical Controls, procedures.</p>		
<p><b>Recommended Text Books / Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. M.L. Gambhir, 'Concrete Technology', McGraw Hill Education.</li> <li>2. M.S. Shetty, 'Concrete Technology', S. Chand.</li> <li>3. Neville and Brooks, 'Concrete Technology', Prentice Hall.</li> </ol>		

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<b>CONCRETE TECHNOLOGY LAB-I</b>		
<b>Subject Code: BCIES1-426</b>	<b>L T P C</b>	<b>Duration: 30 Hrs.</b>
	0 0 2 1	
<b>Course Objectives:</b> The course should enable the students to: <ol style="list-style-type: none"><li>1. Give practical exposure of laboratory testing of different kinds of building construction materials such as brick, cement, lime, aggregate, etc.</li><li>2. Check the suitability for different materials used in civil construction works.</li><li>3. Determine the engineering properties in terms of strength, strain, fatigue, creep, elasticity, stiffness, durability and workability.</li><li>4. The knowledge of these tests is very essential to choose appropriate construction material to exercise better quality control in a civil construction project.</li></ol>		
<b>Course Outcomes:</b> Upon successful completion of this course, student will be able to: <ol style="list-style-type: none"><li>1. Determine the consistency, setting time and fineness of cement.</li><li>2. Determine the specific gravity, soundness and compressive strength of cement</li><li>3. Determine the fineness modulus, grading, density &amp; specific gravity of aggregates.</li><li>4. Determine the shape &amp; size, compressive strength and water absorption of bricks.</li><li>5. Determine the compressive strength and water absorption of interlocking Pavers.</li><li>6. Determine the yield Stress, ultimate Stress, elongation of Steel bars.</li></ol>		
<b>Laboratory Experiments:</b> <ol style="list-style-type: none"><li>1. To Determine the Specific Gravity of cement.</li><li>2. To Determine the Soundness of cement.</li><li>3. To Determine the Standard Consistency, Setting Times (Initial and Final Setting Time) of Cement.</li><li>4. To Determine the Compressive Strength of Cement.</li><li>5. To Determine the Fineness Modulus &amp; Grading of Fine and Coarse Aggregates.</li><li>6. To Determine the Bulk Density, Water Absorption and Specific gravity of Fine and Coarse Aggregates.</li><li>7. To Determine the Compressive strength, Efflorescence and Water absorption of Bricks as per IS standard.</li><li>8. To perform Shape and Size test on Bricks.</li><li>9. To Determine the Compressive strength and Water absorption of interlocking Pavers as per IS standard.</li><li>10. To Determine the Yield Stress, Ultimate Stress and Elongation of Steel bars.</li><li>11. To Perform Bend &amp; Rebend test on Steel bars.</li></ol>		

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**Recommended Books / Manuals:**

1. M.L. Gambhir, 'Building and Construction Materials: Testing and Quality Control', TMH.
2. Concrete Lab Manual by NITTTR Chandigarh.
3. Concrete Technology, Theory and Practice by M.S. Shetty, S. Chand & Company.

**STRUCTURAL ANALYSIS LAB**

**Subject Code: BCIES1-427**

**L T P C**

**Duration: 30 Hrs.**

0 0 2 1

**Course Objectives:**

1. To introduce engineering students to the theory and experimental techniques of structural mechanics.
2. To experimentally illustrate, in a comprehensive way, the basic principles of structural analysis and their applications.
3. To prepare the students learn best by doing.
4. To familiarize them, through the laboratory exercises, with the model behavior and practical limitations of each set-up and to get opportunity to critically examine and developing various skills in them for structural analysis of theoretical concepts, data handling and decision making.

**Course Outcomes:**

1. Students will be able to effectively link the theory / analytical concepts.
2. They will be able to demonstrate the background of the theoretical aspects, with practice and application.
3. They will be able to generate and analyze data using experiments and develop observational skill by the exposure to equipment and machines.
4. They will be able to use computing tools in analyzing and presentation of the experimental data.

**Laboratory Experiments:**

1. To study the behavior of different types of struts.
2. Deflection of a simply supported beam and verification of Clark-Maxwell's theorem.
3. To determine the Flexural Rigidity of a given beam.
4. To verify Moment- Area Theorems for slope and deflection of a given beam.
5. To determine the Carry over Factor (C.O.F.) for beams with rigid connections.
6. Experiment on three-hinged arch and influence line diagram for horizontal thrust.
7. Experiment on two-hinged arch.
8. To determine the deflection of a Pin-connected truss.
9. Forces in members of a redundant frame.



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10. Experiment on curved beams.
11. Unsymmetrical bending of a cantilever beam.
12. Influence line diagrams for BM of a beam with one end hinged and the other fixed.

**Recommended Books / Manuals:**

1. Experimental methods in Structural Mechanics by C.B. Kukreja and V.V. Sastry, Standard Publishers Distributors, Delhi.
2. Laboratory Manual of Testing Materials - William Kendrick Hall
3. Laboratory Manual on Structural Mechanics by Harvinder Singh.

**TRANSPORTATION ENGINEERING LAB**

**Subject Code: BCIES1-428**

**L T P C**

**Duration: 30 Hrs**

0 0 2 1

**Course Objectives:**

1. The main objective of this course is to give practical exposure of laboratory testing of different kinds of highway construction materials such as Soil, Aggregate and Bitumen to check their suitability for their use in road construction.
2. The knowledge of these tests is very essential for a civil engineer to choose appropriate construction material to exercise better quality control in a road construction project.

**Course Outcomes:**

1. The student will learn the laboratory testing of different kinds of highway construction materials such as Soil, Aggregate and Bitumen.
2. The student will learn to check the suitability of highway construction material so as to exercise better quality control in a road construction project.

**Tests on Sub-Grade Soil:**

1. Proctor's Compaction Test
2. California Bearing Ratio Test

**Tests on Road Aggregates:**

1. Crushing Value Test
2. Los Angles Abrasion Value Test
3. Impact Value Test
4. Shape Test (Flakiness and Elongation Index)

**Tests on Bituminous Materials:**

1. Penetration Test
2. Ductility Test
3. Softening Point Test
4. Flash & Fire Point Test

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**Recommended Books / Manuals:**

1. S.K. Khanna and C.E.G. Justo, 'Highway Material & Pavement Testing', Nem Chand and Brothers, Roorkee.
2. Ajay K. Duggal, Vijay P. Puri, 'Laboratory Manual in Highway Engineering', New Age Publications, New Delhi.

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**Total Credits= 21**

<b>Semester-VI (B. Tech Civil Engg.)</b>		<b>Contact Hours</b>			<b>Max Marks</b>		<b>Total Marks</b>	<b>Credits</b>
<b>Subject Code</b>	<b>Subject Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Int.</b>	<b>Ext.</b>		
BCIES1-601	Design of Steel Structures-I	3	0	0	40	60	100	3
BCIES1-602	Structural Analysis-II	3	0	0	40	60	100	3
BCIES1-603	Transportation Engineering-I	3	0	0	40	60	100	3
BCIES1-604	Foundation Engineering	3	0	0	40	60	100	3
<b>Departmental Elective-III (Select any one)</b>								
BCIED1-611	Irrigation Engineering-I							
BCIED1-612	Matrix Methods of Analysis	2	0	0	40	60	100	2
BCIED1-613	Rural Water supply and Onsite Sanitation Systems							
<b>Departmental Elective-IV (Select any one)</b>								
BCIED1-621	Construction Project Planning & Systems							
BCIED1-622	Building Construction Practice	2	0	0	40	60	100	2
BCIED1-623	Pavement Design							
<b>Departmental Elective-V (Select any one)</b>								
BCIED1-631	Water & Wastewater Treatment							
BCIED1-632	Ground Improvement Techniques	3	0	0	40	60	100	3
BCIED1-633	Pavement Construction and Management							
BCIED1-634	Earthquake Engineering							
BCIES1-605	Transportation Engineering Lab	0	0	2	60	40	100	1
BCIES1-606	Computer-aided Civil Engineering Drawing Lab-II	0	0	2	60	40	100	1
<b>Total</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>400</b>	<b>500</b>	<b>900</b>	<b>21</b>

\*There will be 4-6 weeks Internship as per AICTE Internship Policy after 6<sup>th</sup> semester.

# MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

DESIGN OF STEEL STRUCTURES-I		
<b>Subject Code: BCIES1-601</b>	<b>L T P C</b>	<b>Duration: 45 hrs.</b>
	3 0 0 3	
<b>Course Objectives:</b> <ol style="list-style-type: none"><li>1. Learn the behaviour of structural steel components Ability to perform analysis and design of steel members and connections.</li><li>2. Ability to design steel structural systems learns the behaviour of structural steel components.</li></ol>		
<b>Course Outcomes:</b> <ol style="list-style-type: none"><li>1. Identify the different failure modes of bolted and welded connections, and determine their design strengths.</li><li>2. Identify the different failure modes of steel tension and compression members and beams, and compute their design strengths.</li><li>1. Select the most suitable section shape and size for tension and compression members and beams according to specific design criteria.</li></ol>		
<b>Note: IS 800:2007, General construction in Steel-Code of practice is permitted in examination.</b>		
<b>UNIT-I (11 Hours)</b>		
<b>Introduction:</b> Properties of structural steel, I.S. rolled sections, I.S. specifications. <b>Connections:</b> Riveted, bolted and welded connections for axial and eccentric loads (Type-I&II).		
<b>UNIT-II (12 Hours)</b>		
<b>Tension Members:</b> Introduction, Mode of Failure, IS Specifications, Design of members subjected to axial tension using bolts and welds. <b>Compression Members:</b> Introduction, buckling, effective length, slenderness, effects of end supports, Design of axially loaded members, built-up columns, laced and battened columns including the design of lacing and battens using bolts and welds.		
<b>UNIT-III (11 Hours)</b>		
<b>Flexural Members:</b> Plastic behavior, beam types, Shear in beam, bending, splices, Design of laterally restrained and un-restrained rolled and built-up sections using bolts and welds. <b>Foundation:</b> Types, Anchor bolts, bearing plate, Design of slab base, gusseted base and grillage foundation using bolts and welds.		
<b>UNIT-IV (11 Hours)</b>		
<b>Roof Truss:</b> Introduction, Terminology, types & uses, types of load, purlins, Design of roof truss using bolts and welds.		
<b>Recommended Text Books / Reference Books:</b> <ol style="list-style-type: none"><li>1. S.K. Duggal, 'Limit State Design of Steel Structures', McGraw Hill.</li><li>2. N. Subramanian, 'Design of Steel Structures', Oxford Higher Education.</li><li>3. 'Design of Steel Structures', Vol. -1, Ram Chandra Standard Book House – Rajsons.</li><li>4. S S Bhavikatti, 'Design of Steel Structures' (by limit state method as per IS: 800-2007)', I.K. International Publishing House.</li><li>5. IS 800: 2007 (General construction in Steel-Code of practice)</li></ol>		

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STRUCTURAL ANALYSIS-II		
<b>Subject Code: BCIES1-602</b>	<b>L T P C</b>	<b>Duration: 45 Hrs.</b>
	3 0 0 3	
<b>Course Objectives:</b> <ol style="list-style-type: none"><li>1. To provide students with a solid background on principles of structural analysis by exposing them to the theories and concepts of analyzing the civil engineering structures.</li><li>2. To cover the analysis of statically indeterminate structures.</li></ol>		
<b>Course Outcomes:</b> <ol style="list-style-type: none"><li>1. The students will possess the skills to solve statically indeterminate problems of structural analysis dealing with different loads.</li><li>2. They will be able to apply their knowledge of structural analysis to address structural design problems.</li></ol>		
<b>UNIT-I (11 Hours)</b>		
<b>1. Analysis of Statically Indeterminate Structures:</b> Degree of static and kinematic indeterminacies, analysis of indeterminate beams, rigid frames and trusses by method of consistent deformation, law of reciprocal deflections, method of least work, induced reactions on statically indeterminate beams & rigid frames due to yielding of supports.		
<b>2. Fixed &amp; Continuous Beams:</b> Introduction, Analysis of fixed beams by moment-area theorem and strain energy method, fixed end moments due to different types of loadings, sinking and rotation of supports, bending moment and shear force diagrams for fixed beams, slope and deflection of fixed beams, analysis of continuous beams by the Three moment equation (Clapeyron's theorem) due to different types of loadings, effect of sinking of supports, BMDs.		
<b>UNIT-II (12 Hours)</b>		
<b>3. Slope-Deflection Method:</b> Introduction, slope-deflection equations, analysis of statically indeterminate beams and rigid frames (sway and non-sway type) due to applied loads and uneven support settlements.		
<b>4. Moment-Distribution Method:</b> Introduction, absolute and relative stiffness of members, stiffness and carry-over factors, distribution factors, analysis of statically indeterminate beams and rigid frames (sway and non-sway type) due to applied loads and uneven support settlements, symmetrical beams and frames with symmetrical, skew-symmetrical and general loading.		
<b>UNIT-III (11 Hours)</b>		
<b>5. Rotation Contribution Method:</b> Introduction, basic concept, analysis of statically indeterminate beams and rigid frames (sway and non-sway type) due to applied loadings and yielding of supports, symmetrical beams and frames, general case-storey columns unequal in height and bases fixed or hinged.		
<b>6. Approximate Methods of Structural Analysis:</b> Introduction, Vertical and lateral load analysis of multi-story frames, portal, cantilever and substitute-frame methods and their comparison.		
<b>UNIT-IV (11 Hours)</b>		
<b>7. Two Hinged Arches:</b> Introduction, Analysis of two hinged arches for Horizontal Thrust, Bending Moment, Normal Thrust, and Radial Shear, Settlement (Foundation Yielding) and		

<p>Temperature Effects, Rib Shortening and Shrinkage, Influence Lines for Two Hinged Arches.</p> <p><b>8. Influence Lines for Statically Indeterminate Structures:</b> Muller- Breslau principle for statically determinate and indeterminate beams, trusses and rigid frames, influence lines for reactions, shear force and bending moment for statically indeterminate beams, trusses and rigid frames.</p>
<p><b>Recommended Text Books / Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. C.S. Reddy, 'Basic Structural Analysis'.</li> <li>2. C.K. Wang, 'Intermediate Structural Analysis'.</li> <li>3. J. Sterling Kinney, 'Indeterminate Structural Analysis'.</li> <li>4. B.C. Punmia, 'Theory of Structures'.</li> </ol>

<b>TRANSPORTATION ENGINEERING-I</b>			
<b>Subject Code: BCIES1-603</b>	<b>L T P C</b>		<b>Duration: 45 hrs.</b>
	3 0 0 3		
<p><b>Course Objectives:</b></p> <ol style="list-style-type: none"> <li>1. The objective of this course is to acquaint the students about highway planning and development in India.</li> <li>2. The course will cover selection of highway alignment, design of geometric elements of highways, carry out traffic studies and implement traffic regulation and control measures and intersection design.</li> <li>3. The characteristic properties of road construction materials and design of flexible and rigid pavements as per IRC guidelines shall also be covered in this course.</li> </ol> <p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"> <li>1. The student will learn about essentials of highway planning and features of highway development in India.</li> <li>2. The student will learn how to do selection of highway alignment and design the geometric elements of highways.</li> <li>3. The student will learn how to carry out traffic studies and implement traffic regulation and control measures and intersection design.</li> <li>4. The student will know about characteristic properties of road construction materials and design the flexible and rigid pavements as per IRC guidelines.</li> </ol>			
<b>UNIT-I (12 Hours)</b>			
<p><b>Highway Development and Planning:</b> Classification of roads, road development in India, current road projects in India, highway alignment and project preparation.</p> <p><b>Geometric Design of Highways:</b> Highway cross section elements, sight distance, design of horizontal alignment, design of vertical alignment.</p>			
<b>UNIT-II (11 Hours)</b>			
<p><b>Traffic Characteristics &amp; Studies:</b> Road user characteristics, driver characteristics, vehicular characteristics. Volume studies, speed studies, O-D survey, parking study.</p> <p><b>Traffic Safety and Control Measures:</b> Traffic signs, markings, islands, signals, cause and type of accidents, use of intelligent transport system.</p>			

**UNIT-III (11 Hours)**

**Pavement Materials:** Materials used in highway construction- soils, stone aggregates, bituminous binders, desirable properties, tests, requirements for different types of pavements.

**Paving Mixes:** Marshall method of bituminous mix design, Super pave and Concrete mix design for rigid pavements.

**UNIT-IV (11 Hours)**

**Design of Pavements:** Pavement types, factors affecting design and performance of pavements, flexible pavements- components and functions, stresses in flexible pavements, design of flexible pavements as per IRC.

**Rigid Pavements-** components and functions, stresses in rigid pavements, design of cement concrete pavements as per IRC.

**Recommended Text Books / Reference Books:**

1. Khanna, S.K., Justo, C.E.G and Veeraragavan, A, 'Highway Engineering', Nem Chand & Bros., Roorkee.
2. Kadiyali, L.R., 'Traffic Engineering and Transport Planning', Khanna Publishers, Delhi.
3. Partha Chakraborty, 'Principles of Transportation Engineering, PHI Learning, New Delhi.
4. S.K. Sharma, 'Principles, Practice & Design of Highway Engineering', S. Chand & Company Ltd., New Delhi.
5. Fred L. Mannering, Scott S. Washburn, Walter P. Kilareski, 'Principles of Highway Engineering and Traffic Analysis', John Wiley & Sons, USA.
6. Paul H. Wright and Karen K. Dixon, 'Highway Engineering', Wiley Student Edition, USA.
7. C.A.O. Flaherty, 'Highway Engineering', Vol. 2, Edward Arnold, London.

**FOUNDATION ENGINEERING**

**Subject Code: BCIES1-604**

**L T P C**

**Duration: 45 hrs.**

3 0 0 3

**Course Objectives:**

1. Analyse earth retaining structures to determine earth pressures.
2. Analyse bearing capacity of soils under shallow footings.
3. Design shallow footings based on dimensions, thickness, area and length.
4. Determine the bearing capacities of single pile in sand and clay using static method and the distribution of load in group piles as well as their efficiencies.
5. Conduct basic technical investigations, compile and analyse information, and produce a brief and concise report with an appropriate conclusion.

**Course Outcomes:**

After successful completion of this course, the students would:

1. Learn about types and purposes of different foundation systems and structures.
2. Have an exposure to the systematic methods for designing foundations.
3. Be able evaluate the feasibility of foundation solutions to different types of soil conditions considering the time effect on soil behaviour.

4. Have necessary theoretical background for design and construction of foundation systems.

**UNIT-I (11 Hours)**

**Soil Investigation:** Soil Investigation for new and existing structures. Depth of exploration for different structures, spacing of bore Holes, Methods of soil exploration and relative merits and demerits. Types of soil sample. Design features of sampler affecting sample disturbance, Essential features and application of various types of samplers, Geophysical exploration by seismic and electrical resistivity methods, Standard Penetration Test and Plate load test, Bore hole log.

**Stresses in Soil:** Boussinesq's equation for a point load, uniformly loaded circular and rectangular area, pressure distribution diagrams, Isobars, New mark's chart and its construction, Approximate method of load distribution, Comparison of Boussinesq's and Westergaard analysis for a point load.

**UNIT-II (11 Hours)**

**Earth Pressure:** Terms and symbols used for a retaining wall, Movement of wall and the lateral earth pressure, Earth pressure at rest, Rankine states of plastic equilibrium, Coefficient of active and passive earth pressures for horizontal backfills, Rankine's theory both for active and passive earth pressure for Cohesion-less and cohesive soil, Coulomb's method for cohesion less backfill, Merits and demerits of Ranking and Coulomb's theories, Culmann's graphical construction (without surcharge load).

**UNIT-III (12 Hours)**

**Shallow Foundation:** Type of shallow foundations, Factors affecting choice of foundation, Factors affecting the depth of foundation. Definition of ultimate bearing capacity, safe bearing capacity and allowable bearing capacity, Terzaghi's analysis. Types of failures, Factors affecting bearing capacity, Skempton's equation, B.I.S. recommendations for shape, depth, inclination factors and water table corrections, Causes of settlement of structures, Immediate and consolidation settlement, calculation of settlement by plate load Test and Static Cone penetration test data, Allowable settlement of various structures according to I.S. Code, Introduction of rafts and floating foundation.

**UNIT-IV (11 Hours)**

**Pile Foundations:** Types, Necessity and uses of piles, Classification of piles, Types of pile driving hammers & their comparison, Determination of load carrying capacity of driven piles by dynamic formulae, Cyclic Pile Load Test, Determination of point resistance and frictional resistance of a single pile by Static formulas in sand and clay, Spacing of piles in a group, Group action of piles, Calculation of settlement of friction pile group in clay, Settlement of pile groups in sand, Negative skin friction.

**Caissons and Wells:** Major areas of use of caissons, advantages and disadvantages of open box and pneumatic caissons, Essential part of a pneumatic caisson, Components of a well foundation, Calculation of allowable bearing pressure, Conditions for stability of a well, Forces acting on a well foundation, Computation of scour depth.

**Recommended Text Books / Reference Books:**

1. K.R. Arora, 'Soil Mech. & Foundation Engineering,' Standard Publishers Distributors.



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2. V.N.S. Murthy, 'Soil Mech. & Foundation Engineering'.
3. Gopal Ranjan and A.S.R. Rao, 'Basic and Applied Soil Mechanics', New Age International.
4. Muni Budhu, 'Soil Mech. & Foundations', Wiley, John Wiley & Sons.
5. Gulhati and Datta, 'Geotechnical Engineering', Tata McGraw Hill Education.

<b>IRRIGATION ENGINEERING –I</b>					
<b>Subject Code: BCIED1-611</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Duration: 30 Hrs.</b>
<p><b>Course Objectives:</b> The course should enable the students to:</p> <ol style="list-style-type: none"> <li>1. The concepts, techniques and modernization of irrigation.</li> <li>2. Design lined and un-lined canals for irrigations.</li> <li>3. Different theories/ methods to design lined and un-lined canals.</li> <li>4. Losses in canals and its control measures.</li> <li>5. Construction of well and tube well.</li> <li>6. River training works.</li> </ol> <p><b>Course Outcomes:</b> Upon successful completion of this course, student will be able to:</p> <ol style="list-style-type: none"> <li>1. Recognize the concepts, techniques and modernization of irrigation.</li> <li>2. Plan and design lined and un-lined canals for irrigations.</li> <li>3. Apply different theories/ methods to design lined and un-lined canals.</li> <li>4. Learn losses in canals and its control measures.</li> <li>5. Design and construction of well and tube well.</li> <li>6. Learn about river training works.</li> </ol>					
<b>UNIT-I (07 Hours)</b>					
<p><b>1. Introduction:</b> Importance of irrigation engineering, purposes of irrigation, objectives of irrigation, benefits of irrigation, advantages of various techniques of irrigation: Furrow irrigation, boarder strip irrigation, basin irrigation, sprinkler irrigation, drip irrigation.</p> <p><b>2. Methods of Irrigation:</b> Advantages and disadvantages of irrigation, water requirements of crops, factors affecting water requirement, consumptive use of water, water depth or delta, Duty of water, relation between delta, duty and base period, Soil crop relation-ship and soil fertility.</p>					
<b>UNIT-II (08 Hours)</b>					
<p><b>3. Canal Irrigation:</b> Classifications of canals, canal alignment, Inundation canals, Bandhara irrigation, advantages and disadvantages, Silt theories-Kennedy's theory, Lacey's theory, Drawbacks in Kennedy's &amp; Lacey's theories, comparison of Lacey's and Kennedy's theories, Design of unlined canals based on Kennedy &amp; Lacey's theories, suspended and bed loads.</p> <p><b>4. Lined canals:</b> Types of lining, selection of type of lining, Economics of lining, maintenance of lined canals, silt removal, strengthening of channel banks, measurement of discharge in channels, design of lined canals, methods of providing drainage behind lining.</p>					
<b>UNIT-III (07 Hours)</b>					
<p><b>5. Losses in canals, water logging and drainage:</b> Losses in canals-Evaporation and seepage,</p>					

water logging, causes and ill effects of water logging- anti water logging measures. Drainage of land, classification of drains - surface and subsurface drains Design considerations for surface drains, Advantages and maintenance of tile drains.

**6. River training works:** Objectives, classification of river-training works, Design of Guide Banks. Grayness or spurs - Their design and classification, ISI Recommendations of Approach embankments and afflux embankments, pitched Islands, natural cut-offs and artificial cut-offs and design Considerations.

**UNIT-IV (08 Hours)**

**7. Tube well Irrigation:** Types of tube - wells - strainer type, cavity type and slotted type. Type of strainers, Aquifer, porosity, uniformity coefficient, specific yield & specific retention, coefficients of permeability, transmissibility and storage. Yield or discharge of a tube well, Assumptions, Theim's & Duperit's formulae, Interference of tube wells with canal or adjoining tube-wells, optimum capacity, causes of failure of tube wells. Duty and delta of a tube well. Rehabilitation of tube well.

**Recommended Text Books / Reference Books:**

1. Principles & practice of Irrigation Engg. S.K. Sharma
2. Irrigation & Water Power Engg. B.C. Punmia, Pande, B.B. Lal
3. Fundamentals of Irrigation Engg. Dr. Bharat Singh
4. Irrigation Engg. & Hydraulic Structure S.R. Sahasrabudhe
5. Irrigation Engg. & Hydraulic Structure Varshney, Gupta & Gupta
6. Irrigation Engg. & Hydraulic Structure Santosh Kumar Garg.

**MATRIX METHODS OF ANALYSIS**

<b>Subject Code: BCIED1-612</b>	<b>L T P C</b>	<b>Duration: 30 Hrs.</b>
	2 0 0 2	

**Course Objectives:**

1. To provide a reasonably comprehensive treatment of matrix methods in structural analysis of skeletal i.e. framed structure in recent years.
2. To develop the elegant finite element method which is nothing but the extension of it?
3. To give engineering students and practicing professionals the fundamentals of the background theory necessary in commercial frame analysis program.

**Course Outcomes:**

1. Students will be able to analyze skeletal i.e. framed structures.
2. They will be able to differentiate between the flexibility and stiffness methods of structural analysis.
3. They will be able to access computers that permits the use of the stiffness method for analyzing traditional civil engineering structures, air frame, space structures etc.

**UNIT-I (08 Hours)**

**1. Basic Concepts of Structural Analysis:** Introduction, Types of Framed Structures,

Deformations in Framed Structures, Equilibrium, Compatibility, Static and kinematic indeterminacies of beams, rigid-jointed plane and space frames, pin-jointed plane and space frames and hybrid structures, Structural Motilities, Principle of Superposition, Equivalent Joint Loads, Energy Concepts and Virtual Work.

**2. Flexibility & Stiffness Matrices:** Actions and Displacements, Action and Displacement equations, Generalized System of Coordinates, Slope-Deflection equations in Generalized Coordinates, Axes and Coordinates, Flexibility and Stiffness Influence Coefficients, Flexibility Matrix, Stiffness Matrix, Relation between Flexibility and Stiffness Matrices, Basic definitions and types of matrices, matrix operations, matrix inversion, solution of linear simultaneous equations, matrix partitioning.

**UNIT-II (07 Hours)**

**3. Flexibility Matrix (Physical Approach):** Development of flexibility matrices for statically determinate and indeterminate beams, rigid-jointed plane frames and pin-jointed plane frames using physical approach.

**4. Stiffness Matrix (Physical Approach):** Development of stiffness matrices for statically determinate and indeterminate beams, rigid-jointed plane frames and pin-jointed plane frames using physical approach, reduced stiffness matrix, total stiffness matrix, translational or lateral stiffness matrix.

**UNIT-III (08 Hours)**

**5. Flexibility Matrix (Element Approach):** Transformation of system forces to element forces through force transformation matrix, Development of flexibility matrices for statically determinate & indeterminate beams, rigid-jointed plane frames and pin-jointed plane frames using Element Approach.

**6. Stiffness Matrix (Element Approach):** Transformation of system displacements to element displacements through displacement transformation matrix, Development of stiffness matrices for statically determinate and indeterminate beams, rigid-jointed plane frames and pin-jointed plane frames using Element Approach.

**UNIT-IV (07 Hours)**

**7. Flexibility Method of Analysis:** Analysis of continuous beams, rigid-jointed plane frames and pin-jointed plane frames using the physical and element approaches, effect of support settlements, temperature stresses and lack of fit.

**8. Stiffness Method of Analysis:** Analysis of continuous beams, rigid-jointed plane frames and pin-jointed plane frames using the physical and element approaches, effect of support settlements, temperature stresses and lack of fit, comparison of flexibility and stiffness methods of analysis.

**Recommended Text Books / Reference Books:**

1. G.S. Pandit and S.P. Gupta, 'Structural Analysis, A Matrix Approach'.
2. William Weaver, Jr. James M. Gere, 'Matrix Analysis of Framed Structures'.
3. C.S. Reddy, 'Basic Structural Analysis'.
4. C.S. Krishnamurthy, 'Finite Element Analysis'.
5. O.C. Zeinewicz, 'Finite Element Methods'.

<b>RURAL WATER SUPPLY &amp; ONSITE SANITATION SYSTEMS</b>		
<b>Subject Code: BCIED1-613</b>	<b>L T P C</b>	<b>Duration: 30 Hrs.</b>
	2 0 0 2	
<p><b>Course Objectives:</b> The course should enable the students to:</p> <ol style="list-style-type: none"> <li>1. Learn about water supply in rural areas</li> <li>2. Learn about environmental sanitation methods in rural areas</li> <li>3. Comprehend the global picture of water/sanitation/hygiene and health</li> <li>4. Understanding the principles of operation of a range of appropriate water and sanitation technologies, and to be able to critically evaluate them with respect to multiple criteria</li> <li>5. Investigate the concept of community participation and its role in enabling project success and sustainability.</li> </ol> <p><b>Course Outcomes:</b> Upon successful completion of this course, student will be able to:</p> <ol style="list-style-type: none"> <li>1. Knowledge about water supply scheme in rural areas.</li> <li>2. Knowledge about environmental sanitation methods and design in rural areas.</li> </ol>		
<b>UNIT-I (07 Hours)</b>		
<p><b>Sanitation in Rural Area:</b> Concept of environmental and scope of sanitation in rural areas, Magnitude of problem of water supply and sanitation – population to be covered and difficulties National policy, Various approaches for planning of water supply systems in rural areas, Selection and development of preferred sources of water, springs, wells and infiltration galleries, collection of raw water from surface source.</p>		
<b>UNIT-II (08 Hours)</b>		
<p><b>Water Treatment for Rural Areas:</b> Specific problem in rural water supply and treatment e.g. iron, manganese, fluorides etc., Low cost treatment, appropriate technology for water supply and sanitation, Compact system of treatment of surface and ground waters such as MB settlers, slow sand filter, chlorine diffusion cartridge etc.</p>		
<b>UNIT-III (08 Hours)</b>		
<p><b>Waste Water Treatment &amp; Distribution:</b> Planning of distribution system in rural areas, Water supply during fairs, festivals and emergencies, Treatment and disposal of wastewater/sewage, various method of collection and disposal of night soil.</p>		
<b>UNIT-IV (07 Hours)</b>		
<p><b>Onsite Sanitation System for Rural Areas:</b> On site sanitation system and Disposal of solids waste: Simple wastewater treatment system for rural areas and small communities such as stabilization ponds, septic tanks, soakage pits, surface drains, onsite sanitation systems etc., composting, land filling, Biogas plants.</p>		
<p><b>Recommended Text Books / Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Low cost on site sanitation option, Hoffman &amp; Heijno Occasional Nov.1981 paper No. 21, P.O. Box 5500 2280 HM Rijswijk, the Netherlands offices, J.C. Mokeniaan</li> <li>2. Rijswijk (the Haque), Wagner, E.G. and Lanoik, J.N. water supply for rural areas and Small communities, Geneva: W.H.O.1959.</li> </ol>		

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3. Manual of water supply and treatment, 3rd edition, CPHEEO, GOI, New Delhi.
4. Water Supply and Pollution Control by Warren Viessman Jr. and Mark J. Hammer, 7<sup>th</sup> Edition 2005, Pearson Education.
5. Wastewater Engineering; Treatment, Disposal, Reuse, by Metcalf & Eddy, Tata McGraw-Hill.

CONSTRUCTION PROJECT PLANNING & SYSTEMS					
<b>Subject Code: BCIED1-621</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Duration: 30 Hrs.</b>
	2	0	0	2	
<b>Course Objectives:</b> <ol style="list-style-type: none"><li>1. It includes-Integrated Pre-Construction Planning. Collaborative Commissioning. Complete Construction Project Life Cycle Management.</li><li>2. It provides necessary leadership, motivates employees to complete the difficult tasks well in time and extracts potential talents of its employees.</li></ol>					
<b>Course Outcomes:</b> <ol style="list-style-type: none"><li>1. Learn the structure of construction companies</li><li>2. Learn the management functions of construction companies</li><li>3. Practise contract management applications</li><li>4. Use project management applications</li><li>5. Plan construction projects</li><li>6. Gain information about construction risk analysis.</li></ol>					
<b>UNIT-I (08 Hours)</b>					
<b>Introduction:</b> Need for project planning & management, time, activity & event, bar chart, Milestone chart, uses & draw backs. <b>PERT Technology:</b> Construction of PERT network, time estimates, network analysis, forward pass & backward pass, slack, critical path, data reduction, suitability of PERT for research project.					
<b>UNIT-II (08 Hours)</b>					
<b>CPM Technology:</b> Definitions, network construction, critical path, fundamental rules, determination of project schedule, activity time estimates, float types, their significance in project control.					
<b>UNIT-III (07 Hours)</b>					
<b>Construction Equipment and Machinery:</b> Tractors, bull dozers, rippers, scrapers, power shovels, dragline, hoes and uses, factors affecting selection of equipment, economic life of equipment, maintenance and repair cost. Hoisting & Transporting Equipments: Hosts, Winches, Cranes, Belt conveyors, Ropeways, trucks & Wagons, Introduction to modern constructional equipments.					
<b>UNIT-IV (07 Hours)</b>					
<b>Cost Analysis and Contract:</b> Type of costs, cost time relationships, cost slopes, conducting a crash programme, determining the minimum total cost of project, numerical problems, updating a project, planning of different components of civil engineering projects such as a house, workshop, dam, tunnel.					

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## Recommended Text Books / Reference Books:

1. Varghese, P.C., "Building Construction", Prentice Hall India, 2007.
2. National Building Code, Bureau of Indian Standards, New Delhi, 2017.
3. Chudley, R., Construction Technology, ELBS Publishers, 2007.
4. Peurifoy, R.L. Construction Planning, Methods and Equipment, McGraw Hill, 2011
5. Nunnally, S.W. Construction Methods and Management, Prentice Hall, 2006
6. Jha, Kumar Neeraj., Construction Project management, Theory & Practice, Pearson Education
7. Punmia, B.C., Khandelwal, K.K., Project Planning with PERT and CPM, Laxmi Publications.

<b>BUILDING CONSTRUCTION PRACTICE</b>				
<b>Subject Code: BCIED1-622</b>	<b>L</b>	<b>T</b>	<b>P C</b>	<b>Duration: 30 Hrs.</b>
	2	0	0 2	
<b>Course Objectives:</b> The students will get awareness about: <ol style="list-style-type: none"><li>1. Various building construction techniques.</li><li>2. Various practices needed for different types of construction activities.</li><li>3. The students shall have a reasonable knowledge about the various procedures and the structural systems needed for construction of various types of structures from foundation to super structure.</li></ol>				
<b>Course Outcomes:</b> <ol style="list-style-type: none"><li>1. Identify the components of building and understand the impacts on materials.</li><li>2. Identify the factors to be considered in the construction of buildings and develop the construction practices and techniques.</li><li>3. Identify the practices for Sub Structure and Super Structure construction.</li><li>4. Identify the importance of sustainable development/construction approach.</li></ol>				
<b>UNIT-I (07 Hours)</b>				
<b>Structural Introduction</b> - Load Bearing Structure, Framed Structure, Load transfer mechanism, floor system, Development of construction techniques, High rise Building Technology, Seismic effect, Environmental impact of materials - Case studies on residential buildings, office buildings and other buildings in each zone.				
<b>UNIT-II (08 Hours)</b>				
<b>Building Construction Systems</b> - Specifications, details and sequence of activities and construction coordination, Site Clearance, Marking, Earthwork, masonry, stone masonry, Bond in masonry, concrete hollow block masonry, flooring, damp proof courses, construction joints, movement, and expansion joints, Building foundations Basements, temporary shed, centring and shuttering, slip forms, scaffoldings, de-shuttering forms, Fabrication and erection of steel trusses, frames, braced domes, laying brick, weather and water proof, roof finishes, acoustic and fire protection.				
<b>UNIT-III (08 Hours)</b>				
<b>Sub Structure Construction-</b> Techniques of Box jacking, Pipe Jacking, under water construction				

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of diaphragm walls and basement, Tunnelling techniques, Piling techniques, well and caisson, sinking cofferdam, cable anchoring and grouting, driving diaphragm walls, sheet piles, shoring for deep cutting, well points, Dewatering and stand by Plant equipment for underground open excavation.

**Super Structure Construction-** Launching girders, bridge decks, off shore platforms, special forms for shells, techniques for heavy decks, in-situ, pre-stressing in high rise structures, Material handling, erecting light weight components on tall structures, Support structure for heavy Equipment and conveyors, Erection of articulated structures, braced domes, and space decks.

### UNIT-IV (07 Hours)

**Sustainable Construction Practices** - Sustainability in Construction, Waste Utilization as a Construction, Material, Use of green or biomaterials, Eco Building (Green Building & Material used), Construction methods, Natural Buildings, Passive buildings, Intelligent (Smart) buildings, Building automation, Energy efficient buildings for various zones, Role of Building Products in sustainability, Sustainability Assessment Methods.

#### Recommended Text Books / Reference Books:

1. Dr. B.C. Punmia, 'Building Construction', Laxmi Publications (P) Ltd., 2005.
2. S.S. Bhavikatti, 'Building Construction', Vikas Publishing House, 2012.
3. Charles J. Kibert, 'Sustainable Construction', John Wiley & Sons, 2012.
4. J. K. Yates and Daniel castro-Lacouture, 'Sustainability in Engineering Design and Construction', CRC Press, 2018.

### PAVEMENT DESIGN

Subject Code: BCIED1-623

L T P C

Duration: 30 Hrs

2 0 0 2

#### Course Objectives:

1. The objective of this course is to train the students about how to design the crust thickness of highway and airfield pavements.
2. To introduce and practice the design principles and methods of flexible and rigid pavements being used worldwide.
3. To give special emphasis on design methods prescribed by the Indian Roads Congress for flexible and rigid pavements in India
4. To acquaint the students about strengthening of existing pavement structures and some modern pavement design concepts.

#### Course Outcomes:

1. The students will learn about how to design the crust thickness of highway and airfield pavements.
2. They will learn the design principles and methods of flexible and rigid pavements being used worldwide.
3. They will learn in detail the design methods prescribed by the Indian Roads Congress for flexible and rigid pavements in India.

4. The students will get exposure to methodology of strengthening of existing pavement structures and some modern pavement design concepts.

**UNIT-I (07 Hours)**

**Introduction:** Desirable characteristics of pavement, types and components, difference between highway and airfield pavement, functions of pavement components, comparison between rigid and flexible pavement.

**Fundamentals of Design of Pavements:** design life, traffic factors, climatic factors, subgrade strength and drainage, stresses and deflections; Burmister's two layered analysis.

**UNIT-II (08 Hours)**

**Flexible Pavement Design Factors:** Design wheel load, contact pressure, ESWL concept, determination of ESWL by equivalent deflection criteria, stress criteria, soil subgrade strength using CBR value.

**Flexible Pavement Design Methods:** Group Index method, McLeod method, Kansas method, California Resistance Value method, IRC: 37-2018 method.

**UNIT-III (08 Hours)**

**Rigid Pavement Design:** Principles, factors - wheel load and its repetition, properties of sub grade, properties of concrete. Westergaard analysis – critical stresses, wheel load stresses, warping stress, frictional stress, and combined stresses.

**Design Methods of Rigid Pavements:** Design of cement concrete pavements by IRC:58-2015, PCA method, AASHTO method, reinforcement in slabs, requirements of joints, types of joints – expansion joint, contraction joint, warping joint, construction joint, longitudinal joint.

**UNIT-IV (07 Hours)**

**Strengthening of Existing Pavements:** Pavement overlays, types, design equations, flexible pavement overlay design as per IRC: 81-1997 using Benkelman beam.

**Modern Pavement Design Concepts:** Bituminous pavement with cemented base, interlocking concrete block pavement and roller compacted concrete pavement, full depth bituminous pavement, ultrathin white topping, perpetual pavement.

**Recommended Text Books / Reference Books:**

1. E.J. Yoder and M.W. Witzak, 'Principals of Pavement Design', Wiley Publication, New York.
2. S.K. Khanna and C.E.G. Justo, 'Highway Engineering', Nem Chand & Bros., Roorkee.
3. S.K. Sharma, 'Principles, Practice and Design of Highway Engineering', S. Chand & Co.
4. P. Chakraborty and A. Das, "Principles of Transportation Engineering", Prentice Hall India, New Delhi.
5. Yang H. Huang, 'Pavement Analysis and Design', Pearson Publishers.



<b>WATER &amp; WASTEWATER TREATMENT</b>		
<b>Subject Code: BCIED1-631</b>	<b>L T P C</b>	<b>Duration: 45 Hrs</b>
	3 0 0 3	
<b>Course Objectives:</b>		
<ol style="list-style-type: none"> <li>1. Inculcate the basic concepts of water treatment, its design and management.</li> <li>2. Extensive knowledge of sources, conversion, distribution &amp; maintenance of water supply system.</li> <li>3. Modern low cost water treatment techniques for rural supply system.</li> <li>4. Emphasizes on design criteria, design equations, kinetics and hydraulic diagrams for the design of unit operations and processes for wastewater treatment systems.</li> <li>5. Deals with biological sludge handling and treatment.</li> <li>6. Analyse the importance of rural sanitation systems and natural and constructed wetlands.</li> </ol>		
<b>Course Outcomes:</b>		
<ol style="list-style-type: none"> <li>1. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, welfare, and environmental factors.</li> <li>2. An ability to develop and conduct appropriate experimentation, analyze and interpret data for future demand &amp; supply.</li> <li>3. Estimate sewage generation and design sewer system including Sewage pumping stations.</li> <li>4. Required understanding on the characteristics and composition of sewage, self Purification of streams.</li> <li>5. Perform basic design of the unit operations and processes for sewage treatment.</li> </ol>		
<b>UNIT-I (12 Hours)</b>		
<p><b>Water treatment:</b> Water treatment schemes; Basic principles of water treatment; Design of Plain sedimentation, coagulation and flocculation, Filtration: design of slow, rapid and pressure filters; Disinfection units; Fundamentals of water softening, fluoridation and defluoridation, Water desalination and demineralization, taste and odour removal processes.</p>		
<b>UNIT-II (08 Hours)</b>		
<p><b>Water Supply Systems:</b> Pipes for transporting water and their design, water distribution systems and appurtenances; Water supply network design and design of balancing and service reservoirs; operation and maintenance of water supply systems.</p> <p><b>Rural water supply:</b> Principles, selection of source, rain water harvesting, quantitative requirements, low cost treatment techniques.</p>		
<b>UNIT-III (15 Hours)</b>		
<p><b>Treatment of Sewage:</b> Introduction to unit operations and processes - Primary treatment: screening (theory), grit chamber (theory and design), floatation units, sedimentation tanks(theory and design), Secondary treatment units: ASP (theory and design), Sequencing batch reactors (theory and design), Trickling filters (theory and design) Anaerobic systems; Anaerobic filters (theory), UASB (theory), Anaerobic lagoons (theory), Sludge Handling and disposal; thickening, stabilization, dewatering, drying and disposal.</p>		



## MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

compaction, deep compactions- vibro compaction methods, vibro-probes, stone columns, sand compaction, stone column piles, selection of methods – quality control – specifications for compaction process for solving field problems.
<b>UNIT-II (11 Hours)</b>
<b>Drainage methods:</b> seepage, ground water seepage control – filter requirements methods of dewatering – well point methods of discharge computations – design of steps for dewatering – design of well screens selection of pumps and accessories – deep bored wells. Pre-compression methods: compressibility and consolidation properties of soils estimation of rate of consolidation settlements – accelerating methods monitoring compressions – design of vertical drains – consolidation by electro osmosis and vacuum compression methods.
<b>UNIT-III (11 Hours)</b>
<b>Grouting and injection methods:</b> principles, design methods, selection of methods and requirements. Aspects of grouts, types of grouts and chemical applications, seepage control, solidification and stabilization – equipment and accessories used – quality control – specifications for achieving satisfactory results.
<b>UNIT-IV (11 Hours)</b>
<b>Stabilization methods:</b> mechanical, cement, lime, chemical methods of stabilization of soils – use of admixtures – polymers – geo-synthesis –reinforcements thermal slurry trenches, void filling – pre-wetting –improving rock stability methods – exercise quality control to achieve desired results.
<b>Recommended Text Books / Reference Books:</b>  <ol style="list-style-type: none"><li>1. J.E. Bowles – Foundation Design &amp; Analysis, McGraw-Hill Edition 1995.</li><li>2. Ground improvement techniques by P. Purushottam Raj, Laxmi Publications, 1999.</li><li>3. F. S. Fang Handbook of Foundation Engg. CBS Pub., 1985.</li></ol>

### PAVEMENT CONSTRUCTION AND MANAGEMENT

<b>Subject Code: BCIED1-633</b>	<b>L T P C</b>	<b>Duration: 45 Hrs.</b>
	3 0 0 3	
<b>Course Objectives:</b>  <ol style="list-style-type: none"><li>1. The main objective of this course is to acquaint the students about various engineering methods used for construction and maintenance of different types of pavement structures.</li><li>2. To familiarize the students about the methods of evaluation of pavement structures to undertake various types of maintenance management strategies.</li><li>3. To introduce the concept of pavement management system and pavement performance prediction, which ensures timely maintenance of pavements with rational utilization of available budget</li></ol>		
<b>Course Outcomes:</b>  <ol style="list-style-type: none"><li>1. The students will learn about various engineering methods used for construction and maintenance of different types of pavement structures.</li></ol>		

2. The student shall get familiar with the methods of evaluation of pavement structures to undertake various types of maintenance management strategies.
3. They will learn the concept of pavement management system and pavement performance prediction, which will not only help them in field applications but also in research at the postgraduate level after completion of their graduation.

**UNIT-I (11 Hours)**

**Introduction:** Types of highway construction, materials for construction, construction procedure of different highways: Earth roads, Gravel roads, WBM roads, Bituminous pavements, Cement Concrete pavements. Equipment used for highway construction.

**Soil Stabilization for Pavements:** Principles of proportioning of soil-aggregate mixes and compaction, mechanical, soil-cement, soil-bitumen and soil-lime stabilization methods; construction control and quality control checks.

**UNIT-II (12 Hours)**

**Bituminous Pavement Construction:** Earthwork, compaction and construction of embankments, specifications of materials, construction methods and field control checks for various types of flexible pavement materials in sub-base, base, binder and surface course layers.

**Cement Concrete Pavement Construction:** Specifications and method of cement concrete pavement construction; Quality control tests; Construction of various types of joints, Construction of interlocking block pavements.

**UNIT-III (11 Hours)**

**Pavement Maintenance:** Need for maintenance, Pavement failures, causes and remedial measures. Types of highway maintenance, Materials used for maintenance of different pavements, Maintenance and rehabilitation techniques.

**Pavement Evaluation:** Pavement distresses, functional condition evaluation of pavements- Roughness, Skid Resistance. Structural evaluation of pavements – non-destructive testing, Benkelman beam and Falling Weight Deflectometer.

**UNIT-IV (11 Hours)**

**Pavement Management Systems: Concept,** components, structure, data requirements, Project level and Network level needs.

**Pavement Performance Prediction:** Modelling techniques – AASTHO, CRRRI and HDM models, Budget forecasting for maintenance and rehabilitation, Ranking and optimization methodologies, life cycle costing.

**Recommended Text Books / Reference Books:**

1. S.K. Khanna and C.E.G. Justo, 'Highway Engineering', Nem Chand & Bros., Roorkee.
2. S.K. Sharma, 'Principles, Practice and Design of Highway Engineering', S. Chand & Co.
3. Ralph C. G. Haas, W. Ronald Hudson, 'Pavement Management Systems', McGraw-Hill Book Company.
4. M. Y. Shahin, 'Pavement Management for Airports, Roads, and Parking Lots' Kluwer Academic Publishers.

**EARTHQUAKE ENGINEERING**

**Subject Code: BCIED1-634**

**L T P C**

**Duration: 45 Hrs.**

3 0 0 3

**Course Objectives:**

1. The primary objective of earthquake resistant design is to prevent building collapse during earthquakes thus minimizing the risk of death or injury to people in or around those buildings.
2. The potential consequences of strong earthquakes on urban areas and civil infrastructure.
3. Design, construct and maintain structures to perform at earthquake exposure up to the expectations and in compliance with building codes.

**Course Outcomes:**

1. The students will gain an experience in the implementation of Earthquake Engineering on engineering concepts which are applied in field Structural Engineering.
2. The students will get a diverse knowledge of earthquake engineering practices applied to real life problems.
3. The students will learn to understand the theoretical and practical aspects of earthquake engineering along with the planning and design aspects.

**UNIT-I (06 Hours)**

**Introduction to Earthquakes:** Causes of earthquakes, basic Terminology, Magnitude, Intensity, Peak ground motion parameters, Seismic Zoning Map of India, Seismograms and Accelerogram, Past earthquakes and Lessons learnt.

**UNIT-II (15 Hours)**

**Introduction to Dynamics:** Theory of Vibrations, Sources of Vibrations, Types of Vibrations, Degree of Freedom, spring action and damping, Single Degree of Freedom (SDOF) Systems – Formulation of equations of motion –Undamped and damped free vibration –Damping –Response to harmonic excitation –Concept of response spectrum. Multi-Degree of Freedom (MDOF) Systems: -Formulation of equations of motion –Free vibration –Determination of natural frequencies of vibration and mode shapes –Orthogonal properties of normal modes –Mode superposition method of obtaining response.

## MRSPTU B.TECH. CIVIL ENGINEERING SYLLABUS 2018 BATCH

### UNIT-III (12 Hours)

**Lateral Force analysis-** Lateral Strength, stiffness, ductility and structural configuration, Floor Diaphragm action, Moment resisting frames, shear walls.

**Codal Design Provisions-** Review of the latest Indian seismic code IS: 1893 (Part-I) provisions for buildings –Earthquake design philosophy.

### UNIT-IV (12 Hours)

**Codal Detailing Provisions-** Review of the latest Indian Seismic codes IS: 4326 and IS: 13920 provisions for ductile detailing of R.C buildings –Beam, column and joints, Design of Shear walls as per IS: 13920 –Detailing of reinforcements.

#### Recommended Text Books / Reference Books:

1. Earthquake Resistant Design of Structures, Pankaj Aggrawal, Manish Shrikhande, PHI Learning
2. Dynamics of Structures: Theory and Applications to Earthquake Engineering, AK Chopra, Prentice Hall
3. Dynamics of Structures, R.W. Clough and Joseph Penzien, McGraw-Hill Education
4. Structural Dynamics by Mario & Paz, Springer.
5. Earthquake Resistant Design by David J. Dowrick, Wiley India Pvt Ltd
6. Elements of Earthquake Engg. by Jai Krishna, A.R. Chandrasekaran, Brijesh Chandra,
7. IS 1893: 2016 ‘Indian Standard Criteria for Earthquake Resistant Design of Structures’.
8. IS 4326: 1993 ‘Indian Standard for Earthquake Resistant Design and Construction of Buildings’
9. IS 13920:2016 ‘Ductile design and detailing of Reinforced Concrete Structures subjected to Seismic Forces’

### TRANSPORTATION ENGINEERING LAB

**Subject Code: BCIES1-605**

**L T P C**

**Duration: 30 Hrs**

0 0 2 1

#### Course Objectives:

1. The main objective of this course is to give practical exposure of laboratory testing of different kinds of highway construction materials such as Soil, Aggregate and Bitumen to check their suitability for their use in road construction.
2. The knowledge of these tests is very essential for a civil engineer to choose appropriate construction material to exercise better quality control in a road construction project.

#### Course Outcomes:

1. The student will learn the laboratory testing of different kinds of highway construction materials such as Soil, Aggregate and Bitumen.
2. The student will learn to check the suitability of highway construction material so as to exercise better quality control in a road construction project.

#### Tests on Sub-Grade Soil:

1. Proctor’s Compaction Test
2. California Bearing Ratio Test

**Tests on Road Aggregates:**

1. Crushing Value Test
2. Los Angles Abrasion Value Test
3. Impact Value Test
4. Shape Test (Flakiness and Elongation Index)

**Tests on Bituminous Materials:**

1. Penetration Test
2. Ductility Test
3. Softening Point Test
4. Flash & Fire Point Test

**Recommended Books / Manuals:**

1. S.K. Khanna and C.E.G. Justo, 'Highway Material & Pavement Testing', Nem Chand and Brothers, Roorkee.
2. Ajay K. Duggal, Vijay P. Puri, 'Laboratory Manual in Highway Engineering', New Age Publications, New Delhi.

**COMPUTER-AIDED CIVIL ENGINEERING DRAWING LAB-II**

<b>Subject Code: BCIES1-606</b>	<b>L T P C</b>	<b>Duration: 30 Hrs.</b>
	0 0 2 1	

**Course Objectives:**

The students will be able to:

1. Develop structural designs.
2. Understand design procedures and ways- The student learn to interpret drawings, and to produce designs using Civil Engineering software.

**Course Outcomes:**

1. Design and draw working structural drawings of various concrete structures and their members.
2. Understand and interoperate design aids and handbooks.
3. Use of relevant Indian Standard specifications applicable to Reinforced concrete structures.

**Laboratory Drawing Works:**

1. Structural Drawings of Concrete elements such as Beams, Columns, Slabs, Stair, etc.
2. RCC framed structures.
3. Perspective view of one and two storey buildings.
4. Structural Drawings of Steel Elements such as Connections, Tension Members, Compression Members, Beams, Foundations, girders, etc.
5. Industrial buildings - North light roof structures – Trusses.

**RE- REVISED**  
**MRSPTU PRE-Ph. D. (CHEMISTRY) COURSE SYLLABUS**

Pre-Ph.D. (Chemistry)		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
PCHM1-101	Requisites of article writing	0	0	2	60	40	100	1
PCHM1-102	Seminar	0	0	2	Satisfactory/Unsatisfactory			1
PREPE0-101	Research and Publication Ethics	2	0	0	40	60	100	2
<b>Departmental Electives (Choose any two subjects)</b>		4	0	0	40	60	100	4
PCHM1-111	Electroanalytical Chemistry							
PCHM1-112	Supramolecular Chemistry							
PCHM1-113	Chemistry of Organometallic Compounds							
<b>Total</b>		<b>14</b>	<b>0</b>	<b>4</b>	<b>220</b>	<b>280</b>	<b>500</b>	<b>16</b>

**RESEARCH METHODOLOGY**

**Subject Code: MREM0-101**

**L T P C**  
**40 04**

**Duration: 60 Hrs.**

**UNIT-I (15 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 (15 Hrs.)**

**Sources of Data:** Primary and Secondary, Validation of Data

**Data Collection Methods:** Questionnaire Designing, Construction.

**Sampling Design & Techniques** – Probability Sampling and Non Probability Sampling.

**Scaling Techniques:** Meaning & Types.

**Reliability:** Test – Retest Reliability, Alternative Form Reliability, Internal Comparison Reliability and Scorer Reliability.

**Validity:** Content Validity, Criterion Related Validity and Construct Validity.

**UNIT-III (15 Hrs)**

**Data Process Operations:** Editing, Sorting, Coding, Classification and Tabulation.

**Analysis of Data:** Statistical Measure and Their Significance, Central Tendency, Dispersion, Correlation: Linear and Partial, Regression: Simple and Multiple Regression, Skewness, Time series Analysis, Index Number.

**Testing of Hypothesis:** T-test, Z- test, Chi Square, F-test, ANOVA.

**UNIT – IV (15 Hrs.)**

**Multivariate Analysis:** Factor Analysis, Discriminant Analysis, Cluster Analysis, Conjoint Analysis, Multi-Dimensional Scaling.

**Report Writing:** Essentials of Report Writing, Report Format.

**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

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**MRSPTU PRE-Ph. D. (CHEMISTRY) COURSE SYLLABUS**

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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', 7<sup>th</sup>Edn. Pearson Education New Delhi.
2. N.K. Malhotra, 'Marketing Research – An Applied Orientation', 4<sup>th</sup>Edn.,Pearson Education NewDelhi.
3. Donald Cooper, 'Business Research Methods', Tata McGraw Hill, NewDelhi.
4. Sadhu Singh, 'Research Methodology in Social Sciences', HimalayaPublishers.
5. Darren George & Paul Mallery, 'SPSS for Windows Step by Step', Pearson Education, New Delhi
6. C.R. Kothari, 'Research Methodology Methods & Techniques', 2<sup>nd</sup>Edn.,New Age InternationalPublishers.

**REQUISITES OF ARTICLE WRITING**

**Subject Code– PCHM1-101**

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

**Duration – 30Hrs**

**Essentials of Report and article writing:** Search Engines, Research/Review paper writing, Introduction to Impact Factor, Indexing, Citations, Peer Review, h-index, i10-index, ISSN, Leading Science Publishers Referencing styles and Process of article submission.

**Journal Club** – Presentation of research problems and publications. Critical review of published articles.

Working knowledge of softwares like SPSS, Minitab, accelrys Draw, Chem draw, freely available reference management softwares etc.

**Recommended Websites**

1. [www.google.com](http://www.google.com)
2. [www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed)
3. [www.sciencedirect.com](http://www.sciencedirect.com)
4. [www.elsevier.co.in](http://www.elsevier.co.in)
5. [www.wiley.com](http://www.wiley.com)
6. [www.thomsonreuters.com](http://www.thomsonreuters.com)
7. [www.benthamscience.com](http://www.benthamscience.com)
8. [www.scholar.google.co.in](http://www.scholar.google.co.in)

**SEMINAR**

**Subject Code: PCHM1-102**

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

**Duration: 30Hrs.**

The Pre-PhD course work candidate will do literature review of minimum 10 research paper of reputed journals related to his/her research field and will finally present the seminar.

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.

**RESEARCH PUBLICATION ANDETHICS**

**Subject Code- PREPE0-101**

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

**Duration – 30Hrs**

**UNIT – I (5 Hrs)**

**Introduction to Philosophy:** Definition, Nature and Scope, Concept and Branches

**Ethics –** Definition, Moral Philosophy, Nature of Moral Judgements and Reaction, Ethics with respect to Science and Research

**UNIT -II (6 Hrs)**

Intellectual Honesty and Research integrity

**Scientific Misconduct:** Falsification, Fabrication and Plagiarism

**Redundant Publications:** Duplicate and Overlapping Publication, Salami Slicing Selective reporting and misrepresentation of data

**Database:** Indexing Databases, Citation Databases – Web of Science, Scopus etc.

**Research Metrics:** Impact Factor of Journal as per journal citation report, SNIP, SJR, IPP, Cite Score

**Metrics –** H-Index, i10-Index, g-Index, Altmetrics

**UNIT -III (9 Hrs)**

**Publication Ethics-** Definition, Introduction and Importance Best Practices/Standard

Settings initiatives and guidelines: COPE, WAME etc. Conflict of Interest Software to identify predatory publications developed by SPPU

**Journal Finding / Journal Suggester Tools –** Elsevier Journal Finder, Springer Journal Suggester etc.SHERPA/RoMEO online resource to check publisher copyright & Self Archiving Policies

**UNIT -IV (10 Hrs)**

**PublicationMisconduct–**Definition,Concept,Problemsthatleadounethicalbehaviour and vice-versa

Violation of Publication ethics and authorship and contributorship, Identification of PublicationMisconduct,ComplaintsandAppeal-ExamplesandFraudfromIndiaandAbroad, Predatory Publishers andJournals

Use of Plagiarism Software like Turnitin, Urkund and other open source software tools

### Recommended Books

- Bird A. (2006) Philosophy of Science Roulledge
- MacIntyre Alasdair (1967) A Short History of Ethics London
- P. Chaddah (2018) Ethics in competitive Research: Do not get scooped; Donot get plagiarized, ISBN:9789387480865
- National Academy of Sciences, National Academy of Engineering and Institute of Medicine, (2009) On being a scientist: A Guide to Responsible Conduct in research: Third edition, National Academies Press.
- Resnik, D.B. (2011) What is ethics in research and why it is so important, National Institute of Environmental Health Sciences, 1-10
- Beall, J. (2012) Predatory publishers are corrupting open access, Nature 415 (7415), 179- 179
- Indian National Science Academy (INSA) Ethics in Science Education Research and Governance ISBN: 978-81-939482-1-7

### **ELECTROANALYTICAL CHEMISTRY**

**Subject Code: PCHM1-111**

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

**Duration: 60(Hrs.)**

### Course Objectives:

1. To introduce the concept of activity and activity coefficient.
2. To introduce various electrochemical theories.
3. To familiarize with the concept of electron transfer.
4. To understand various electrochemical techniques.
5. To introduce various theories of electrolytic solutions and electrolytic conductance.

### Course Outcomes:

The students will acquire knowledge of

1. Various electrochemical techniques.
2. Electrochemical theories.
3. Electrolytic solution and conductance.
4. Interfacial electrochemistry

#### **UNIT-I (13 Hours)**

Recall: Concept of activity and activity coefficients in electrolytic solutions. The mean ionic activity coefficient. Debye-Huckel theory of electrolytic solutions. Debye-Huckel limiting law (derivation not required). Calculation of mean ionic activity coefficient. Limitations of Debye-Huckel theory. Extended Debye-Huckel law. Theory of electrolytic conductance. Nernst equation, redox systems.

#### **UNIT-II (15 Hours)**

Transmission of nervous impulse, bioenergetics, electrochemical methods in biology and medicine. Electron transfer in homogeneous systems, theory of electron transfer processes, electron tunneling, electron transfer in heterogeneous systems, electrode-solution interface, rate of charge transfer in electrode reactions, study of kinetics of electrode processes.

**UNIT-III (15 Hours)**

Potentiometric titrations. Functioning of ion selective electrodes, glass electrodes and pH sensor, ion exchange membrane and neutral carrier membrane electrodes. Sensor selective to dissolved gases, enzyme selective electrodes. Recent developments related to miniaturization, potentiometric sensors in flow system, electroanalysis with potentiometric sensor. Liquid junction potential (LJP) – derivation of the expression for LJP – its determination and elimination. Methods of determining structures of electrified interfaces, Guoy-Chapman, Stern. Decomposition potential and its significance. Electrode polarization – its causes and elimination. Concentration over-potential.

**UNIT-IV (17 Hours)**

Cyclic voltammetry, study of reaction mechanism, spectroelectrochemistry, electrochemical quartz crystal microbalance, controlled potential techniques, electrochemical cells, oxygen removal, instrumentation, working electrodes, chemically modified electrodes, microelectrodes.

**Recommended Text Books / Reference Books:**

1. P. Atkins, J. D. Paula, 'Physical Chemistry', 7<sup>th</sup> Indian Edn., Oxford University Press.
2. Ira N. Levine, 'Physical Chemistry', McGraw Hill.
3. D.A. McQuarrie and J.D. Simon, 'Physical Chemistry-A Molecular approach', Viva Books Pvt. Ltd.
4. S. Glasstone, 'Introduction to Electrochemistry', Litton Educational Publishing.
5. J. O. M. Bockris & A. K. N. Reddy, 'Modern Electrochemistry', Plenum.
6. K.L. Kapoor, 'A textbook of Physical Chemistry', Vol.3, Laxmi Publications.

**SUPRAMOLECULAR CHEMISTRY**

**Subject Code: PCHM1-112**

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

**Duration: 60(Hrs.)**

**Course Objectives**

1. To familiarize the students with the basic concepts of supramolecular chemistry.
2. To make students learn the mechanism of molecular recognition and synthesis & application of supramolecular substrates
3. To understand the supramolecular reactivity and catalysis procedure
4. To acquaint with supramolecular structures.

**Course Outcomes:**

The students will acquire knowledge of:

1. Fundamental terminology and definitions of supramolecular chemistry
2. Mechanistic aspects of molecular recognition and synthesis & applications of supramolecular reactants
3. Reaction mechanism of supramolecular catalysis
4. Supramolecular structures and their applications

**UNIT-I**

**(15 Hours)**

Fundamentals of Supramolecular chemistry terminology and definitions in supramolecular chemistry. Intermolecular forces: Ion pairing, ion-dipole and dipole-dipole interactions; hydrogen bonding; cation- $\pi$ , anion- $\pi$ ,  $\pi$ - $\pi$  interactions and Van der Waal forces. Solvent and solution properties, solvation and hydrophobic effect. Binding constants; definition and use, determination of binding constant by physical methods.

**UNIT-II**

**(15 Hours)**

Molecular Recognition Principle of molecular recognition, host-guest complementarity, preorganisation, chelate effect, cooperativity. Synthesis and applications of supramolecular host (crown ethers, lariat ethers, podands, cryptands, spherands, calix[n]arenes, cyclodextrine) as cation and anion binding receptors and receptors for ion-pair recognition.

**UNIT-III**

**(15 Hours)**

Supramolecular Reactivity and Catalysis: Organocatalysis mediated through hydrogen bonding, preconcentration, self-assembly of catalysts and preorganisation of catalyst-substrate systems. Influence of organisation (effective molarity) on catalysis, Catalytic acyl transfer, acid-base catalysis, catalysis hydrolysis as ATPase mimic

**UNIT-IV**

**(15 Hours)**

Supramolecular structures – molecular wires, sensors, switches and logic gate devices, metal-organic frameworks and their applications.

**Recommended Books:**

1. Supramolecular Chemistry: from Molecules to Nanomaterials Eds. by P.A. Gale and J.W. Steed (2012).
2. Modern Supramolecular Chemistry by F. Diederich, P. J. Stang, R. T. Tykwinski (2008).
3. Core Concepts in Supramolecular Chemistry and Nanochemistry by J. W. Steed, D. R. Turner, K. J. Wallace (2007).
4. Supramolecular Chemistry by J.W. Steed and J.L. Atwood (2011).
5. Supramolecular Chemistry: Concepts and Perspectives by J.-M. Lehn, Wiley VCH, Weinheim (1995).
6. Supramolecular Chemistry by V. Balzani (Editor), L. De Cola, Kluwer, Dordrecht (1992).
7. Introduction to Supramolecular Chemistry by H. Dodziuk, Kluwer Academic Publishers, The Netherlands (2002).
8. Supramolecular Assemblies Y. Murakami (Editor), Mita Press, Tokyo, (1990).
9. Advances in Supramolecular Chemistry, Vol 1 (1990), Vol 2 (1992), Vol 3 (1993) by G. W. Gokel (Editor), JAI Press, Greenwich.
10. Supramolecular Chemistry – Fundamentals and Applications. Advanced Textbook by T. Kunitake, K Ariga, Berlin: Springer-Verlag Heidelberg, 20

**CHEMISTRY OF ORGANOMETALLIC COMPOUNDS**

**Subject Code: PCHM1-113**

**L T P C**

**Duration: 60Hrs.**

**4 0 0 4**

**Course Objectives**

1. To recall classification of ligands and nomenclature of organometallic compounds.
2. To understand structure, bonding and reactivity of organometallic compounds.
3. To familiarize with the role of organometallic compounds in organic syntheses.
4. To understand the applications of organometallic compounds as catalysts.
5. To understand fluxional behavior in various organometallic compounds.

**Course Outcomes:**

The students will acquire knowledge of

1. Organometallic compounds and its nomenclature.
2. Bonding and reactivity of metal complexes.
3. Fluxional behaviour
4. Role of organometallic complexes in organic syntheses.
5. Importance of catalyst in syntheses.

**UNIT-1 (15 Hrs.)**

Nomenclature of organometallic compounds, Classification of Ligands in organometallic compounds, inert gas rule. Transition Metal compounds with Bonds to hydrogen. Characterization of Hydride complexes, Hydrogen Bridges. Synthetic methods, Chemical behavior of Hydride Compounds, Mononuclear polyhydrides, Carbonyl hydride & Hydride Anion Molecular Hydrogen compounds, Metal – Hydrogen interactions with C-H groups, Complexes of Borohydrides and Aluminohydrides Wade's rules, carboranes and other hetero-boranes

**UNIT-2 (15 Hrs.)**

Energy polarity and reactivity of M-C bond, Stability of Main group organometallics: Methods of preparation in perspective-organolithium compounds: structure and bonding & reaction- carbolithiatic organometallics of group 2 and 12 e.g. Mg and Zn, Cd and Hg: Preparation and structure of organoaluminium compounds. Technical applications of Tris (alkyl) aluminium compounds.  $\eta^2$  - ligands: olefinic and acetylenic complexes, chelating olefinic ligands – synthesis and structure.  $\eta^2$  – ligands: Allylic and  $\eta^4$  – complexes of cyclopentadiene.

Ferrocenes- Structure & bonding of ferrocenes, basic chemical reactions of ferrocenes, chirality in ferrocene derivatives, ferrocene based condensation polymers.

**UNIT-3 (15 Hrs.)**

Transition Metal Carbon Monoxide compounds. Preparation of Metal Carbonyls, Structures of Metal carbonyls Mononuclear, Binuclear, Trinuclear and Tetranuclear and larger Polynuclear carbonyls. Additional structural and Bonding features: Semibridging CO groups, side on Bonding to CO, Oxygen to Metal Bonds, Vibrational Spectra of Metal carbonyls, Detection of Bridging CO groups. Molecular symmetry from the number of Bands, Bond Angles & Relative Intensities, Force constants, Prediction and Assignment of Spectra. Carbonylate Anions, Metal carbonyl, Hydrides, Reactions of Metal Carbonyls; Photochemical Reactions of Metal Carbonyls

:Nucleophilic & electrophilic attacks on CO Metal carbonyl scrambling

Fluxional organometallic compounds: Fluxionality and dynamic equilibria in compounds such as  $\eta^2$  Allyl, Carbonyl and diene Complexes.

#### **UNIT-4 (15 Hrs.)**

Applications of organometallic complexes to Catalysis-Basic principles, sequences involved in catalytic reaction, Hydro formylation: Cobalt catalyst & phosphine modified cobalt catalysts, water gas shift reaction, Oxopalladation reactions. Monsanto, Cativa & Wacker processes, polymerization & oligomerisation of olefins & dienes, Heck reaction and Suzuki-Miyaura Coupling.

Bioorganometallic Chemistry: Role of organometallics in heavy metal poisoning: Mercury and Arsenic poisoning, organometallic compounds as drugs: ruthenium and ferrocene based drugs; Organometallics as radiopharmaceutical, tracers, ionophores and sensors.

#### **Recommended Books**

1. 'Basic Organometallic Chemistry: Concepts, Synthesis & Application of Transition Metals', CRC Press & Univ. Press, 2010.
2. R.C. Mehrotra & A. Singh, 'Organometallic Chemistry, A Unified Approach', New Age International.
3. B.D. Gupta & A.J. Elias, 'Basic Organometallic Chemistry', Universities Press.
4. F.A. Cotton & G. Wilkinson, 'Advanced Inorg, Chemistry', Wiley Intersciences.

**MRSPTU UNDER GRADUATE OPEN ELECTIVES MODIFICATIONS  
(2020 BATCH ONWARDS)**

**Modified list of UG Open Electives offered by Deptt. of CSE**

Column A			Column B		
Previously uploaded on 26.08.2020			Modified for 2K20 Batch onwards		
Subject Name	Subject Code	L – T – P – C	Subject Name	Subject Code	L – T – P – C
Data Structures & Algorithms	BCSEO1-001	3 – 0 – 0 – 3	Data Structures & Algorithms	BCSEO1-001	2 – 0 – 0 – 2
			Data Structures & Algorithms laboratory	BCSEO1-051	0 – 0 – 2 – 1
MATLAB Programming	BCSEO1-002	3 – 0 – 0 – 3	Computational Sciences and Problem Solving	BCSEO1-002	2 – 0 – 0 – 2
			Computational Sciences and Problem Solving Lab	BCSEO1-052	0 – 0 – 2 – 1
Object Oriented Programming	BCSEO1-014	3 – 0 – 0 – 3	Object Oriented Programming	BCSEO1-014	2 – 0 – 0 – 2
			Object Oriented Programming Laboratory	BCSEO1-053	0 – 0 – 2 – 1

**Note:**

1. The previously uploaded open electives of CSE Deptt. (Column A), stands modified as given in Column B for 2K20 Batch onwards.
2. The other open electives offered by Department of CSE (except Column A) previously uploaded on 26.08.2020 will remain same for all the batches.
3. Only subject name MATLAB Programming has been replaced by Computational Sciences and Problem Solving from 2K20 Batch onwards. However, syllabi of both the subjects are identical.



**MRSPTU UNDER GRADUATE OPEN ELECTIVES MODIFICATIONS  
(2020 BATCH ONWARDS)**

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**DATA STRUCTURES AND ALGORITHMS**

**Subject Code- BCSE01-001**

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

**Duration – 30 Hrs**

**COURSE OBJECTIVE:**

1. To impart the basic concepts of data structures and algorithms
2. To understand concepts about searching and sorting techniques.
3. To understand basic concepts about stacks, queues, lists, trees and graphs

**COURSE OUTCOMES**

CO1: For a given algorithm student will able to analyze the algorithms and justify the correctness.

CO2: To learn basics of stacks and queues.

CO3: To learn linked list concepts.

CO4: To learn different sorting algorithms.

**COURSE CONTENTS**

**UNIT-I (08 hrs)**

**Introduction:** Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc. Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. Searching: Linear Search and Binary Search Techniques.

**UNIT-II (07 hrs)**

**Stacks and Queues:** ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks, Queues and its types.

**UNIT-III (07 hrs)**

**Linked Lists:** Introduction to Linked Lists and its types, Representation of single linked list in memory, operations: Traversing, Searching, Insertion into, Deletion from linked list; Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Binary Search trees

**UNIT-IV (08 hrs)**

**Sorting and Hashing:** Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Performance and comparison among all the methods, Hashing. Graph: Basic Terminologies and Representations.

**RECOMMENDED BOOKS:**

1. Fundamentals of Data Structures, Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer Science Press.
2. Algorithms, Data Structures, and Problem Solving with C++, Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
3. —How to Solve it by Computer, 2nd Impression by R.G. Dromey, Pearson Education.

**MRSPTU UNDER GRADUATE OPEN ELECTIVES MODIFICATIONS  
(2020 BATCH ONWARDS)**

**DATA STRUCTURES & ALGORITHMS LABORATORY**

**Subject Code- BCSE01-051**

**L T P C**

**0 0 2 1**

**COURSE OUTCOMES:**

CO1 To introduce the basic concepts of Data structure, basic data types, searching and sorting based on array data types.

CO2 To introduce the structured data types like Stacks and Queue and its basic operation's implementation

CO3 To introduces dynamic implementation of linked list

CO4 To introduce the concepts of Tree and graph and implementation of traversal algorithms

**PRACTICALS:**

1. Write a program for Linear search methods.
2. Write a program for Binary search methods.
3. Write a program for insertion sort, selection sort and bubble sort.
4. Write a program to implement Stack and its operation.
5. Write a program for quick sort.
6. Write a program to implement Queue and its operation.
7. Write a program to implement singly linked list for the following operations: Create, Display, searching, traversing and deletion.

**MRSPTU UNDER GRADUATE OPEN ELECTIVES MODIFICATIONS  
(2020 BATCH ONWARDS)**

**COMPUTATIONAL SCIENCES AND PROBLEM SOLVING**

**Subject Code- BCSEO1-002**

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

**Duration- 30 Hrs**

**COURSE OBJECTIVE:**

1. To learn the MATLAB environment and its programming fundamentals
2. Ability to write Programs using commands and functions

**COURSE OUTCOMES:**

CO1: Student will able to use MATLAB environment for writing, debugging and executing programs.

CO2: To be able to learn different operators used in MATLAB.

CO3: To learn how to use data types.

CO4: To learn 1D and 2D plotting.

**COURSE CONTENTS**

**UNIT I (08 Hrs)**

**Introduction to MATLAB Software:** MATLAB window, Command window, Workspace, Command history, Setting directory, working with the MATLAB user interface, Basic commands, Writing Script file, Executing script files The MATLAB Editor, Saving m files.

**UNIT-II (07 Hrs)**

Assigning variable, operation with variables. BODMAS Rules, Arithmetic operations, Operators and special characters, Mathematical and logical operators, Solving arithmetic equations

**UNIT III (07 Hrs)**

**Data files and Data types:** Character and string, Arrays and vectors, Column vectors and Row vectors

Creating rows and columns Matrix, Matrix operations, finding transpose, determinant and Solving matrices

**UNIT IV (08 Hrs)**

**1D and 2D Plotting:** Plotting vector and matrix data, Plot labelling, curve labelling and editing, 2D plots: Basic Plotting Functions, Creating a Plot, Plotting Multiple Data Sets in One Graph Specifying Line Styles and Colors Graphing, Displaying Multiple Plots in One Figure, Controlling the Axes.

**RECOMMENDED BOOKS**

1. "MATLAB and its applications in Engineering", by R.K. Bansal, A.K. Goel and M.K Sharma, PEARSON
2. "MATLAB: Easy way of Learning" by S. Swapna Kumar and Lenina S. V. B.

**MRSPTU UNDER GRADUATE OPEN ELECTIVES MODIFICATIONS  
(2020 BATCH ONWARDS)**

**COMPUTATIONAL SCIENCES AND PROBLEM SOLVING LABORATORY**

**Subject Code- BCSE01-052**

**L T P C**

**0 0 2 1**

**COURSE OUTCOMES:**

CO1 Students will be able to learn the introduction to MATLAB.

CO2 To be able to learn about inbuilt functions.

CO3 To be able to learn various matrix operations.

CO4 To be able to learn various control statements.

**PRACTICALS:**

1. Introduction to MATLAB environment and types of MATLAB files.
2. Use of help command to get help about different inbuilt functions.
3. Write a program to show the output of various unary and binary operators.
4. Write programs for Matrix Manipulations, (reshaping matrices, expanding matrix size, appending or deleting a row/column to a matrix, concatenation of matrices).
5. Write programs which demonstrate the use special matrices.
6. Write programs to show output for various matrix and array operations.
7. Write programs for demonstrating the use for various control statements.
8. Write a MATLAB code for computing factorial of a number n. Assume n is already defined. The code should return a scalar, not a vector.

**MRSPTU UNDER GRADUATE OPEN ELECTIVES MODIFICATIONS  
(2020 BATCH ONWARDS)**

**OBJECT ORIENTED PROGRAMMING**

**Subject Code- BCSE01-014**

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

**Duration – 30 hrs.**

**COURSE OBJECTIVE**

To introduce the principles and paradigms of Object Oriented Programming Language for design and implement the Object Oriented System

**COURSE OUTCOMES**

CO1 To introduce the basic concepts of object oriented programming language and its representation

CO2 To understand the concept of memory allocation.

CO3 To introduce polymorphism and overloading of operator.

CO4 To learn the concept of text streams.

**COURSE CONTENT**

**UNIT-I (08 hrs)**

Introduction to C++, C++ Standard Library, Illustrative Simple C++ Programs. Header Files, Namespaces, Application of object oriented programming. Object Oriented Concepts, Introduction to Objects and Object Oriented Programming, Encapsulation, Polymorphism, Overloading, Inheritance, Abstract Classes, Access specifier (public/ protected/ private), Class Scope.

**UNIT-II (08 hrs)**

This Pointer, Dynamic Memory Allocation and De-allocation (New and Delete), Static Class Members, Constructors, parameter Constructors and Copy Constructors, Destructors, Introduction of inheritance, Types of Inheritance

**UNIT-III (07 hrs)**

Polymorphism and its types, Fundamentals of Operator Overloading, Rules for Operators Overloading, Implementation of Overloading Unary Operators, Binary Operators.

**UNIT-IV (07 hrs)**

Text Streams and binary stream, Sequential and Random Access File, Stream Input/ Output Classes, Stream Manipulators.

**RECOMMENDED BOOKS:**

1. Robert Lafore, *Object Oriented Programming in Turbo C++*, 2nd Ed., The WAITE Group Press, 1994.
2. Herbert shield, *The complete reference C ++*, 4th Ed., Tata McGraw Hill, 2003.
3. Shukla, *Object Oriented Programming in C++*, Wiley India, 2008.
4. H M Deitel and P J Deitel, *C++ How to Program*, 2nd Ed., Prentice Hall, 1998.
5. D Ravichandran, *Programming with C++*, 3 rd Ed., Tata McGraw Hill, 2003.
6. Bjarne Stroustrup, *The C++ Programming Language*, 4th Ed., Addison Wesley, 2013.
7. R. S. Salaria, *Mastering Object-Oriented Programming with C++*, Salaria Publishing House, 2016.

**OBJECT ORIENTED PROGRAMMING LABORATORY**

**Subject Code- BCSE01-053**

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

**COURSE OUTCOMES:**

CO1 To learn about classes and objects.

CO2 To implement Constructors and Destructors

CO3 To learn Operator Overloading

CO4 To implement typecasting

**PRACTICALS:**

1. Classes and Objects- Write a program that uses a class where the member functions are defined inside a class.
2. Classes and Objects- Write a program that uses a class where the member functions are defined outside a class.
3. Classes and Objects- Write a program to demonstrate the use of static data members.
4. Classes and Objects- Write a program to demonstrate the use of const data members.
5. Constructors and Destructors- Write a program to demonstrate the use of zero argument and parameterized constructors.
6. Operator Overloading- Write a program to demonstrate the overloading of increment and decrement operators.
7. Operator Overloading- Write a program to demonstrate the overloading of binary arithmetic operators.
8. Typecasting- Write a program to demonstrate the typecasting of basic type to class type.
9. Typecasting- Write a program to demonstrate the typecasting of class type to basic type.

**SCHEME FOR ADDITIONAL 20 CREDITS FOR BTECH CSE WITH HONORS**

<b>B. Tech CSE with Honors</b>			<b>Contact Hrs.</b>			<b>Marks</b>			<b>Credits</b>
<b>Basket</b>	<b>Code</b>	<b>Subject Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Int.</b>	<b>Ext.</b>	<b>Total</b>	
<b>Basket-I</b>	BCSEH1-001	Advanced Computer Networks	3	1	0	40	60	100	4
	BCSEH1-002	Advanced Operating Systems	3	1	0	40	60	100	4
	BCSEH1-003	Advanced Data Structures & Algorithms	3	1	0	40	60	100	4
	BCSEH1-004	Computer Networks & Security	3	1	0	40	60	100	4
	BCSEH1-005	Wireless Sensor Networks	3	1	0	40	60	100	4
<b>Basket-II</b>	BCSEH1-006	Python Programming	3	0	0	40	60	100	3
	BCSEH1-051	Python Programming Laboratory	0	0	2	60	40	100	1
	BCSEH1-007	Introduction to AI & Machine learning	3	1	0	40	60	100	4
	BCSEH1-008	Deep Learning and Neural Networks	3	1	0	40	60	100	4
	BCSEH1-009	Data Analytics	3	1	0	40	60	100	4
	BCSEH1-010	Data Science	3	1	0	40	60	100	4
	BCSEH1-011	Natural Language Processing	3	1	0	40	60	100	4
<b>Basket-III</b>	BCSEH1-012	Introduction to Internet Of Things (IOT)	3	1	0	40	60	100	4
	BCSEH1-013	Introduction to Security of Cyber-Physical Systems	3	1	0	40	60	100	4
	BCSEH1-014	Ubiquitous Sensing, Computing and Communication	3	1	0	40	60	100	4
	BCSEH1-015	Embedded Systems for IoT	3	1	0	40	60	100	4
	BCSEH1-016	IoT with Arduino, ESP, and Raspberry Pi	3	1	0	40	60	100	4

**Select at least one subject from each basket.**

**Note:** The students may opt one/two subjects from the MOOCs/ SWAYAM as per University Notification & as per the AICTE Model Curriculum as modified from time to time.

**ADVANCED COMPUTER NETWORKS**

**Subject Code: BCSEH1-001**

**L T P C**

**Duration – 60 hrs.**

**3 1 0 4**

**COURSE OBJECTIVE**

To familiarize students with different networking concepts and its emerging techniques.

**COURSE OUTCOMES**

1. To be able to understand basic networking concepts.
2. To measure network traffic and learn routing techniques.
3. To learn about wireless sensor networks.
4. To learn overlay networks and various emerging technologies.

**COURSE CONTENTS**

**UNIT I (15Hrs)**

**Basic networking concepts revisited:** Introduction to networks, Review of the Internet architecture, layering and link layer, network layer, intra and inter domain routing, end-to-end layer, congestion control, wired and wireless MAC

**UNIT II (15Hrs)**

**Modeling and measurement:** Network traffic modeling, network measurement, simulation issues, network coding techniques  
Routing and router design, scheduling and QoS, integrated and differentiated services, RSVP, BGP, MPLS.

**UNIT III (15Hrs)**

**Wireless networks:** Wireless Networks and mobility supports, MAC protocol, routing, AODV, group communication, multicast, mobility, mobile IP, TCP and MAC interactions  
Flow and congestion control, TCP variants, TCP modeling, active queue management

**UNIT IV (15Hrs)**

**Overlay networks:** RON, P2P, CDN, Web caching, cross-layer optimizations,  
**Emerging network types:** data center, DTN, 4G mobile networks (LTE, Wi-Max), online social networks (OSN), wireless sensor networks (WSN) – cross-layer sensor data dissemination  
**Emerging applications** – VoIP, SIP, video over P2P

**RECOMMENDED BOOKS**

1. J.F. Kurose and K.W. Ross, Computer networking: A top-down approach, 6th edition, Addison Wesley.
2. L.L. Peterson and B.S. Davie, Computer Networks ISE: A System Approach, 5th edition, Morgan Kaufman.
3. B.A. Forouzan, Data communication & networking, 5th Edition, Tata Mc-Graw Hills.



**ADVANCED OPERATING SYSTEM**

**Subject Code: BCSEH1-002**

**L T P C**

**Duration – 60 hrs.**

**3 1 0 4**

**COURSE OBJECTIVE:**

To be able to learn the concepts of advance operating systems.

**COURSE OUTCOMES:**

1. To learn process synchronization and deadlocks.
2. To learn the concepts of distributed operating systems.
3. To learn distributed OS Implementation and multiprocessor systems.
4. To understand security and protection.

**COURSE CONTENTS:**

**UNIT-I (15 hrs.)**

**Process Synchronization:** Concepts of processes, Concurrent processes, Threads, Overview of different classical synchronization problems, Monitors, Communicating Sequential processes (CSP)

**Process deadlocks:** Introduction, causes of deadlocks, Deadlock handling strategies, Models of deadlock

**UNIT-II (15 hrs.)**

**Distributed operating system:** Architectures, Issues in Distributed operating systems, Limitations of Distributed Systems, Lamport's logical clock, Global states, Chandy-Lamport's global state recording algorithm, Basic concepts of Distributed Mutual Exclusion, Lamport's Algorithm, Ricart-Agrawala Algorithm; Basic concepts of Distributed deadlock detection, Distributed File system, Architecture, Design issues, SUN Network File system Basic concepts of Distributed shared memory, Basic concepts of Distributed Scheduling, Load balancing, Load sharing.

**UNIT-III (15 hrs.)**

**Distributed OS Implementation:** Models, Naming, Process migration, Remote Procedure Calls.

**Multiprocessor System:** Motivation, Classification, Multiprocessor Interconnections, Types, Multiprocessor OS functions & requirements; Design & Implementation Issue; Introduction to parallel programming; Multiprocessor Synchronization.

**UNIT-IV(15 hrs.)**

**Performance, Coprocessors, RISC & data flow:** Introduction, Necessity, Measures, Techniques, Bottlenecks & Saturation, Feedback loops, Coprocessors, RISC.

**Security & Protection:** Security-threats & goals, Penetration attempts, Security Policies & mechanisms, Authentication, Protections & access control Formal models of protection, Cryptography, worms & viruses.

**Recommended Books:**

1. M. Milenkoviac, "Operating Systems Concepts and Design", Tata McGraw Hill, 2/e, 1992.
2. H. M. Deitel, "Operating System", Prentice Hall, 3/e, 2003.

3. Mukesh Singhal and Niranjana G. Shivaratri, "Advanced Concepts in operating Systems", Tata McGraw Hill, 2001.
4. M. J. Bach, "Design of the Unix Operating System", Prentice-Hall of India, 1986.
5. Charles Crowley, "Operating System: A Design-oriented Approach", Irwin Publishing, 1996.

**ADVANCED DATA STRUCTURES & ALGORITHMS**

**Subject Code: BCSEH1-003**

**L T P C**

**Duration – 60 hrs.**

**3 1 0 4**

**COURSE OBJECTIVE:**

To be able to understand various concepts of advanced data structures.

**COURSE OUTCOMES:**

- Understand and apply linear data structures-List, Stack and Queue.
- Understand the graph algorithms.
- Learn different algorithms analysis techniques.
- Apply data structures and algorithms in real time applications

**COURSE CONTENTS:**

**UNIT I (16 hrs.)**

**LINEAR DATA STRUCTURES:** Introduction - Abstract Data Types (ADT) – Stack – Queue – Circular Queue - Double Ended Queue - Applications of stack – Evaluating Arithmetic Expressions - Other Applications - Applications of Queue - Linked Lists - Singly Linked List - Circularly Linked List - Doubly Linked lists – Applications of linked list – Polynomial Manipulation.

**UNIT II (15 hrs.)**

**NON-LINEAR TREE STRUCTURES:** Binary Tree – expression trees – Binary tree traversals – applications of trees – Huffman Algorithm - Binary search tree - Balanced Trees - AVL Tree - B-Tree - Splay Trees – Heap operations- -Binomial Heaps - Fibonacci Heaps- Hash set.

**UNIT III (15 hrs.)**

**GRAPHS:** Representation of graph - Graph Traversals - Depth-first and breadth-first traversal - Applications of graphs - Topological sort – shortest-path algorithms - Dijkstra's algorithm – Bellman-Ford algorithm – Floyd's Algorithm - minimum spanning tree – Prim's and Kruskal's algorithms.

**UNIT IV (14 hrs.)**

**ALGORITHM DESIGN AND ANALYSIS** Algorithm Analysis – Asymptotic Notations - Divide and Conquer – Merge Sort – Quick Sort - Binary Search - Greedy Algorithms – Knapsack Problem – Dynamic Programming – Optimal Binary Search Tree - Warshall's Algorithm for Finding Transitive Closure.

**RECOMMENDED BOOKS:**

1. Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education, 2015
2. E. Horowitz, S.Sahni and Dinesh Mehta, "Fundamentals of Data structures in C++", University Press, 2007

3. E. Horowitz, S. Sahni and S. Rajasekaran, “Computer Algorithms/C++”, Second Edition, University Press, 2007
4. Gilles Brassard, “Fundamentals of Algorithms”, Pearson Education 2015
5. Harsh Bhasin, “Algorithms Design and Analysis”, Oxford University Press 2015
6. John R.Hubbard, “Data Structures with Java”, Pearson Education, 2015
7. M. A. Weiss, “Data Structures and Algorithm Analysis in Java”, Pearson Education Asia, 2013

### COMPUTER NETWORKS AND SECURITY

**Subject Code: BCSEH1-004**

**L T P C**

**Duration – 60 hrs.**

**3 1 0 4**

**COURSE OBJECTIVE:**

To learn the concepts of computer networks and implement security techniques.

**COURSE OUTCOMES:**

1. To learn data communication techniques among various layers.
2. To learn mobile and wireless networks.
3. To learn the different concepts of network security.
4. To learn to manage database security.

**COURSE CONTENTS:**

**UNIT-I (15 hrs.)**

**Data and Computer Communication Networks:** Data Communication, Transmission Methodologies, Data Link Layer, Multiple Access & Local Area Networks, Connecting Devices and Backbone Networks, Network Layer and Transport Layer, Application Layer.

**UNIT-II (15 hrs.)**

**Mobile & Wireless Networks** Wireless networking, wireless LANS & PANS, ad-hoc wireless networks & security, wireless sensor networks, Cellular Mobile Wireless Networks, Evolution of Modern Mobile Wireless Communication System.

**UNIT-III (13 hrs.)**

**Cryptography and Network Security** Introduction to the Concept of Security, Cryptographic Techniques, Computer-based Symmetric and Asymmetric Key Cryptographic Algorithms, Public Key Infrastructure (PKI), Internet Security Protocols, Network Security.

**UNIT-IV (17 hrs.)**

**Database Security** Data management technologies, Information security, Information Management Technologies, Security policies, Policy enforcement & related issues, Design principles, Multi-level relational data models.

**Software Security:** Defining a discipline, A Risk Management Framework, Code review with a tools, Architectural risk analysis, Software penetrating testing, Risk Based security Testing, An Enterprise S/W security program, Security knowledge.

**WIRELESS SENSOR NETWORKS**

**Subject Code: BCSEH1-005**

**L T P C**

**Duration – 60 hrs.**

**3 1 0 4**

**COURSE OBJECTIVE:**

To be able to architect sensor networks for various application setups. To Devise appropriate data dissemination protocols and model links cost. Make better understanding of the fundamental concepts of wireless sensor networks and have a basic knowledge of the various protocols at various layers.

**COURSE OUTCOMES:**

After completion of course, students would be able to:

1. Describe and explain radio standards and communication protocols for wireless sensor networks.
2. Explain the function of the node architecture and use of sensors for various applications.

**COURSE CONTENTS:**

**UNIT-I (17 hrs.)**

Introduction to Wireless Sensor Networks: Course Information, Introduction to Wireless Sensor Networks: Motivations, Applications, Performance metrics, History and Design factors, Network Architecture: Traditional layered stack, Cross-layer designs, Sensor Network Architecture Hardware Platforms: Motes, Hardware parameters.

**UNIT-II (16 hrs.)**

Introduction to ns-3: Introduction to Network Simulator 3 (ns-3), Description of the ns-3 core module and simulation example. Medium Access Control Protocol Design: Fixed Access, Random Access, WSN protocols: synchronized, duty-cycled.

**UNIT-III (15 hrs.)**

MAC Protocol: Introduction to analysis of MAC Protocols.

Routing Protocols: Introduction, MANET protocols Routing Protocols for WSN: Resource-aware routing, Data-centric, Geographic Routing, Broadcast, Multicast.

**UNIT-IV (12 hrs.)**

Security: Possible attacks, countermeasures, SPINS, Static and dynamic key distribution.

**RECOMMENDED BOOKS:**

1. Takahiro Hara, Vladimir I. Zadorozhny and Erik Buchmann, 'Wireless Sensor Network Technologies for the Information Explosion Era', Springer, 2010.
2. W. Dargie and C. Poellabauer, 'Fundamentals of Wireless Sensor Networks –Theory and Practice', Wiley, 2010.
3. Kazem Sohraby, Daniel Minoli and Taieb Znati, 'Wireless Sensor Networks -Technology, Protocols, and Applications', Wiley Interscience, 2007.

**PYTHON PROGRAMMING**

**Subject Code: BCSEH1-006**

**L T P C**

**Duration – 45 hrs.**

**3 0 0 3**

**COURSE OBJECTIVE:**

To understand python concepts and its implementation.

**COURSE OUTCOMES:**

1. To be able to understand basic concepts of python and its data types.
2. To learn various control structures.
3. To learn python modules and functions.
4. To learn concept of classes and objects.

**COURSE CONTENTS:**

**UNIT-I (12 hrs.)**

**Introduction to Python Programming Language:** Features of Python, Limitations, Major Applications of Python, Getting, Installing Python, setting up Path and Environment Variables, Running Python, First Python Program, Python Interactive Help Feature, Python differences from other languages.

**Python Data Types & Input/Output:** Keywords, Identifiers, Python Statement, Indentation, Documentation, Variables, Multiple Assignment, Understanding Data Type, Data Type Conversion, Python Input and Output Functions, Import command.

**Operators and Expressions:** Operators in Python, Expressions, Precedence, Associativity of Operators, Non-Associative Operators.

**UNIT-II (11 hrs.)**

**Control Structures:** Decision making statements, Python loops, Python control statements. Python Native Data Types: Numbers, Lists, Tuples, Sets, Dictionary, Functions & Methods of Dictionary, Strings (in detail with their methods and operations).

**Data Analysis:** Using the following packing Pandas, Numpy, Scipy

**UNIT-III (11 hrs.)**

**Python Functions:** Functions, Advantages of Functions, Built-in Functions, User defined functions, Anonymous functions, Pass by value Vs. Pass by Reference, Recursion, Scope and Lifetime of Variables.

**Python Modules:** Module definition, Need of modules, Creating a module, Importing module, Path Searching of a Module, Module Reloading, Standard Modules, Python Packages.

**UNIT-IV (11 hrs.)**

**Exception Handling:** Exceptions, Built-in exceptions, Exception handling, User defined exceptions in Python.

**File Management in Python:** Operations on files (opening, modes, attributes, encoding, closing), read() & write() methods, tell() & seek() methods, renaming & deleting files in Python, directories in Python.

**Classes and Objects:** The concept of OOPS in Python, Designing classes, Creating objects, Accessing attributes, Editing class attributes, Built-in class attributes, Garbage collection, Destroying objects.

**RECOMMENDED BOOKS:**

1. Programming in Python, Pooja Sharma, BPB Publications, 2017.
2. Core Python Programming, R. Nageswara Rao, 2nd Edition, Dreamtech.
3. Python in a Nutshell, A. Martelli, A. Ravenscroft, S. Holden, OREILLY.
4. Python, The complete Reference, Martin C. Brown, Mc Graw Hill Education.

**PYTHON PROGRAMMING LABORATORY**

**Subject Code: BCSEH1-051**

**L T P C**

**0 0 2 1**

**COURSE OBJECTIVE:** Students will be able to learn primary fundamentals of python programming and potential of python is to achieve modern computing requirements.

**COURSE OUTCOMES:**

1. Students will learn about the data types implementation.
2. To be able to implement different operators
3. To be able to work with lists.
4. To be able to work with dictionaries.

**PRACTICALS:**

1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
4. Write a python script to print the current date in the following format Sun May 29 02:26:23 IST 2017
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python.
8. Write a python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [ Formula :  $c/5 = f-32/9$  ]
10. Write a Python program to construct the following pattern, using a nested for loop

**INTRODUCTION TO AI AND MACHINE LEARNING**

**Subject Code: BCSEH1-007**

**L T P C**

**Duration – 60 hrs.**

**3 1 0 4**

**COURSE OBJECTIVE:**

1. To review and strengthen important Mathematical concepts required for AI & ML
2. Introduce the concept of learning patterns from data and develop a strong theoretical foundation for understanding state of the art Machine Learning algorithms.

**COURSE OUTCOMES:**

After completion of course, students would be:

1. Design and implement machine learning solutions to classification, regression and clustering problems
2. Evaluate and interpret the results of the different ML techniques

**COURSE CONTENTS:**

**UNIT-I (15 hrs.)**

Defining Artificial Intelligence, Defining AI techniques, Using Predicate Logic and Representing Knowledge as Rules, Representing simple facts in logic, Computable functions and predicates, Procedural vs Declarative knowledge, Logic Programming,

**UNIT-II (15 hrs.)**

Idea of Machines learning from data, Classification of problem –Regression and Classification, Supervised and Unsupervised learning

**UNIT-III (15 hrs.)**

Linear Regression: Model representation for single variable, Single variable Cost Function, Gradient Decent for Linear Regression, Gradient Decent in practice

**UNIT-IV (15 hrs.)**

Logistic Regression: Classification, Hypothesis Representation, Decision Boundary, Cost function, Advanced Optimization, Multi-classification (One vs All), Problem of Overfitting

**Lab Work:**

1. Implementation of logical rules in Python.
2. Using any data apply the concept of: a) Liner regression b) Gradient decent c) Logistic regression
3. To add the missing value in any data set
4. Perform and plot under fitting and overfitting in a data set
5. Implement a movie recommendation system.

**RECOMMENDED BOOKS:**Sr. No. Book Detail

1. Tom Mitchell, Machine Learning, McGraw Hill, 2017
2. Christopher M. Bishop, Pattern Recognition and Machine Learning, Springer, 2011

3. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e, 2011
4. Yuxi (Hayden) Liu, "Python Machine Learning By Example", Packet Publishing Limited, 2017.
5. Anindita Das Bhattacharjee, "Practical Workbook Artificial Intelligence and Soft

### DEEP LEARNING AND NEURAL NETWORKS

**Subject Code: BCSEH1-008**

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

**Duration – 60 hrs.**

#### **COURSE OBJECTIVE:**

Introduce major deep learning algorithms, the problem settings, and their applications to solve real world problems.

#### **COURSE OUTCOMES:**

1. Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains.
2. Implement deep learning algorithms and solve real-world problems.

#### **COURSE CONTENTS:**

##### **UNIT-I (15 hrs.)**

**Introduction:** Various paradigms of learning problems, Perspectives and Issues in deep learning framework, review of fundamental learning techniques.

**Feed forward neural network:** Artificial Neural Network, activation function, multi-layer neural network.

##### **UNIT-II (15 hrs.)**

**Training Neural Network:** Risk minimization, loss function, backpropagation, regularization, model selection, and optimization.

**Conditional Random Fields:** Linear chain, partition function, Markov network, Belief propagation, Training CRFs, Hidden Markov Model, Entropy.

##### **UNIT-III (15 hrs.)**

**Deep Learning:** Deep Feed Forward network, regularizations, training deep models, dropouts, Convolutional Neural Network, Recurrent Neural Network, Deep Belief Network.

**Probabilistic Neural Network:** Hopfield Net, Boltzman machine, RBMs, Sigmoid net, Autoencoders.

##### **UNIT-IV (15 hrs.)**

**Deep Learning research:** Object recognition, sparse coding, computer vision, natural language processing.

**Deep Learning Tools:** Caffe, Theano, Torch.

#### **RECOMMENDED BOOKS:**

1. Goodfellow, I., Bengio, Y., and Courville, A., Deep Learning, MIT Press, 2016..



2. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006.
3. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009.
4. Golub, G.,H., and Van Loan,C.,F., Matrix Computations, JHU Press,2013.
5. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education, 2004.

### **DATA ANALYTICS**

**Subject Code: BCSEH1-009**

**L T P C**

**Duration – 60 hrs.**

**3 1 0 4**

#### **COURSE OBJECTIVE:**

The purpose of this course is to introduce the students with Data Storage Systems and important algorithms that form the basis of Data Processing. The course also introduces the students with major application areas of Data Analytics.

#### **COURSE OUTCOMES:**

1. To be able to understand concepts of big data.
2. To understand distributed file systems.
3. To learn scalable algorithms.
4. To implement big data applications.

#### **COURSE CONTENTS:**

##### **UNIT-I (15 hrs.)**

**Introduction to Big Data:** Introduction to Big Data The four dimensions of Big Data: volume, velocity, variety, veracity, Drivers for Big Data, Introducing the Storage, Query Stack, Revisit useful technologies and concepts, Real-time Big Data Analytics

##### **UNIT-II (15 hrs.)**

**Distributed File Systems:** Hadoop Distributed File System, Google File System, Data Consistency Big Data Storage Models: Distributed Hash-table, Key-Value Storage Model (Amazon's Dynamo), Document Storage Model (Facebook's Cassandra), Graph storage models

##### **UNIT-III (15 hrs.)**

**Scalable Algorithms:** Mining large graphs, with focus on social networks and web graphs. Centrality, similarity, all-distances sketches, community detection, link analysis, spectral techniques. Map-reduce, Pig Latin, and NoSQL, Algorithms for detecting similar items, Recommendation systems, Data stream analysis algorithms, Clustering algorithms, Detecting frequent items

##### **UNIT-IV (15 hrs.)**

**Big Data Applications:** Advertising on the Web, Web Page Quality Ranking, Mining Social-Networking Group, Human Interaction with Big-Data. Recommendation systems with case studies of Amazon's

**RECOMMENDED BOOKS:**

1. Mining of massive datasets, Anand Rajaraman, Jure Leskovec, and Jeffrey Ullman
2. An Introduction to Information Retrieval, Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze
3. Data-Intensive Text Processing with MapReduce, Jimmy Lin and Chris Dyer.

**DATA SCIENCE**

**Subject Code: BCSEH1-010**

**L T P C**

**Duration – 60 hrs.**

**3 1 0 4**

**COURSE OBJECTIVE:**

The main objectives of this course are:

1. To provide with the knowledge and expertise to become a proficient data scientist.
2. To demonstrate an understanding of statistics and machine learning concepts that are vital for data science.

**COURSE OUTCOMES:**

At the end of the course, students will be able to:

1. Create competitive advantage from both structured and unstructured data
2. Predict outcomes with supervised machine learning techniques.
3. Unearth patterns in customer behaviour with unsupervised techniques.

**COURSE CONTENTS:**

**UNIT-I (17 hrs.)**

**Introduction to Data Science:** What is data science, relation to data mining, machine learning, big data and statistics.

**Getting To Know Your Data:** From data to features- Interactive group discussion, Representing problems with matrices, Representing problem with relations Computing simple statistics- Means, variances, standard deviations, weighted averaging, modes, quartiles. Simple visualizations- Histograms, Boxplots, Scatterplots, Time series, Spatial data

**UNIT-II (16 hrs.)**

**Overview of Tasks & Techniques:** Prediction: The prediction task- Definition, Examples, Format of input / output data Prediction algorithms- Decision trees, Rule learners, Linear/logistic regression, Nearest neighbour learning. Support vector machines Properties of prediction algorithms and practical exercises, Combining classifiers

**Evaluation and Methodology of Data Science:** Experimental setup- Training, tuning, test data, Holdout method, cross-validation, bootstrap method Measuring performance of a model- Accuracy, ROC curves, precision-recall curves, Loss functions for regression Interpretation of results, Confidence interval for accuracy, Hypothesis tests for comparing models, algorithms

**UNIT-III (14 hrs.)**

Data Engineering: Attribute selection- Filter methods, Wrapper methods Data discretization- Unsupervised discretization, Supervised discretization Data transformations- PCA and variants  
Overview of Tasks & Techniques: Probabilistic Models: Introduction- Probabilities, Rule of Bayes and Conditional Independence Naive Bayes- Application to spam filtering Bayesian Networks- Graphical representation, Independence and correlation Temporal models- Markov Chains, Hidden Markov Models.

**UNIT-IV (13 hrs.)**

Overview of Tasks & Techniques: Exploratory Data Mining: Introduction to Exploratory Data Mining Association discovery- What is association discovery?, What are the challenges?, In detail: Apriori Clustering- What is clustering?, What are the challenges?, In detail: agglomerative clustering

**RECOMMENDED BOOKS:(Sr. No., Book Detail, Year of Publication)**

1. Joel Grus, Data Science from Scratch: First Principles with Python, O'Reilly Media.
2. Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, An Introduction to Statistical Learning, Springer Texts in Statistics.
3. I. Witten, E. Frank, M. Hall. Data Mining: Practical Machine Learning Tools and Techniques (3rd Edition),

**NATURAL LANGUAGE PROCESSING**

**Subject Code: BCSEH1-011**

**L T P C**

**Duration – 60 hrs.**

**3 1 0 4**

**COURSE OBJECTIVE:**

The students should be able to study language and the tools that are available to efficiently study and analyze large collections of text. They should learn about and discuss the effects of electronic communication on our language.

**COURSE OUTCOMES:**

At the end of the course, students will be able to:

1. Learn natural language processing with manual and automated approaches.
2. Learn computational frameworks for natural language processing.

**COURSE CONTENTS:**

**UNIT-I (15 hrs.)**

**INTRODUCTION**

A computational framework for natural language, description of English or an Indian language in the frame work, lexicon, algorithms and data structures for implementation of the framework, Finite state automata, The different analysis levels used for NLP (morphological, syntactic,

semantic, pragmatic, Recursive and augmented transition networks. Applications like machine translations.

**UNIT-II (15 hrs.)**

**WORD LEVEL AND SYNTACTIC ANALYSIS** Word Level Analysis: Regular Expressions, Finite-State Automata, Morphological Parsing, Spelling Error Detection and correction, Words and Word classes, Part-of Speech Tagging. Syntactic Analysis: Context-free Grammar, Constituency, Parsing-Probabilistic Parsing. Machine-readable dictionaries and lexical databases, RTN, ATN

**UNIT-III (16 hrs.)**

**SEMANTIC ANALYSIS** Semantic Analysis: Meaning Representation, Lexical Semantics, Ambiguity, Word Sense Disambiguation. Discourse Processing: cohesion, Reference Resolution, Discourse Coherence and Structure. Knowledge Representation, reasoning.

**NATURAL LANGUAGE GENERATION** Natural Language Generation (NLG): Architecture of NLG Systems, Generation Tasks and Representations, Application of NLG. Machine Translation: Problems in Machine Translation, Characteristics of Indian Languages, Machine Translation Approaches, Translation involving Indian Languages.

**UNIT-IV (14 hrs.)**

**INFORMATION RETRIEVAL AND LEXICAL RESOURCES** Information Retrieval: Design features of Information Retrieval Systems, Classical, Nonclassical, Alternative Models of Information Retrieval, valuation Lexical Resources: World Net, Frame Net, Stemmers, POS Tagger

**RECOMMENDED BOOKS:**

1. Natural Language understanding by James Allen, Pearson Education 2008.
2. NLP: A Paninian Perspective by Akshar Bharati, Vineet Chaitanya, and Rajeev Sangal, Prentice Hall 1995.
3. Meaning and Grammar by G. Chirchia and S. McConnell Ginet, MIT Press 2000.
4. An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition by Daniel Jurafsky and James H. Martin, Pearson Education 2008.
5. Natural language processing in Prolog by Gazdar, & Mellish, Addison-Wesley 1989.

**INTRODUCTION TO INTERNET OF THINGS**

**Subject Code: BCSEH1-012**

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

**Duration – 60Hrs.**

**COURSE OBJECTIVE:**

The purpose of this course is to impart knowledge on IoT Architecture and various protocols, study their implementations

**COURSE OUTCOMES:**

1. To Understand the Architectural Overview of IoT

2. To Understand Raspberry.
3. To Understand the various IoT Protocols ( Datalink, Network)
4. To understand sensor applications.

**COURSE CONTENTS:**

**UNIT I (12 hours)**

**OVERVIEW:** Introduction to IOT, how does it work? Difference between Embedded device and IoT device, Properties of IoT device, IoT Ecosystem, IoT Decision Framework, IoT Solution Architecture Models, Major IoT Boards in Market , Privacy issues in IOT

**UNIT II (11 hours)**

Setting Up Raspberry Pi/Arduino to Create Solutions Explore Raspberry Pi, setting up Raspberry Pi, showing working of Raspberry Pi using Secure Shell (SSH) Client and Team Viewer, Understand Sensing actions, Understand Actuators and Microelectromechanical Systems (MEMS).

**UNIT III (12 hours)**

**IOT DATA LINK LAYER & NETWORK LAYER PROTOCOLS:** Communication Protocols used in IoT Types of wireless communication, Major wireless Short-range communication devices, properties, comparison of these devices (Bluetooth, Wireless Fidelity(WiFi), ZigBee, Low-power Wireless Personal Area Network(6LoWPAN)), Major wireless Long-range communication devices, properties, comparison of these devices (Cellular IoT, Low-Power Wide-Area Network(LPWAN))

**UNIT IV (10 hours)**

**Sensors Applications of various sensors:** Google Maps, Waze, WhatsApp, Ola Positioning sensors: encoders and accelerometers, Image sensors: cameras Global positioning sensors: Global Positioning System (GPS), Global Navigation Satellite System (GLONASS), Indian Regional Navigation Satellite System (IRNSS).

**RECOMMENDED BOOKS:**

1. Vijay Madiseti and ArshdeepBahga, “Internet of Things (A Hands-onApproach)”, 1 st Edition, VPT, 2014.
2. Peter Waher, “Learning Internet of Things”, PACKT publishing, BIRMINGHAM – MUMBAI
3. Bernd Scholz-Reiter, Florian Michahelles, “Architecting the Internet of Things”, ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
4. Daniel Minoli, “Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications”, ISBN: 978-1-118-47347-4, Willy Publications

**INTRODUCTION TO SECURITY OF CYBER PHYSICAL SYSTEMS**

**Subject Code: BCSEH1-013**

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

**Duration – 60Hrs.**

**COURSE OBJECTIVE:**

This course help students to have an understanding of basics of security and issues related to it and biometric techniques available and how they are used in today's world. They will learn security issues in web and how to tackle them.

**COURSE OUTCOMES:**

1. To learn the basics of security and various types of security issues.
2. To study different cryptography techniques available and various security attacks.
3. Explore network security and how they are implemented in real world.
4. To get an insight of various issues of Web security and biometric authentication.

**COURSE CONTENTS:**

**UNIT-I (20 Hrs.)**

Introduction-Overview of Security and Privacy in Information System.

Applied Cryptography & Intrusion Detection, Architecture of Applied Cryptography, One Way Hash Function and Integrity, Encryption Algorithms and Confidentiality, Digital Signature and Authentication (DH, RSA, 2 class), Intrusion Detection and Information Theory.

**UNIT-II (15 Hrs.)**

Internet of Things Security, Security and Privacy for IoT Case Study: Smart Home, Smart Grid Network, Modern Vehicle, Wearable Computing & BYOD, Mobile HealthCare.

**UNIT-III (15 Hrs.)**

Software-Defined Networks, Introduction of Software-Defined Networks, Security for Software-Defined Networks, Privacy Leakages for Software-Defined Networks, Case Studies: How to Attack Software-Defined Networks.

**UNIT-IV (10 Hrs.)**

Cyber-Physical Systems (CPS), CPS - Platform components, CPS implementation

**RECOMMENDED BOOKS:**

1. Li Da Xu, Shancang Li, "Securing the Internet of Things", Syngress.
2. Alasdair Gilchrist, "IoT Security Issues", De Gruyter
3. Sean Smith, "The Internet of Risky Things", Sean Smith, Shroff/O'Reilly

**UBIQUITOUS SENSING, COMPUTING AND COMMUNICATION**

**Subject Code: BCSEH1-014**

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

**Duration – 60Hrs.**

**COURSE OBJECTIVE:**

This course will give basic introduction of all the elements of IoT-Mechanical, Electronics/sensor platform, Wireless and wireline protocols, Mobile to Electronics integration, Mobile to enterprise integration. It also helps to have an understanding of basics of open source/commercial electronics platform for IoT

**COURSE OUTCOMES:**

1. To understand merging technological options, platforms and case studies of IoT implementation in home & city automation
2. Determine the Market perspective of IoT.

**COURSE CONTENTS:**

**UNIT-I (10 Hrs.)**

Introduction, Overview, Challenges in IoT, Networking Basics of IoT, NFC, Wireless LAN

**UNIT-II (20 Hrs.)**

Location in ubiquitous computing: Personal assistants, Location aware computing, Location tracking, Architecture, Location based service and applications, Location based social networks (LBSN), LBSN Recommendation

Context-aware computing: Context and Context-aware Computing, Issues and Challenges, Developing Context-aware Applications, System Architecture

**UNIT-III (15 Hrs.)**

Privacy and security in ubiquitous computing, Energy constraints in ubiquitous computing  
Wearable computing, Glass and Augmented Reality, Eye-Tracking, Digital Pen and Paper, Mobile social networking & crowd sensing, Event based social network.

**UNIT-IV (15 Hrs.)**

Mobile affective computing: Human Activity and Emotion Sensing, Health Apps, Mobile p2p computing, Smart Homes and Intelligent Buildings, Mobile HCI, Cloud centric IoT, Open challenges, Architecture, Energy Efficiency, Participatory sensing, Protocols, QoS, QoE.

**RECOMMENDED BOOKS:**

1. John Krumm, Ubiquitous Computing Fundamentals, CRC Press/.
2. N. Jeyanthi, Ajith Abraham, Hamid Mcheick, “Ubiquitous Computing and Computing Security of IoT”.
3. Dirk Slama, “Enterprise IoT”, Shroff/O’Reilly

**EMBEDDED SYSTEMS FOR IOT**

**Subject Code: BCSEH1-015**

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

**Duration – 60Hrs.**

**COURSE OBJECTIVE:**

This course will help students to know the basic concept and architecture of embedded systems and different design platforms used for an embedded system for IoT applications.

**COURSE OUTCOMES:**

1. Understand the embedded system concepts and architecture of embedded systems.
2. Understand the different hardware/software co-design techniques for microcontroller-based embedded systems, apply techniques in IoT applications.
3. To be able to design web/cloud based IoT applications.

**COURSE CONTENTS:**

**UNIT-I (15 Hrs.)**

Purpose and requirement specification, IoT level specification, Functional view specification, Operational view specification, Device and component integration, Pillars of Embedded IoT and Physical Devices: The internet of devices.

**UNIT-II (10 Hrs.)**

Design of Embedded Systems: Common Sensors, Actuators, Embedded Processors, Memory Architectures, Software architecture.

**UNIT-III (15 Hrs.)**

Inputs and Outputs: Digital Inputs and Outputs, Digital Inputs, Digital Outputs, BusIn, BusOut, and BusInOut, Analog Inputs and Outputs, Analog Inputs, Analog Outputs, Pulse Width Modulation (PWM), Accelerometer and Magnetometer, SD Card, Local File System (LPC1768)

**UNIT-IV (20 Hrs.)**

IoT Enabling Technologies: Communications, RFID and NFC (Near-Field Communication), Bluetooth Low Energy (BLE), LiFi, 6LowPAN, ZigBee, Z-Wave, LoRa, Protocols, HTTP, WebSocket, MQTT, CoAP, XMPP, Node-RED, Platforms, IBM Watson IoT—Bluemix, Eclipse IoT, AWS IoT, Microsoft Azure IoT Suite, Google Cloud IoT, ThingWorx, GE Predix, Xively, macchina.io, Carriots.

**RECOMMENDED BOOKS:**

1. Klaus Elk, “Embedded Software for the IoT”.
2. Perry Xiao, “Designing Embedded Systems and the Internet of Things (IoT) with the ARM Mbed”.
3. Elizabeth Gootman et. al, “Designing Connected Products”, Shroff/O’Reilly

**IOT WITH ARDUINO,ESP, AND RASPBERRY Pi**

**Subject Code: BCSEH1-016**

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

**Duration – 60Hrs.**

**COURSE OBJECTIVE:**

To give students hands-on experience using different IoT architectures and to provide skills for interfacing sensors and actuators with different IoT architectures

**COURSE OUTCOMES:**

1. Understand Arduino Uno, NODE MCU 8266 and Raspberry PI along with critical protocols and its communication to cloud
2. Understand commonly used IOT protocols such as REST API, MQTT through IOT based demonstration.
3. Understand analog sensor and digital sensor Interfacing with IOT devices

**COURSE CONTENTS:**

**UNIT-I (10 Hrs.)**

IoT- introduction and its components, IoT building blocks, Sensors and Actuators, IoT Devices, IoT boards (Arduino Uno, ESP 8266-12E Node MCU, and Raspberry Pi 3)



**UNIT-II (15 Hrs.)**

Arduino Uno – getting started with the Uno boards, blink program, connection of sensors to the Uno board, reading values of sensors from the Uno board, interrupts. Case study: Temperature/Humidity Control; Case Study: Sending values Temperature/Humidity values to the Internet via GSM module

**UNIT-III (20 Hrs.)**

ESP 8266-12E Node MCU – getting started with the ESP board, Micropython and Explorer IDE, Flushing the ESP8266 board with micropython, connecting sensors to the ESP board, Connecting ESP board to WiFi, Interfacing ESP with the Cloud (REST API-GET, POST, MQTT), interrupts, comparison of ESP 32 board with the ESP 8266 board. Case Study: Switching light on /off remotely. Case Study: Voice-based Home Automation for switching lights on/off (Android phone – Google Assistant (Assistant <-> IFTTT), MQTT (ESP <-> IFTTT), ESP 8266 <-> Lights).

**UNIT-IV (15 Hrs.)**

Raspberry Pi 3 - Rpi3 introduction and installing the Raspbian Stretch OS, Headless - Computer and Rpi3 configuration to connect through SSH via Ethernet, Headless - connecting Rpi3 remotely without Ethernet cable via SSH, IP address, Rpi 3 - Testing the GPIO pins through Scripts.

**RECOMMENDED BOOKS:**

1. Baichtal, J. (2013). Arduino for beginners: essential skills every maker needs. Pearson Education.
2. Schwartz, M. (2016). Internet of Things with ESP8266. Packt Publishing Ltd.
3. Richardson, M., & Wallace, S. (2012). Getting started with raspberry PI. " O'Reilly Media, Inc."
4. Rao, M. (2018). Internet of Things with Raspberry Pi 3: Leverage the power of Raspberry Pi 3 and JavaScript to build exciting IoT projects. Packt Publishing Ltd.

**MRSPTU UNDER GRADUATE OPEN ELECTIVES SYLLABUS OFFERED BY  
CIVIL ENGG. W.E.F. JAN-2021 ONWARDS**

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<b>UG OPEN ELECTIVES</b>		
Internal	External	Total
40	60	100

<b>UG OPEN ELECTIVES</b>		
<b>COURSE CODE</b>	<b>COURSE</b>	<b>NOT APPLICABLE FOR PROGRAMMES</b>
<b>Open Electives offered by Department of Civil Engg.</b>		
BCIEO1-001	Disaster Management	B. Tech. Civil Engg.
BCIEO1-002	Environment Management	
BCIEO1-003	Construction Management	
BCIEO1-004	Traffic Management	

**Note:** Already uploaded open elective subjects BCIEO-F91, F92, F93, F94, F95, F96, F97, F98, F99 and F9A offered by Civil Engg. Department stands discarded w.e.f. Jan-2021 onwards.

**MRSPTU UNDER GRADUATE OPEN ELECTIVES SYLLABUS OFFERED BY  
CIVIL ENGG. W.E.F. JAN-2021 ONWARDS**

<b>DISASTER MANAGEMENT</b>			
<b>Subject Code: BCIEO1-001</b>	<b>L T P C</b>		<b>Duration: 45 Hrs.</b>
	3 0 0 3		
<b>Course Objectives:</b>			
<ol style="list-style-type: none"> <li>1. To introduce the students to various types of natural and manmade disasters.</li> <li>2. To learn about components of disaster management cycle and framework.</li> <li>3. To learn about disaster management activities in India at the national, state, and local level.</li> <li>4. To familiarize the students about applications of science and technology in disaster management.</li> </ol>			
<b>Course Outcomes:</b>			
<ol style="list-style-type: none"> <li>1. Student is introduced to various types of natural and manmade disasters.</li> <li>2. Student is able to learn about components of disaster management cycle and framework.</li> <li>3. Student learns about disaster management activities in India at the national, state, and local level.</li> <li>4. Student is able to learn about applications of science and technology in disaster management.</li> </ol>			
<b>UNIT-I (12 Hours)</b>			
<p>Concepts and definition of Disaster, Hazard, Vulnerability, Risk, Capacity – Disaster and Development. Types, Trends, Causes, Consequences and Control of Disasters, Geological Disasters (earthquakes, landslides, tsunami, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves), Biological Disasters (epidemics, pest attacks, forest fire), Technological Disasters (chemical, industrial, radiological, nuclear) and Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters), Global Disaster Trends – Emerging Risks of Disasters – Climate Change and Urban Disasters.</p>			
<b>UNIT-II (11 Hours)</b>			
<p>Disaster Management Cycle and Framework, Paradigm Shift in Disaster Management, Pre-Disaster – Risk Assessment and Analysis, Risk Mapping, zonation and Micro-zonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development; Awareness During Disaster – Evacuation – Disaster Communication – Search and Rescue – Emergency Operation Centre – Incident Command System – Relief and Rehabilitation Post-disaster – Damage and Needs Assessment, Restoration of Critical Infrastructure – Early Recovery – Reconstruction and Redevelopment.</p>			
<b>UNIT-III (11 Hours)</b>			
<p>Disaster Management in India, Disaster Profile of India – Mega Disasters of India and Lessons Learnt, Disaster Management Act 2005 – Institutional and Financial Mechanism, National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national), Non-Government and Inter Governmental Agencies.</p>			
<b>UNIT-IV (11 Hours)</b>			
<p>Applications of Science and Technology for Disaster Management, Geo-informatics in Disaster Management (RS, GIS, GPS and RS) Disaster Communication System (Early Warning and Its Dissemination), Land Use Planning and Development Regulations, Disaster Safe Designs and Constructions, Structural and Non-Structural Mitigation of Disasters, S&amp;T Institutions for Disaster Management in India.</p>			
<b>Recommended Text Books / Reference Books:</b>			
<ol style="list-style-type: none"> <li>1. Manual on Natural Disaster Management in India, M C Gupta, NIDM, New Delhi.</li> </ol>			

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2. An Overview on Natural & Man-made Disasters and their Reduction, R K Bhandani, CSIR, New Delhi.
3. Disaster Management Policy and Administration, S L Goyal, Deep & Deep, New Delhi, 2006
4. Management of Natural Disasters in Developing Countries, H.N. Srivastava & G.D. Gupta, Daya Publishers, Delhi, 2006.
5. Disaster Management Act 2005, Published by Govt. of India.
6. National Disaster Management Policy, 2009, Published by Govt. of India.

**ENVIRONMENT MANAGEMENT**

**Subject Code: BCIEO1-002**

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

**Duration: 45 Hrs.**

**Course Objectives:**

The course should enable the students to:

1. Global environmental issues and their Management.
2. Green technologies for cleaner production.
3. Major principles and steps required in environmental impact assessment.
4. Causes of land degradation, biodiversity loss and methods of their management.

**Course Outcomes:**

1. An ability to understand the major global environmental issues, their causes, sources, management and laws/policies related to these technologies involved in eco-friendly production and mechanism of carbon credits.
2. An ability to understand the major principles of environmental impact assessment.
3. An ability to understand the implications of current rules and regulations in relation to environmental impact assessment.
4. An ability to understand the causes, implications and management of local environmental issues like land degradation, wasteland and water logging.

**UNIT-I (12 Hours)**

**Global Environmental Problems:** Global warming, green-house effect, ozone depletion, acid rain, oil pollution, radiation hazard and control, global climate change. Main clauses and basic steps for Environmental Management System certification. Environmental Laws/Acts.

**UNIT-II (11 Hours)**

Cleaner Production Technologies Need and benefits, cleaner production techniques and options, zero impact manufacturing initiatives CDM and carbon credits/case studies.

**UNIT-III (11 Hours)**

**Environment Impact Assessment:** Definition and its importance for environment management, constituents of environment impact assessment, project data for EIA study, prediction of impacts, EIA methodologies, constraints in implementation of EIA, impact prediction on water resources projects and other relevant case studies. Environment pollution.

**UNIT-IV (11 Hours)**

**Degradation of Land Resources:** Deforestation: Forest land, deforestation and its effects on land use and Environmental quality, wetland and their importance in environment, causes and extent of wasteland, Soil degradation problems, erosion, salinization, water logging, land use management & planning.

**MRSPTU UNDER GRADUATE OPEN ELECTIVES SYLLABUS OFFERED BY  
CIVIL ENGG. W.E.F. JAN-2021 ONWARDS**

**Recommended Text Books / Reference Books:**

1. Peavy, Rowe, 'Techobanoglous, Environmental Engg.' Tata McGraw Hill.
2. Mackenzie L. Davis, 'Environmental Engg.' Tata McGraw Hill.
3. Baljeet S. Kapoor; 'Environmental Engg. An overview', Khanna Publishers.
4. Gilbert H. Masters, 'Environmental Engineering and Science', Prentice Hall of India Pvt. Ltd.
5. G.N. Panday, G.C. Carney Environmental Engineering, Tata McGraw Hill.
6. P.D. Sharma, Ecology and Environment, Rastogi Publications.
7. P.A. Ray, Lcances, 'Environmental Impact Assessment', Hand National Environmental Protection Council, Manile.

**CONSTRUCTION MANAGEMENT**

<b>Subject Code: BCIEO1-003</b>	<b>L T P C</b>	<b>Duration: 45 Hrs.</b>
	3 0 0 3	

**Course Objectives:**

1. To train the students with the latest and the best in the rapidly changing fields of Construction Engineering, Technology and Management.
2. To prepare the students to be industry leaders who implement the best engineering and management practices and technologies in the construction industry.
3. To continually work with industry to enhance the program's effectiveness and the opportunities for innovation in the construction industry.
4. To conduct research to develop advanced technologies and management approaches.

**Course Outcomes:**

1. Be able to apply theoretical and practical aspects of project management techniques to achieve project goals.
2. Possess organizational and leadership capabilities for effective management of construction projects.
3. Be able to apply knowledge and skills of modern construction practices and techniques.
4. Have necessary knowledge and skills in accounting, financing, risk analysis and contracting.
5. Be capable of using relevant software packages for planning, scheduling, executing and controlling of construction projects.

**UNIT-I (12 Hours)**

**GENERAL MANAGEMENT:** Introduction and characteristics of management, Principle and function management, Scientific of management.

**CONSTRUCTION MANAGEMENT:** Definition, functions and scope of construction management; scientific methods of management, construction team.

**UNIT-II (11 Hours)**

**MANPOWER PLANNING:** Manpower Planning process, Role of HR manager, Personnel Principles, Managerial Staffing, Recruitment Selection strategies.

**HUMAN RELATIONS AND ORGANISATIONAL BEHAVIOUR:** Introduction & Significance, Basic individual psychology, Conflicts in organizations, Engineer as Manager, Communication and negotiation skills.

**UNIT-III (11 Hours)**

**MATERIALS MANAGEMENT:** Scope, Objective and functions of material management, Procurement and store management, Materials handling management, Inventory control and management, Disposal of Surplus Materials.

**MRSPTU UNDER GRADUATE OPEN ELECTIVES SYLLABUS OFFERED BY  
CIVIL ENGG. W.E.F. JAN-2021 ONWARDS**

<p><b>CONSTRUCTION PLANNING:</b> Basic Concepts in the Development of Construction Plans, Choice of Technology and Construction Method, Estimating Activity Durations &amp; Resource Requirements for Work Activities.</p>
<p><b>UNIT-IV (11 Hours)</b></p>
<p><b>CONSTRUCTION CONTRACTS:</b> Indian Contracts Act, Elements of Contracts, Types of Contracts, Features, Suitability, Design of Contract Documents, International Contract Document, Standard Contract Document.</p> <p><b>SITE LAYOUT:</b> Principles governing site lay out, factors effecting site lay out, preparation of site lay out, Feasibility study, project reports, progress reports, monitoring and controlling construction activities.</p>
<p><b>Recommended Text Books / Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Mahesh Verma, 'Construction Equipment and its Planning and Application'.</li> <li>2. R.L. Peuripo, 'Construction Planning Equipment and Methods', Tata McGraw Hill.</li> <li>3. Calin M. Popescu, Chotchai Charoenngam, "Project Planning, Scheduling and Control in Construction: An Encyclopedia of terms and Applications", Wiley, New York, 1995.</li> <li>4. Chitkara, K.K. "Construction Project Management: Planning, Scheduling and Control", McGraw-Hill Publishing Company, New Delhi, 1998</li> <li>5. Carleton Counter II and Jill Justice Coutler, "The Complete Standard Handbook of Construction Personnel Management", Prentice-Hall, Inc., 1989.</li> </ol>

<b>TRAFFIC MANAGEMENT</b>			
<b>Subject Code: BCIEO1-004</b>	<b>L T P C</b>		<b>Duration: 45 Hrs.</b>
	3 0 0 3		
<p><b>Course Objectives:</b></p> <ol style="list-style-type: none"> <li>1. To introduce the students to various interacting elements of road traffic.</li> <li>2. To learn about traffic facilities for road users and engineering studies for traffic management.</li> <li>3. To learn about traffic and road facilities, and intersection control measures for smooth traffic movement.</li> <li>4. To familiarize the students with ITS user services for traffic management.</li> </ol> <p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"> <li>1. Student is able to learn about various interacting elements of road traffic.</li> <li>2. Student is able to learn about traffic and road facilities, and engineering studies for traffic management</li> <li>3. Student learns about traffic and road facilities, and intersection control measures for smooth traffic movement.</li> <li>4. Student is able to learn about ITS user needs and services like vehicle fleet management and public transportation management.</li> </ol>			
<b>UNIT-I (10 Hours)</b>			
Introduction, Components of Road Traffic – Vehicle, Driver and Road, Road User and Vehicle Characteristics and their effect on Road Traffic, IRC standards - Design speed, volume. Highway capacity and levels of service - capacity of urban and rural roads - PCU concept.			
<b>UNIT-II (11 Hours)</b>			
Road user facilities – Parking facilities - Cycle tracks and cycleway - Pedestrian facilities. Traffic volume studies, origin destination studies, speed studies, travel time and delay studies, Parking studies, Accident studies.			

**MRSPTU UNDER GRADUATE OPEN ELECTIVES SYLLABUS OFFERED BY  
CIVIL ENGG. W.E.F. JAN-2021 ONWARDS**

**UNIT-III (12 Hours)**

Traffic regulation and control – Road signs and markings, At-grade intersections, Roundabouts, Traffic signals - pre-timed and traffic actuated, Grade separated intersections, access-controlled highways and expressways, Traffic Safety, Road Safety Audit.

**UNIT-IV (12 Hours)**

Intelligent Transportation Systems (ITS), Benefits of ITS, Data collection techniques, ITS User Needs and Services – Travel and Traffic management, Public Transportation Management, Electronic Payment, Commercial Vehicle Operations, Emergency Management, Advanced Vehicle safety systems, Information Management.

**Recommended Text Books / Reference Books:**

1. Pignataro, L., Traffic Engineering – Theory & Practice, John Wiley.
2. Kadiyali, L.R., Traffic Engineering and Transport Planning, Khanna publishers.
3. O’Flaherty C A, Highways- Traffic Planning & Engineering, Edward Arnold, UK.
4. Chowdhury, M. A., and Sadek, A., Fundamentals of Intelligent Transportation Systems Planning, Artech House.
5. Sussman, J. M., Perspectives on Intelligent Transportation Systems (ITS), Springer.
6. Turban, E., and Aronson, J. E., Decision Support Systems & Intelligent Systems, Prentice Hall.



ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਤਕਨੀਕੀ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ

ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ - 151001

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

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

ਡੀਨ (ਅਕਾਦਮਿਕ ਮਾਮਲੇ)

DEAN (Academic Affairs)

Ref. No.: DAA/MRSPTU/2020/NOTIFICATION/71/408

Date: 29-01-2020

**NOTIFICATION**

**MRSPTU REGULATIONS FOR MINOR ENGINEERING WITH UNDERGRADUATE  
DEGREE IN ENGINEERING - 2020**

**Whereas**, Maharaja Ranjit Singh Punjab Technical University, Bathinda established as a State University by the State Government of Punjab vide Punjab State Legislature Act No 5 of 2015 u/s 2(f) and also approved u/s 12B of the UGC Act, 1956 is empowered to introduce an optional add-on concurrent Minor Engineering with Undergraduate Degree in Engineering.

**And further whereas**, the proposal/ resolution to start an optional additional Minor Engineering concurrently with UG Degree in Engineering program is in line with provision made in AICTE Model Curriculum 2018 for UG degree courses in Engineering & Technology: Chapter-1, point B, and the same was approved in the meeting of MRSPTU Standing Committee of Academic Council held on 24.05.2019 vide MoM item No 3.23.

**And further whereas**, said proposal was subsequently approved by the Board of Governors of MRSPTU in its 9<sup>th</sup> meeting held on 10.12.2019 vide item No 9.10 (point 12) with Principal Secretary to Government of Punjab, Department of Technical Education & Industrial Training in the chair.

**Now therefore**, in exercise of the powers conferred on it, Maharaja Ranjit Singh Punjab Technical University Bathinda makes the following regulations; namely:

**1.0 SHORT TITLE, APPLICATION AND COMMENCEMENT:**

**1.1 Short Title:**

These regulations may be called the "MRSPTU Regulations for Minor Engineering with Undergraduate Degree in Engineering - 2020"

**1.2 Category of Institutions to whom the Regulations Apply:**

These shall apply to MRSPTU Main Campus, its Constituent & Affiliated Colleges hereafter called as 'Academic Institutions'. In these academic institutions, concurrent add-on Minor Engineering program shall be offered in running AICTE UG Engineering streams only.

**1.3 Date of Effect:**

These regulations shall be effective from UG Engineering students admitted in the BTech programme w.e.f. session 2019-2020 and through BTech LEET from session 2020-2021.





## 2.0 INTRODUCTION, OBJECTIVES AND ADMISSION CRITERION:

### 2.1 Introduction:

The UG Engineering students enrolled in any Engineering Discipline in Academic Institutions can choose one concurrent additional add on, Minor Engineering option, out of other UG Engineering degree programs running in that institution. Obtaining this Minor Engineering typically involves taking a fixed number of approved additional courses within normal period of BTech program. Minor Engineering transcripts shall be applicable only after completing the requirements of UG Engineering discipline in which they were admitted for their BTech. Minor Engineering is not an independent program but an optional add-on course.

### 2.2 Program objectives:

The objective of commencing the additional Minor Engineering certification is:

- a) To enhance competitiveness/ adaptation of engineering graduates in multiple domain
- b) To make engineering graduates more employable in multiple domains/organizations
- c) To diversify knowledge of undergraduates to facilitate inter-disciplinary academic interactions for more inclusive research catering to inter-related issues/ solutions

### 2.3 Admission Criterion:

- a) Offer to candidates seeking admissions to Minor Engineering shall be restricted to 25% (to the next nearest whole number) of the sanctioned strength of the UG Engineering discipline in which they were admitted and shall be allocated in proportion of their strength to BTech & BTech LEET in a particular department/discipline per batch.
- b) Offer is applicable to those students only, who have all clear (no pending reappears or detentions) till last notified result, as on the date of admission to Minor Engineering
- c) After submitting a formal request in the prescribed format, eligible students can opt for Minor Engineering concurrently from 3<sup>rd</sup> semester onwards. Admission in 3<sup>rd</sup> semester to prescribed limited seats shall be based on First Semester result marks for BTech and on average of all semesters of the Diploma result in case of LEET students
- d) Eligible students can seek admission to the vacant seats, if any, in Minor Engineering in later semesters too, but not later than start of 6<sup>th</sup> semester with the condition that all the requirements of Minor Engineering are to be completed within the prescribed duration.

## 3.0 STRUCTURE, MONITORING AND DURATION:

### 3.1 Structure:

- a) Eligible interested students can only opt for a single additional Minor Engineering in his/her entire tenure of UG Engineering degree. A student can withdraw his/her option of Minor Engineering at any time during the duration of the program and once withdrawn, the option cannot be exercised again.
- b) Eligible student is required to complete an additional 20-credits comprising of minimum of five prescribed courses, to get additional Minor Engineering. Out of the five courses (Core + department Elective); student must choose minimum of 02-Core courses and rest may be chosen from Elective courses.



- c) The list of the subjects for Minor Engineering shall be offered from the list of running majors in the concerned UG Engineering disciplines only. BoS of concerned branch shall provide a comprehensive list of Core and Departmental Electives considering the AICTE model curriculum guidelines as available from time to time.
- d) Credits for minimum one course out of the five courses are to be earned through MOOCS/ SWAYAM (as per AICTE Model Curriculum-2018 or modified by it from time to time) offered subjects, after they are approved by the concerned BoS, in anticipation to its approval by the Faculty of Engineering (FoE)/Academic Council (AC). The policy of UGC/ AICTE shall be applicable for these credit transfer.
- e) A student shall be allowed to register for maximum 2-subjects per semester pertaining to Minor Engineering by paying additional fee as specified by MRSPTU from time to time.
- f) Change of subject/s within the respective category of subjects is allowed, but only in the beginning of semester.

### 3.2 **Progress Monitoring Mechanism:**

The students enrolled in the offered Minor Engineering courses will be monitored through already adopted continuous evaluation system comprising of various Mid Semester Tests, Seminars, Quizzes, Viva-voce etc., as applicable. The classroom attendance requirements shall be the same as that of UG Engineering degree program in which they are admitted. Minor Engineering shall be at par with the prevailing academic practices and examination standards and shall be governed by the prevailing academic rules and regulations of MRSPTU or as modified/ updated from time to time.

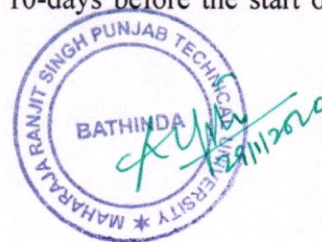
### 3.3 **Program Duration:**

Duration of completion of add-on Minor engineering course shall be up to the Regular 8<sup>th</sup> semester exam result of the UG Engineering degree in which they were admitted, failing which the student shall not be awarded any credit/s for Minor Engineering.

## 4.0 **PROCEDURE:**

### 4.1 **Allocation of Seats & Courses:**

- a) The academic institution shall announce the vacant seats for Minor Engineering in the concerned departments for a batch well in advance before the start of the semester.
- b) The concerned department will compile and announce the list of successful eligible applicants (within the approved/ available strength only) for Minor Engineering and shall communicate the same to all concerned including time-table committee accordingly, at-least 15-days before start of each session.
- c) The concerned department will also announce the list of prescribed courses for the Minor Engineering. The interested students from other disciplines can also choose courses from the list of the offered Minor Engineering courses within the structure of the Minor Engineering Program.
- d) The applicant students shall then apply for courses with due approval from its parent department. The whole process shall be completed at least 10-days before the start of every session.



**4.2 Minor Engineering Course Registration:**

Students shall be separately registered for the Minor Engineering courses in the concerned departments by paying additional fees, as applicable, from time to time.

**5.0 FEES & EXAMINATION CHARGES:**

The additional course fee for the add-on Minor Engineering will be @ Rs. 4,000/- per theory subject and @ Rs. 2,000/- per laboratory subject per semester. Course fee for MOOCS/ SWAYAM course shall be paid by the student as per NPTEL norms as applicable. The examination charges will be additional as per the MRSPTU norms as applicable from time to time.

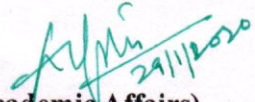
**6.0 MINOR ENGINEERING NOTIFICATIONS:**

- a) Since Minor Engineering is an add-on program and not an independent program, so the notification of its successful completion shall be done on or after the successful completion of all requirements of the UG Engineering degree discipline in which the candidate was admitted for BTech.
- b) Separate independent notification of only Minor Engineering shall not be done.

**7.0 AUTHORITY TO ISSUE CLARIFICATIONS, IF ANY:**

The Academic Council of the MRSPTU shall be the sole competent authority to issue clarification in case of any ambiguity or any amendment/modification in all other conditions mentioned in this notification pertaining to MRSPTU Regulations for the add-on Minor Engineering with Under-Graduate degree in Engineering – 2020.

This notification is issued with the approval of the competent authority.

  
**DEAN (Academic Affairs)**  
(Dr Savina Bansal)

Copy forwarded to office of following for information, further necessary action, circulation and records, as applicable:

1. PSTE *cum* Chairman Board of Governors of MRSPTU Bathinda
2. Vice-Chancellor *cum* Chairman Academic Council of MRSPTU Bathinda
3. Registrar *cum* Member Secretary BoG of MRSPTU Bathinda
4. Dean Faculty of Engineering of MRSPTU Bathinda
5. All Deans/Directors of MRSPTU Bathinda, COE-MRSPTU
6. Directors/Principals of all MRSPTU Acad Institutions (Univ Campus/Constituent/Affiliated)
7. Director ITES/Webmaster to put on the MRSPTU Website



  
**DEAN (Academic Affairs)**

		Department for relaxation of these guidelines. It was decided that the Vice Chancellor may follow up the matter with Finance Department. It was further decided that in case the Vice Chancellor is unable to get relaxation from Finance Department by 31 Mar 2020, the compliance of Finance Department instructions dated 15.01.15 should be made and due amount should be recovered from the employees concerned.
9.9	<p><b>TO APPROVE THE PROCEEDINGS OF 1st MEETING OF UNIVERSITY RESEARCH BOARD OF THE UNIVERSITY</b></p> <p>The 1<sup>st</sup> meeting of University Research Board, Maharaja Ranjit Singh Punjab Technical University, Bathinda was held on 23.05.2019. The minutes of the meeting are placed at <b>Annexure-28 from Page No. 210 to 215</b> .</p> <p>Matter is placed before the Board of Governors for approval.</p>	Approved subject to the condition that these are in conformity with UGC Regulations /Guidelines.
9.10	<p><b>TO APPROVE THE PROCEEDINGS OF 3<sup>rd</sup> MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL OF THE UNIVERSITY.</b></p> <p>The 3<sup>rd</sup> meeting of Standing Committee of Academic Council, Maharaja Ranjit Singh Punjab Technical University, Bathinda was held on 24.05.2019. The minutes of the meeting are placed at <b>Annexure- 29 from Page No. 216 to 236</b>. The major decisions taken in the meeting are given below:</p> <ol style="list-style-type: none"> <li>1. Academic Calender-2019,</li> <li>2. Holiday Calender-2019,</li> <li>3. Start of new University Approved AICTE and UGC Programmes in Constituent colleges of MRSPTU from session 2019-20 like MCA, M. Tech. (Electrical Engg.), PGDCA, Skill Certificate Course in Refrigeration and Air Conditioning Mechanic, Computer Hardware &amp; Networking, Computer Proficiency, Computer Maintenance &amp; Programming Assistant</li> <li>4. Start of new University Approved AICTE and UGC Programmes in University Main Campus from session 2019-20 like B. Tech. (Mechatronics), B. Sc. (Hons.) Physics, B. Sc. (Hons.) Chemistry, Bachelors in Interior Design, Integrated UG course: B. Sc. (Food Sci. &amp; Tech.) – 3 Yrs./ Bachelor of Food Sci&amp; Tech. (Hons.) – 4 Yrs.,</li> <li>5. Start of new University Approved AICTE and UGC Programmes in PSAEC, Patiala from 2019-20 like B. Tech. Aerospace Engg. (Avionics), Bachelor of Management Studies (Airline, Tourism and Hospitality)</li> <li>6. Closure of Courses in constituent colleges of MRSPTU from session 2019-20 like B. Tech. (ME/ CE/ ECE) M. Tech. (ECE/ EE), B. Sc (Non-Medical), MBA, Skill Certificate in Plumbing</li> <li>7. Approval of courses offered by university main campus/constituent colleges and eligibility criteria of the courses offered by the university from academic session 2019-20,</li> <li>8. University fellowship to promote quality research,</li> <li>9. Amendment in the Choice Based Credit System – 2016,</li> <li>10. Modification in Migration Regulations – 2016,</li> <li>11. Fee structure for various programmes at MRSPTU Main Campus, Constituent colleges and affiliated colleges of MRSPTU, Bathinda for session 2019-20,</li> <li>12. Approval for B. Tech. with Minor Engg. and B. Tech. with Honours,</li> <li>13. To Institute awards for MOOCS, SWAYAM, NPTEL achievers,</li> </ol>	Approved

AM

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ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਤਕਨੀਕੀ ਯੂਨੀਵਰਸਿਟੀ, ਬਠਿੰਡਾ

ਡੱਬਵਾਲੀ ਰੋਡ, ਬਠਿੰਡਾ - 151001

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

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

ਡੀਨ (ਅਕਾਦਮਿਕ ਮਾਮਲੇ)

DEAN (Academic Affairs)

Ref. No.: DAA/NOTIFICATIONS/2020/72/778

Date: 04.03.2020

### NOTIFICATION

#### MRSPTU REGULATIONS FOR BTECH WITH HONORS - 2020

**Whereas**, Maharaja Ranjit Singh Punjab Technical University, Bathinda established as a State University by the State Government of Punjab vide Punjab State Legislature Act No 5 of 2015 u/s 2(f) and also approved u/s 12B of the UGC Act, 1956 is empowered to introduce an optional add-on BTech Honors for Undergraduate Degree in Engineering.

**And further whereas**, the proposal/ resolution to start an optional BTech Honors concurrently with UG Degree in Engineering program is in line with the provisions made in AICTE Model Curriculum 2018 for UG degree courses in Engineering & Technology: Chapter-1, point B, and the same was approved in the meeting of MRSPTU Standing Committee of Academic Council held on 24.05.2019 vide MoM item No 3.23.

**And further whereas**, said proposal to start BTech Honors was subsequently approved by the Board of Governors of MRSPTU in its 9<sup>th</sup> meeting held on 10.12.2019 vide item No 9.10 (point 12) with Principal Secretary to Government of Punjab, Department of Technical Education & Industrial Training in the chair.

**Now therefore**, in exercise of the powers conferred on it, Maharaja Ranjit Singh Punjab Technical University Bathinda makes the following regulations; namely:

1.0 **SHORT TITLE, APPLICATION AND COMMENCEMENT:**

1.1 **Short Title:**

These regulations may be called the "MRSPTU Regulations for BTech with Honors - 2020"

1.2 **Category of Institutions to whom the Regulations Apply:**

These shall apply to MRSPTU Main Campus, its Constituent & Affiliated Colleges hereafter called as 'Academic Institutions'. In these academic institutions, concurrent BTech with Honors in Engineering program shall be offered in running AICTE approved UG Engineering streams only.

1.3 **Date of Effect:**

These regulations shall be applicable to those eligible BTech aspirant students, who are admitted w.e.f. 2018 batch onwards and comes into force from the date of this notification.



## 2.0 INTRODUCTION, OBJECTIVES AND ADMISSION CRITERION:

### 2.1 Introduction:

The UG Engineering students enrolled in any Engineering Discipline in Academic Institutions can choose concurrent additional BTech with Honors option, in the undertaken UG Engineering degree program. Obtaining this Honors typically involves taking a fixed number of approved additional courses within normal period of BTech Program. Honors certification shall be applicable only after completing the requirements of undertaken UG Engineering discipline. BTech with Honors is not an independent or a mandatory program but an add on optional program.

### 2.2 Program objectives:

The objective of commencing the additional BTech with Honors certification is:

- a) To enhance competitiveness of engineering graduates in specialized/ thrust domains
- b) To enhance knowledge of engineering graduates, to facilitate more focused research
- c) To acknowledge /promote the higher learning capability/ challenges among students

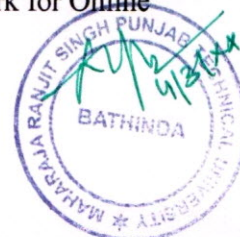
### 2.3 Admission Criterion:

- a) Offer to BTech with Honors is applicable to those students only, who at the time of admission possesses all subjects cleared in first attempt only.
- b) After submitting a formal request in the prescribed format, eligible students can opt for BTech with Honors concurrently from 5<sup>th</sup> semester onwards.

## 3.0 STRUCTURE, MONITORING AND DURATION:

### 3.1 Structure:

- a) Student eligible for basic BTech with Honors is required to complete additional 20-credits concentration courses (as approved by the concerned BoS for the purpose for BTech study scheme) comprising of minimum of five prescribed courses approved by respective BoS. These courses may include lab components also.
- b) In addition to it, a student to be eligible for award of BTech with Honors must have cleared all his courses including concentration courses during the entire BTech program in first attempt. Furthermore, a student needs to earn minimum CGPA of 7.5 in the undertaken BTech program.
- c) To enable students to upgrade their knowledge and skills through MOOCs, credits for minimum two courses out of these five courses are allowed to be earned through ongoing MOOCs courses offered on SWAYAM (as per AICTE Model Curriculum-2018 or as modified by it from time to time), after they are approved by the concerned BoS, in anticipation to its approval by the Faculty of Engineering/Academic Council. BoS shall select/ include the course title, subject code and its credits at the time of allocating a MOOCs course out of the dynamic basket of MOOCs courses. These SWAYAM courses are permitted for credit transfer as per applicable UGC (Credit Framework for Online



Learning Courses through SWAYAM) Regulations 2016 or as modified/ updated by it from time to time.

- d) A student shall be allowed to register for maximum 2-subjects per semester (distributed over 4-semesters from 5<sup>th</sup> to 8<sup>th</sup>) for the approved concentration courses.

3.2 **Progress Monitoring Mechanism:**

Students enrolled in the offered BTech with Honors in the prescribed courses will be monitored through already adopted continuous evaluation system comprising of various Mid Semester Tests, Seminars, Quizzes, Viva-voce etc., as applicable. Classroom attendance requirements shall be the same as that of UG Engineering degree program in which they are admitted. BTech with Honors shall be at par with the prevailing academic practices and examination standards and shall be governed by the prevailing academic rules and regulations of MRSPTU or as updated from time to time.

3.3 **Program Duration:**

Duration of completion of BTech with Honors shall be up to the Regular 8<sup>th</sup> semester exam result of the undertaken UG Engineering degree in which they were admitted, failing which the student shall not be awarded any credit/s for Honors in Engineering.

4.0 **PROCEDURE:**

4.1 **Allocation of Students & Courses:**

- a) The concerned department will compile and announce the list of eligible and aspirant applicants for BTech with Honors and shall communicate the same to all concerned including time-table committee and academic section at-least 15-days before start of each session.
- b) At the start of semester, the concerned department will also announce the list of prescribed concentration courses for the BTech with Honors, duly approved by respective BoS.
- c) Applicant students shall then apply for registration of these courses with due approval from the department. The whole process shall be completed at least 10-days before the start of every session.

4.2 **BTech with Honors in Engineering Course Registration:**

Students shall be separately registered for concentration courses leading to BTech with Honors by paying additional fee as applicable from time to time.

5.0 **FEES & EXAMINATION CHARGES:**

The additional course fee for concentration courses leading to BTech with Honors will be @ Rs. 2,000/- per theory subject and @ Rs. 1,000/- per laboratory subject per semester. Course fee for MOOCS/ SWAYAM course shall be paid by the student as per NPTEL norms as applicable. Examination charges will be additional as per the MRSPTU norms as applicable from time to time.



**6.0 BTECH WITH HONORS NOTIFICATIONS:**

Since BTech with Honors is an add-on program and not an independent program, so the notification of its successful completion shall be done on or after the successful completion of all requirements of the undertaken UG Engg degree discipline in which the candidate was admitted. A single DMC based on Overall Grade Point Average for additional concentration courses shall be issued at the end. To be eligible for the award of BTech with Honors degree, a student must obtain minimum overall GPA as 6.0 in first attempt in these additional concentration courses. Degree shall be awarded with the mention of BTech (Admitted branch of Engg) with Honors for example BTech (Mech Engg) with Honors.

**7.0 AUTHORITY TO ISSUE CLARIFICATIONS, IF ANY:**

The Academic Council of the MRSPTU shall be the sole competent authority to issue clarification in case of any ambiguity or any amendment/modification in all other conditions mentioned in this notification pertaining to MRSPTU Regulations for the BTech with Honors - 2020.

This notification is issued with the approval of the competent authority.



**DEAN (Academic Affairs)**  
(Dr Savina Bansal)

Endst. No. MRSPTU/DAA/Notifications/

Dated:

**Copy forwarded to:** (for information, necessary action, circulation and records, as applicable)

1. PSTE *cum* Chairman Board of Governors of MRSPTU Bathinda; o/o PSTE Chandigarh
2. Vice-Chancellor *cum* Chairman Academic Council of MRSPTU Bathinda
3. Registrar *cum* Member Secretary BoG of MRSPTU Bathinda
4. Dean Faculty of Engineering of MRSPTU Bathinda
5. All Deans/Directors and Controller of Examinations of MRSPTU Bathinda
6. Directors/Principals of all MRSPTU Acad Institutions (Univ Campus/Constituent/Affiliated)
7. Director ITES (for putting it up on the MRSPTU Website)

**DEAN (Academic Affairs)**



		Department for relaxation of these guidelines. It was decided that the Vice Chancellor may follow up the matter with Finance Department. It was further decided that in case the Vice Chancellor is unable to get relaxation from Finance Department by 31 Mar 2020, the compliance of Finance Department instructions dated 15.01.15 should be made and due amount should be recovered from the employees concerned.
9.9	<p><b>TO APPROVE THE PROCEEDINGS OF 1st MEETING OF UNIVERSITY RESEARCH BOARD OF THE UNIVERSITY</b></p> <p>The 1<sup>st</sup> meeting of University Research Board, Maharaja Ranjit Singh Punjab Technical University, Bathinda was held on 23.05.2019. The minutes of the meeting are placed at <b>Annexure-28 from Page No. 210 to 215</b> .</p> <p>Matter is placed before the Board of Governors for approval.</p>	Approved subject to the condition that these are in conformity with UGC Regulations /Guidelines.
9.10	<p><b>TO APPROVE THE PROCEEDINGS OF 3<sup>rd</sup> MEETING OF STANDING COMMITTEE OF ACADEMIC COUNCIL OF THE UNIVERSITY.</b></p> <p>The 3<sup>rd</sup> meeting of Standing Committee of Academic Council, Maharaja Ranjit Singh Punjab Technical University, Bathinda was held on 24.05.2019. The minutes of the meeting are placed at <b>Annexure- 29 from Page No. 216 to 236</b>. The major decisions taken in the meeting are given below:</p> <ol style="list-style-type: none"> <li>1. Academic Calender-2019,</li> <li>2. Holiday Calender-2019,</li> <li>3. Start of new University Approved AICTE and UGC Programmes in Constituent colleges of MRSPTU from session 2019-20 like MCA, M. Tech. (Electrical Engg.), PGDCA, Skill Certificate Course in Refrigeration and Air Conditioning Mechanic, Computer Hardware &amp; Networking, Computer Proficiency, Computer Maintenance &amp; Programming Assistant</li> <li>4. Start of new University Approved AICTE and UGC Programmes in University Main Campus from session 2019-20 like B. Tech. (Mechatronics), B. Sc. (Hons.) Physics, B. Sc. (Hons.) Chemistry, Bachelors in Interior Design, Integrated UG course: B. Sc. (Food Sci. &amp; Tech.) – 3 Yrs./ Bachelor of Food Sci&amp; Tech. (Hons.) – 4 Yrs.,</li> <li>5. Start of new University Approved AICTE and UGC Programmes in PSAEC, Patiala from 2019-20 like B. Tech. Aerospace Engg. (Avionics), Bachelor of Management Studies (Airline, Tourism and Hospitality)</li> <li>6. Closure of Courses in constituent colleges of MRSPTU from session 2019-20 like B. Tech. (ME/ CE/ ECE) M. Tech. (ECE/ EE), B. Sc (Non-Medical), MBA, Skill Certificate in Plumbing</li> <li>7. Approval of courses offered by university main campus/constituent colleges and eligibility criteria of the courses offered by the university from academic session 2019-20,</li> <li>8. University fellowship to promote quality research,</li> <li>9. Amendment in the Choice Based Credit System – 2016,</li> <li>10. Modification in Migration Regulations – 2016,</li> <li>11. Fee structure for various programmes at MRSPTU Main Campus, Constituent colleges and affiliated colleges of MRSPTU, Bathinda for session 2019-20,</li> <li>12. Approval for B. Tech. with Minor Engg. and B. Tech. with Honours,</li> <li>13. To Institute awards for MOOCS, SWAYAM, NPTEL achievers,</li> </ol>	Approved

MINUTES OF 1<sup>ST</sup> MRSSTU ACADEMIC COUNCIL MEETING HELD ON  
11.03.2016

ITEM NO. 01.13 TO APPROVE REMUNERATION FOR Ph.D ENTRANCE TEST  
QUESTION PAPER SETTER

DECISION: Approved.

It was decided that rate of remuneration will be Rs. 50 per question.

ITEM NO. 01.14 TO APPROVE PATTERN OF PET QUESTION PAPER,  
MAXIMUM TIME ALLOWED AND NO OF QUESTIONS

DECISION: Approved.

ITEM NO. 01.15 TO APPROVE MINIMUM ELIGIBILITY CRITERIA & PET  
SYLLABUS FOR ADMISSION TO Ph.D PROGRAMME IN A  
DISCIPLINE AS RECOMMENDED BY CHAIRPERSONS OF  
CONCERNED BOS

DECISION: Approved with the clarification that Multiple Choice Questions will be put  
in the question paper.

ITEM NO. 01.16 TO APPROVE THE COURSE WORK RECOMMENDED BY DDRC  
IN CSE FOR QIP Ph.D CANDIDATE MRS. VIDHU KIRAN OF CSE  
DEPARTMENT GZSCCET, BATHINDA

DECISION: Approved.

ITEM NO. 01.17 TO REPORT THE MINUTES OF 1<sup>ST</sup> DEANS OF FACULTIES  
MEETING HELD ON 4.11.2015

DECISION: Noted. It was clarified that admission to M.Tech. (Part-Time) will be  
discontinued in the University and its Constituent/Affiliated Colleges from  
2016-17 Academic Session.

ITEM NO. 01.18 TO APPROVE THE PROPOSED CHOICE BASED CREDIT  
SYSTEM

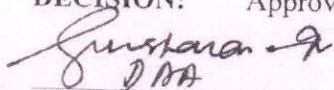
DECISION: Approved.

ITEM NO. 01.19 TO APPROVE THE PROPOSED MINIMUM ELIGIBILITY  
CRITERIA FOR 2016-17 BATCH ADMISSIONS

DECISION: Approved with following recommendations given in table as **Appendix-I**.  
Approved changes/additions have been shown in bold italics wherever  
feasible.

ITEM NO. 01.20 TO APPROVE THE PROPOSED NOMENCLATURE SYSTEM OF  
STUDENT UNIVERSITY REGISTRATION NUMBER

DECISION: Approved with changes as below,

  
J. B. A.

MAHARAJA RANJIT SINGH STATE TECHNICAL UNIVERSITY, BATHINDA

05/24

**MINUTES OF 1<sup>ST</sup> MRSSTU ACADEMIC COUNCIL MEETING HELD ON  
11.03.2016**

**STUDENT REGISTRATION NUMBER**

All the students to be admitted in Affiliated/Constituent Colleges/Main Campus of MRSSTU will be identified by a unique ID consisting of 9 numeric characters (numbers), known as MRSSTU Student Registration Number.

- 1. TWO CHARACTER CODE FOR YEAR OF ADMISSION:** 1<sup>st</sup> & 2<sup>nd</sup> numbers from left to right will signify the Year of Admission.
- 2. THREE CHARACTER PROGRAMME CODE:** 3<sup>rd</sup>, 4<sup>th</sup> & 5<sup>th</sup> numbers from left to right will represent the Programme, in which the student has been admitted. It will start from 001.
- 3. FOUR CHARACTER UNIQUE IDENTIFICATION NUMBER:** 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup> & 9<sup>th</sup> numbers from left to right will provide unique identification number to the student, specific to the Programme. It will start from 0001.
- 4. ILLUSTRATION FOR REGISTRATION NUMBER:** Suppose a student has been admitted in 2016-17 July Batch Counselling, in B.Tech. Programme in Civil Engineering 1<sup>st</sup> Semester. MRSSTU has allotted 0043 unique identification number to the student, specific to B.Tech. Programme in Civil Engineering. B.Tech. Programme in Civil Engineering has numeric Programme Code 011. The MRSSTU Registration number of the student will be

**160110043**

16	011	0043
Year of Admission	Numeric Code of B.Tech. Programme in Civil Engineering	Unique Identification Number of student Specific to B.Tech. Programme in Civil Engineering

Again, if a student has been admitted in 2016-17 July Batch Counselling, in M.Tech. Programme in Mechanical Engineering 1<sup>st</sup> Semester. MRSSTU has allotted 0012 unique identification number to the student, specific to M.Tech. Programme in Mechanical Engineering. M.Tech. Programme in Mechanical Engineering has numeric Programme Code 063. The MRSSTU Registration number of the student will be

*Suresh*  
DPA

MINUTES OF 1<sup>ST</sup> MRSSTU ACADEMIC COUNCIL MEETING HELD ON  
11.03.2016

160630012

16	063	0012
Year of Admission	Numeric Code of M.Tech. Programme in Mechanical Engineering	Unique Identification Number of student Specific to M.Tech. Programme in Mechanical Engineering

**COURSE CODES**

If a department offers only one Post Graduate, Under Graduate, Post Graduate Diploma, Diploma or Certificate Programme, then four alphabet Programme code will be followed by character 1.

For Example, if Department of Textile Engineering offers only one Under Graduate Programme - B.Tech. Textile Engineering, then its Programme code will be BTEX1. Similarly, if Department of Textile Engineering offers only one Post Graduate Programme - M.Tech. Textile Technology, then its Programme code will be MTEX1.

On the other hand, if Department of Mechanical Engineering offers two M.Tech. Programmes, then four alphabets of these Programme codes will be the same, but these will be followed by different characters. So, we will have: M.Tech. CAD/CAM Programme having code MMEE1 & M.Tech. Mechanical Engineering Programme having code MMEE2.

If a Course being offered by a Department is not specific to its own Programme then four alphabets of this Programme will be followed by 0. For example, Applied Mathematics-I Course being offered to B.Tech. Programme is not specific to Programme of Mathematics Department. So Applied Mathematics-I Course Code is BMAT0-101. Similarly, if a Course being offered by a Department of its Programme is common with Programmes of other Departments, again this character will be zero. For example, Basics of Electrical Engineering Course offered by Electrical Engineering Department is common with other B.Tech. Programmes, like Civil, Electronics, Mechanical, etc. So Basics of Electrical Engineering Course Code is BELE0-101.

*Sunshara Singh*  
DAA

**MRSPTU PROGRAMME CODES**

<b>S.No.</b>	<b>Programme</b>	<b>Numeric Code only for Registration</b>	<b>Alphanumeric Code only for Course Codes</b>
1	B. Tech. Aeronautical Engineering	001	BAEE-1
2	B. Tech. Aerospace Engineering	002	BAEE-2
3	B.Sc. (Hons.) Agriculture	003	BAGE-1
4	B. Arch.	004	BARC-1
5	M. Arch.	005	MARC-1
6	B.Sc. Biotechnology	006	BBOT-1
7	M.Sc. Biotechnology	007	MBOT-1
8	B.Sc. Medical Lab Science	008	BMLT-1
9	M.Sc. Medical Lab Science	009	MMLT-1
10	B. Tech. Chemical Engineering	010	BCHE-1
11	M.Sc. Chemistry	011	MCHM-1
12	B. Tech. Civil Engineering	012	BCIE-1
13	M. Tech. Civil Engg. (Environmental Engineering & Management)	013	MCIE-1
14	M. Tech. Civil Engg. (Geo-informatics & Surveying Technology)	014	MCIE-2
15	M. Tech. Civil Engg. (Geo-Technical Engineering)	015	MCIE-3
16	M. Tech. Civil Engg. (Infrastructural Engineering)	016	MCIE-4
17	M. Tech. Civil Engg. (Structural & Foundation Engineering)	017	MCIE-5
18	M. Tech. (Construction Technology and Management)	018	MCIE-6
19	M. Tech. Civil Engineering	019	MCIE-7
20	M. Tech. Civil Engg. (Structural Engineering)	020	MCIE-8
21	B. Com. (Hons.)	021	BCOM-1
22	M.Com.	022	MCOM-1
23	BCA	023	BCAP-1
24	MCA	024	MCAP-1
25	Post Graduate Diploma in Computer Applications	025	PCAP-1
26	B.Sc. Computer Science	026	BCAP-2
27	M.Sc. Computer Science	027	MCAP-3
28	B. Tech. Computer Science & Engineering	028	BCSE-2
29	3D Animation & Graphics	029	BCSE-3
30	M. Tech. Computer Science & Engineering	030	MCSE-2
31	M. Tech. Computer Science & Engineering (Computer Networks and Information Security)	031	MCSE-3
32	M. Tech. Computer Science & Engineering (Software Engineering)	032	MCSE-4
33	M. Tech. Computer Science & Engineering (E-Security)	033	MCSE-5
34	B. Tech. Electrical Engineering	034	BELE-1
35	M. Tech. Electrical Engineering	035	MELE-1
36	M. Tech. Electrical Engineering (Instrumentation and Control Engineering)	036	MELE-2
37	M. Tech. Electrical Engineering (Power Systems)	037	MELE-3

**MRSPTU PROGRAMME CODES**

<b>S.No.</b>	<b>Programme</b>	<b>Numeric Code only for Registration</b>	<b>Alphanumeric Code only for Course Codes</b>
38	B. Tech. Electrical & Electronics Engineering/Electronics & Electrical Engineering	038	BEEE-1
39	B. Tech. Electronics and Communications Engineering	039	BECE-1
40	M. Tech. ECE (Electronics and Communications Engineering)	040	MECE-1
41	M. Tech. ECE (Embedded Systems)	041	MECE-2
42	M. Tech. ECE (Signal Processing)	042	MECE-3
43	M. Tech. Electronics & Telecommunications Engineering	043	MECE-4
44	M. Tech. Micro Electronics	044	MECE-5
45	M. Tech. ECE (Electronics & Instrumentation Control)	045	MECE-6
46	M. Tech. Environmental Sc. & Engineering	046	MESE-1
47	M.Sc. Environmental Science	047	MESE-2
48	B.Sc. Fashion Design	048	BFTE-1
49	B.Sc. Fashion Technology	049	BFTE-2
50	M.Sc. Fashion Technology	050	MFTE-1
51	B. Tech. Food Technology	051	BFOT-1
52	Bachelor of Management Studies (Airlines, Tourism & Hospitality)	052	BHOM-1
53	Bachelor of Hotel Management & Catering Technology	053	BHOM-2
54	B.Sc. Information Technology	054	BITE-1
55	B. Tech. Information Technology	055	BITE-2
56	M.Sc. Information Technology	056	MITE-1
57	M. Tech. Information Technology	057	MITE-2
58	M. Tech. IT/IT (Information Tech.-Cyber Warfare)	058	MITE-3
59	BBA	059	BBAD-1
60	MBA	060	MBAD-1
61	M.Sc. Mathematics	061	MMAT-1
62	B. Tech. Mechanical Engineering	062	BMEE-1
63	B. Tech. Industrial Engineering	063	BMEE-2
64	B. Tech. Automobile Engineering	064	BMEE-3
65	M. Tech. CAD/CAM	065	MMEE-1
66	M. Tech. Mechanical Engineering	066	MMEE-2
67	M. Tech. Mechanical Engineering (Automation & Robotics)	067	MMEE-3
68	M. Tech. Mechanical Engineering (Computer Aided Design, Manufacture & Automation)	068	MMEE-4
69	M. Tech. Mechanical Engineering (Industrial & Production Engineering)	069	MMEE-5
70	M. Tech. Production Engineering	070	MMEE-6
71	M. Tech. Robotics and Mechatronics	071	MMEE-7
72	M. Tech. Thermal Science Engineering	072	MMEE-8
73	B. Pharm.	073	BPHA-1
74	M. Pharm. (Pharmaceutics)	074	MPHA-1
75	M. Pharm. (Pharmacology)	075	MPHA-2

**MRSPTU PROGRAMME CODES**

<b>S.No.</b>	<b>Programme</b>	<b>Numeric Code only for Registration</b>	<b>Alphanumeric Code only for Course Codes</b>
76	MBA in Pharmaceutical Management	076	MPHA-3
77	M. Pharm. (Pharmacognosy)	077	MPHA-4
78	M. Pharm. (Pharmaceutical Analysis)	078	MPHA-5
79	M. Pharm. (Quality Assurance)	079	MPHA-6
80	M. Pharm. (Pharmaceutical Chemistry)	080	MPHA-7
81	Pharm. D.	081	MPHD-1
82	Pharm. D. (Post Baccalaureate)	082	MPHD-2
83	PG Skill Certification in Hospital Administration	083	CPHA-1
84	PG Skill Certification in Pharmaceutical Analysis & Quality Control	084	CPHA-2
85	PG Skill Certification in Pharmaceutical Marketing & Entrepreneurship	085	CPHA-3
86	PG Skill Certification in Pharmacovigilance & Clinical Trials	086	CPHA-4
87	M.Sc. Physics	087	MPHY-1
88	B. Tech. Textile Engineering	088	BTEX-1
89	M. Tech. Textile Technology	089	MTEX-1
90	B. Tech. Petrochemicals and Petroleum Refinery Engineering	090	BCIE-2
91	B. Tech. Mining Engineering	091	BCIE-3
92	B. Tech. Computer and Communication Engineering	092	BCSE-4
93	B. Tech. Computer Networking	093	BCSE-5
94	B. Tech. Electronics Engineering	094	BECE-2
95	B. Tech. Marine Engineering	095	BMEE-4
96	B. Tech. Automotive Technology	096	BMEE-5
97	B. Tech. Construction Engineering and Management	097	BCIE-4
98	B. Tech. Agriculture Engineering	098	BAGE-2
99	B. Tech. Electronics & Telecommunications Engg.	099	BECE-2
100	B. Tech. Electronics & Instrumentation Engg.	100	BECE-3
101	Bachelor of Management Studies (Hotel Management & Catering Technology)	101	BHOM-3
102	Bachelor of Tourism & Travel Management	102	BHOM-4
103	B. Sc. (Hons.) Physics	103	BPHY-1
104	B. Sc. (Hons.) Chemistry	104	BCHM-1
105	B. Sc. (Hons.) Mathematics	105	BMAT-1
106	Skill Certificate Course in Welding	106	CMEE-1
107	Skill Certificate Course in Tool & Die Making	107	CMEE-2
108	Skill Certificate Course in Refrigeration & Air Conditioning	108	CMEE-3
109	Skill Certificate Course in Computer Maintenance & Programming Assistant	109	CCSE-1
110	Skill Certificate Course in Electrician	110	CELE-1
111	B. Planning	111	BARC-2
112	M. Planning	112	MARC-2
113	M.Arch. (Building Engineering & Management)	113	MARC-3
114	Skill Certificate Course in Plumbing	114	CCIE-1

**MRSPTU PROGRAMME CODES**

<b>S.No.</b>	<b>Programme</b>	<b>Numeric Code only for Registration</b>	<b>Alphanumeric Code only for Course Codes</b>
115	B. Com. (E-Commerce)	115	BCOM-2
116	BCA-MCA 5 Years Integrated Course	116	MCAP-2
117	M. Tech. Computer Science & Engineering (Artificial Intelligence)	117	MCSE-6
118	B. Tech. ECE (Medical Electronics)	118	BECE-4
119	M.Sc. Food Tech.	119	MFOT-1
120	Bachelors of Food Sci. & Tech. (Hons.)	120	BFOT-2
121	Bachelor of Management Studies (Rural Development)	121	BBAD-2
122	M.Sc. (Clinical Research)	122	MPHA-8
123	M. Tech. (Garment Manufacturing Tech.)	123	MTEX-2
124	B.Sc. Textile Design	124	BTEX-2
125	B.Sc. (Non-Medical)	125	BNME-1
126	B.Sc. (Animation and Multimedia Tech.)	126	BANM-1
127	M.Sc. (Animation and Multimedia Tech.)	127	MANM-1
128	B.Sc. Home Sci. (Hons.)	128	BHOS-1
129	B.Sc. (Agronomy)	129	BAGE-3
130	B.Sc. (Agricultural Economics)	130	BAGE-4
131	Skill Certificate in Computer Hardware and Networking	131	CECE-2
132	BBA-MBA Integrated Course	132	MBAD-2
133	Six Months Certificate Course in Computer Proficiency	133	CCAP-2
134	Six Months Certificate Course in Functional English	134	CHUM-1
135	Skill Certificate Course in Lathe Operator	135	CMEE-4
136	Skill Certificate Course in CAD/CAM	136	CMEE-5
137	Skill Certificate Course in Sewing Operator	137	CTEX-1
138	Skill Certificate Course in Medical Lab. Technology	138	CMLT-1
139	Skill Certificate Course in Servicing and Maintaining of Electronics Instruments	139	CECE-1
140	Skill Certificate Course in Farm Equipment Technician	140	CMEE-4
141	Skill Certificate in Food Processing	141	CFOT-1
142	B.Sc. (Hons.) Aircraft Maintenance Engineering	142	BAEE-3
143	B. Pharm. (Practice)	143	BPHA-2
144	M. Tech. (Computer Applications)	144	MCAP-4
145	B.Sc. Food Tech.	145	BFOT-3
146	Bachelor in Interior Design	146	BARC-3
147	B. Tech. Mechatronics	147	BMEE-6
148	M.Sc. (Mathematics & Computing)	148	MMAC-1
149	B. Tech. Aerospace Engineering (Avionics)	149	BAEE-4
150	Integrated Undergraduate Course B.Sc. (Food Science and Technology) 3 years / Bachelor of Food Sciences & Technology (Hons.) 4 years	150	
151	B. Sc. Radio Medical Imaging Technology	151	BRMI-1
152	B. Sc. Optometry	152	BOPT-1



**MRSPTU PROGRAMME CODES**

<b>S.No.</b>	<b>Programme</b>	<b>Numeric Code only for Registration</b>	<b>Alphanumeric Code only for Course Codes</b>
153	B. Sc. Operation Theater Technology	153	BOTT-1
154	MBA (Part Time)	154	MBAD-3
155	BBA Aviation Management	155	BBAD-3
156	B. Sc. (Social Science)	156	BSSC-1
157	B.Voc. Medical Image Technology	157	BVOC -1
158	PG Diploma in Pharmaceutical Mgt.	158	PPHA-1
159	PG Diploma in Hospital Administration	159	PPHA-2
160	Master of Hospital Administration	160	MPHA-9
161	M.Sc. Microbiology	161	MPHA-10
162	B.A. (Journalism & Mass Communication)	162	BART-1
163	B.Sc. Dialysis Technology	163	BPRM-1
164	B.Sc. Cardiac Care Technology	164	BPRM-2
165	B.Sc. (Hons.) Forensic Science	165	BPRM-3
166	B.Sc. Anesthesia Technology	166	BPRM-4
167	B.Sc. Respiratory Care Technology	167	BPRM-5
168	M. Sc. Medical Lab Science (Clinical Microbiology)	168	MMLT-2
169	M.Sc. Radio Medical Imaging Technology	169	MRMI-1
170	M.Sc. Anesthesia & Operation Theater Technology	170	MPRM-1
171	B. Sc. Graphics & Web Designing	171	BCAP-3
172	B.Com.-M.Com. Integrated Course	172	MCOM-2

# ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਠਿੰਡਾ।

**Subject: Details of verified MRSPTU Admissions: 2019-20 for Main Campus/Constituent Colleges and Affiliated Colleges for approval**

MRSPTU Admissions for the academic session 2019-20 were carried out as per the procedure notified vide no. DAA/MRSPTU/Notifications/62 dated 18.06.2019 keeping in view the Punjab Govt. Notifications No. 8/30/2019/4TE2/1495283/1, 8/30/2019-4TE2/1495333/1, 8/30/2019-4TE2/1495136/1, 8/30/2019-4TE2/1495315/1, 8/30/2019-4TE2/1495382/1, 8/30/2019-4TE2/1495160/1, 8/30/2019-4TE2/1495357/1, 8/30/2019-4TE2/1495398/1, 8/30/2019-4TE2/1495344/1, 8/30/2019-4TE2/1495124/1, 8/30/2019-4TE2/1495205/1 dt. 31/5/19 (enclosed at **Annexure-1**). Programs offered by University were categorized as-i) AICTE approved Courses ii) University Approved AICTE course (UA-AICTE) (iii) Non-AICTE or UGC courses and iv) skill certificate courses. The last date of admission was 15.8.2019 for Cat I/II programs and 15.9.2019 for the cat III/IV courses (enclosed at **Annexure-1(a)**).

As the last admission date for AICTE/UA-AICTE courses was 15.8.2019, a Gazetted holiday, counselling fee module was skipped on 15.08.19 in consultation with Hon'ble VC to facilitate uninterrupted admissions with e-mail intimation to all colleges. Similarly, for Non-AICTE/UGC courses, the counselling fee module was skipped on 14.09.19 & 15.09.19 with intimation to all concerned vide e-mail dated 13.09.2019. (enclosed at **Annexure-2(a) & 2(b)**).

Details of students admitted through online mode were sought upto 6.9.19 and 17.9.19 on a 25 columns sheet from the concerned colleges through mail on 29.8.2019 and 4.9.2019 for AICTE and Non-AICTE courses respectively. Further, three committees were constituted for admission verification of the online admission data sought from IKGPTU and MRSPTU Admission portal. These committees were formed and notified vide DAA/MRSPTU/2019/2757 dated 23.09.19, DAA/MRSPTU/2019/2763 dated 26.09.19, and DAA/MRSPTU/2019/2786 dated 17.10.19 coordinated by three CDEO(Academics) under the overall supervision and coordination of DR (Academics, MRSPTU). Colleges were asked to appear for original documents verification before the respective committees **Annexure-3 (a), 3(b), 3(c)** in three major rounds.

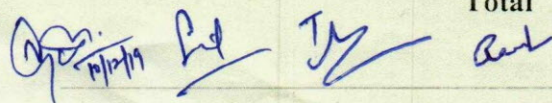
For not-confirmed admissions on the online Admission portal of MRSPTU, due to software technical issues or otherwise, the case was put up before the Hon'ble VC and approval was accorded with the directions to receive affidavits from the concerned colleges vide VC/927 dated 30.09.19 (enclosed at **Annexure-4**).

Requests were received from some of the colleges, whose students (Total = 157) could not register on Online MRSPTU admission portal due to software/technical or some other relevant grounds, but, were admitted before admission deadlines as per the affidavits submitted by the concerned colleges. Such cases were put before the Hon'ble VC and permission was granted to verify their eligibility documents vide VC/958 dated 14.10.19 (enclosed at **Annexure-5**).

The verification reports received from the duly constituted committees and the summary of the same is attached as **Annexure-6(a), 6(b), 6(c), 6(d)**.


In total 4072 admissions stand verified for AICTE/UA-AICTE/Non-AICTE/ Skill Courses under MRSPTU during 2019-20 admission as per the following detail:

(i) Total Number of AICTE/UA-AICTE admissions	=	1428
(ii) Total Number of Non-AICTE/UGC admissions	=	2498
(iii) Total Number of Skill course students	=	146
<b>Total</b>	=	<b>4072</b>



# ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਠਿੰਡਾ।

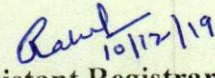
University Roll numbers stand issued to all the verified admissions by o/o DAA and communicated through e-mail to the o/o Controller of Examination, MRSPTU for further updating on concerned College portals.  
Admission details submitted for your information and approval please.

  
CDEO 1

  
CDEO 2

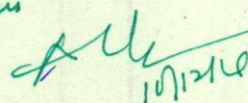
  
CDEO 3

Diary  
Receipt No. 2321  
Date ... 13/12/2019  
Dean Academic Affairs,  
MRSSTU, Bathinda

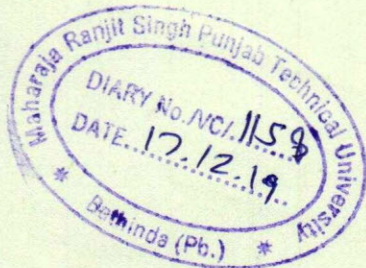
  
Assistant Registrar (Academics)

— on leave —  
Deputy Registrar (A&R)

Dean Academic Affairs

for your personal approval  
please (Admission 2019-20)  
  
10/12/19

  
VICE CHANCELLOR



# ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਠਿੰਡਾ।

**Subject: Details of verified MRSPTU Admissions: 2020-21 for University Main Campus/ Constituent/ PITs & Affiliated Colleges of MRSPTU, Bathinda for approval.**

MRSPTU Admissions for the academic session 2020-21 were carried out as per the procedure notified vide no. DAA/MRSPTU/Notifications/98 dated 07.08.2020 and DAA/MRSPTU/Notifications/99 dated 07.08.2020 keeping in view the Punjab Govt. Notifications No. Tech-TE-2013/1/2020-5TE1/I/59905/2020, Tech-TE-2013/1/2020-5TE1/I/59903/2020, Tech-TE-2013/1/2020-5TE1/I/59902/2020, Tech-TE-2013/1/2020-5TE1/I/59900/2020, Tech-TE-2013/1/2020-5TE1/I/59899/2020, Tech-TE-2013/1/2020-5TE1/I/59897/2020, Tech-TE-2013/1/2020-5TE1/I/59895/2020, Tech-TE-2013/1/2020-5TE1/I/59894/2020, Tech-TE-2013/1/2020-5TE1/I/59890/2020, Tech-TE-2013/1/2020-5TE1/I/59893/2020, dt. 05/08/2020 (enclosed **Annexure-1**). Programs offered by University were categorized as-(i) AICTE approved Courses (ii) University Approved AICTE course (UA-AICTE/PCI/CoA) (iii) Non-AICTE/ UGC and Skill courses. The last date of admission was 31.1.2021 for Cat I/II programs and 31.12.2020 for the cat III courses (enclosed at **Annexure-2**).

Further, three teams were constituted for admission verification of the online admission data sought from IKGPTU and MRSPTU Admission portal. These committees were formed and sent through email on 11.12.2020, MRSPTU/Acad/2020/62 dated 29.12.2020, DAA/MRSPTU/2021/3241 dated 12.01.2021, DAA/Acad/2021/70 dated 08.02.2021, MRSPTU/Acad/2021/74 dated 18.02.2021 coordinated by three CDEOs(Academics) under the overall supervision and coordination of DR(Academics, MRSPTU) (**Annexure-3**). Colleges were asked to appear for original documents verification before the respective committees **Annexure-4** in the above rounds.

Regarding 2<sup>nd</sup> online direct counselling of vacant Tuition Fee Waiver Seats after centralized online counselling conducted by IKGPTU, Kapurthala in First Year & Lateral Entry in various streams at University Main Campus/ Constituent/ PITs/ Affiliated colleges of MRSPTU, Bathinda for session 2020-21 was conducted as per schedule and procedure approved by competent authority vide no. VC/2219 dated 02.12.2020 (attached at **Annexure-5**).

Supernumerary seats in B. Pharmacy Tuition Fee Waiver Category was offered for session 2020-21<sup>4</sup> was approved by the competent authority vide no. VC/2063 dated 09.10.2020 and notified vide no. DAA/MRSPTU/Notifications/102 dated 13.10.2020 (attached at **Annexure-6**).

For non-uploading of merit lists/ locking of application form by various colleges of AICTE/ Non-AICTE courses for session 2020-21 requests were received from the various colleges due to one or another reason, the case was put up before the Hon'ble VC and approval was accorded with the directions to deal the other cases in the same line vide no. VC/2270 dt. 21.12.2020 and VC/82 dt. 02.02.2021 (enclosed at **Annexure-7(a),7(b)**).

Some students have pending Migration/Gap Certificate who were issued university roll numbers with approval from the competent authority vide no. VC/145 dated 05.03.2021 (**enclosed at Annexure-8**) as per the following details.

(i) Migration Certificate pending cases	=	32
(ii) Migration + Gap Certificate pending cases	=	13
(iii) Gap Certificate pending cases	=	02
<b>Total</b>	=	<b>47</b>

# ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਠਿੰਡਾ।


The verification files received from the duly constituted three teams and the summary of the same is attached as **Annexure-9(a), 9(b), 9(c), 9(d)**.

In total 3570 admissions stand verified for AICTE/UA-AICTE/UA-PCI/CoA/Non-AICTE/ Skill Courses under MRSPTU during 2020-21 admission as per the following detail:

(i) Total Number of AICTE/UA-AICTE/UA-PCI/CoA admissions	=	1583
(ii) Total Number of Non-AICTE/UGC admissions	=	1880
(iii) Total Number of Skill certificate course admissions	=	107
<b>Total</b>	=	<b>3570</b>

University Roll numbers stand issued to all the verified admissions by o/o DAA & communicated through e-mail to the o/o Controller of Examination, MRSPTU for further updating on concerned college portals.  
Admission details submitted for your information and approval please.

  
CDEO 1

  
CDEO 2

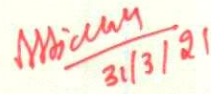
  
CDEO 3

Duty Receipt No. 3719  
Date 31/3/21  
Dean Academic Affairs,  
MRSSTU, Bathinda

AWAY ON DEPUTATION -  
Deputy Registrar (A&R)

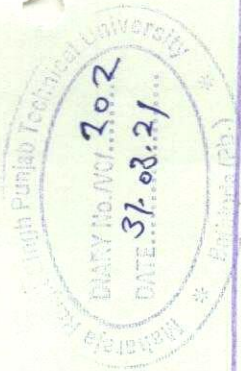
  
Dean Academic Affairs 23/3/21

~~VICE CHANCELLOR~~

  
31/3/21



CDEO



# Request for updating the curriculum of Bachelor of Management studies (Hotel Management & Catering Technology)

SVGOI Banur <directorplanning@gmail.com>  
To: "Director College Development, MRSPTU, Bathinda" <dir.cdc@mrsptu.ac.in>, DIR CDC MRSSTU <dir.cd@mrsstu.ac.in>, "Dean Academics, MRSPTU" <daa@mrsptu.ac.in>

Fri, Feb 28, 2020 at 10:25 AM

Respected Sir,

It is submitted that we are running educational institution namely Swami Vivekanand College of Management and Technology situated at village Ramnagar, near Banur, Tehsil Rajpura, District Patiala. We are offering Bachelor of Management studies (Hotel Management & Catering Technology) course-30 seats in this college. The duration of this course is three years. But in present scenario for the admission and placement point of view, graduation in four years Hotel management course is more useful than three years course. Due to this, most of the students prefer to take admission in four years Hotel Management course. IKGPTU, Jalandhar as well as Punjabi University, Patiala is also offering four years Bachelor of Hotel Management and Catering Technology (non-AICTE course). Study scheme of IKGPTU is being enclosed herewith for your kind perusal.

It is requested that, if possible, curriculum of Bachelor of Management Studies (Hotel Management & Catering Technology) may very kindly be updated and it may very kindly be converted into four years course instead of existing three years.

Regards  
Director Planning  
Swami Vivekanand Group Of Institutes  
Ramnagar, Banur  
Ph. No. 07837300373

2 attachments

HMCT.jpg  
536K

scheme.pdf  
266K

Copy  
Receipt No. .... 2698  
Date ..... 4.3.2020  
Dean Academic Affairs,  
MRSSTU, Bathinda

*As discussed with Harkh K. n'A + BTM course kindly put up the syllabi available with the Uni. as on date & colleges decision of giving the course be asked to submit the syllabus for the course to be approved. (HOD met) to + DR (A) to assist. 4/3/20*

As the syllabus of BHMCT (4 Yrs) is ready and upload on University website after approval.

University can offer this course after taking Consent from concerned BOS. But it is AICTE Course while BMS (HMCT) is Non-AICTE ~~is Non-AICTE~~ Course of 3 Yrs. It is not appropriate to change it into 4 Yrs course

Bhullor

DAA

Univ. is offering BHMCT (4 Yrs / AICTE) + non-AICTE 3 Yrs. BMS (HMCT). It is recommended to continue with the same <sup>as per 'A'</sup> till the matter is decided in Academic Council to convert

3 Yrs non-AICTE course to 4-1/2. course, as asked by the concerned college. Submitted for approval.

12/3/20

Flouide

for records + intimation to concerned.

20/5/20

Receipt No. 2755  
Date 20/5/2020  
Dean Academic Affairs,  
MRSSTU, Bahinda

DR(A)  
AC

to intimate. to concerned as per Av. & put up in them 27/5/20.

Kailash J



# SWAMI VIVEKANAND COLLEGE OF MANAGEMENT & TECHNOLOGY

(Affiliated to Maharaja Ranjit Singh Punjab Technical University, Bathinda)  
Promoted by : Shri Raghu Nath Rai Memorial Educational & Charitable Trust (Regd.)

Ref. No : RNR/SMCT/039

Date : 27/2/20

To : The Director College Development Council/Director Academics  
MRSPTU, Bathinda


Sub: Request for updating the curriculum of Bachelor of Management studies (Hotel Management & Catering Technology)

Respected Sir,

It is submitted that we are running educational institution namely Swami Vivekanand College of Management and Technology situated at village Ramnagar, near Banur, Tehsil Rajpura, District Patiala. We are offering Bachelor of Management studies (Hotel Management & Catering Technology) course-30 seats in this college. The duration of this course is three years. But in present scenario for the admission and placement point of view, graduation in four years Hotel management course is more useful than three years course. Due to this, most of the students prefer to take admission in four years Hotel Management course. IKGPTU, Jalandhar as well as Punjabi University, Patiala is also offering four years Bachelor of Hotel Management and Catering Technology (non-AICTE course). Study scheme of IKGPTU is being enclosed herewith for your kind perusal.

It is requested that, if possible, curriculum of Bachelor of Management Studies (Hotel Management & Catering Technology) may very kindly be updated and it may very kindly be converted into four years course instead of existing three years.

Thanking You,  
With Regards,

  
(With Care)  
Director Secretarial & Administration

Chandigarh-Patiala National Highway, Ram Nagar, Near Banur, Distt. Patiala-140 601  
Phone : 01762-507888, Toll Free : 1800 120 1200, Email : [info@sviet.ac.in](mailto:info@sviet.ac.in)



IAS-ANZ



ISO 9001:2008 (Regd. No. 8432/SOI)





ज्ञान-विज्ञान विमुक्तये

प्रो. रजनीश जैन  
सचिव

Prof. Rajnish Jain  
Secretary



सत्यमेव जयते

विश्वविद्यालय अनुदान आयोग  
University Grants Commission

(मानव संसाधन विकास मंत्रालय, भारत सरकार)  
(Ministry of Human Resource Development, Govt. of India)

बहादुरशाह जफर मार्ग, नई दिल्ली-110002  
Bahadur Shah Zafar Marg, New Delhi-110002

Ph : 011-23236288/23239337

Fax : 011-2323 8858

E-mail : secy.ugc@nic.in

D.O.No.F.1-1/2020(Secy)

29<sup>th</sup> April, 2020

**UGC Guidelines on Examinations and Academic Calendar in view of COVID-19 Pandemic**

Respected Madam/Sir,

In view of the Covid-19 pandemic and subsequent lockdown, the University Grants Commission constituted an Expert Committee to deliberate and make recommendations on the issues related to the Examinations and the Academic Calendar for avoiding academic loss and taking appropriate measures in the interest of students. The Expert Committee interacted with the stakeholders such as Vice-Chancellors of the universities, Principals of the colleges and academia through various electronic means such as email, phone, WhatsApp, online meetings etc. and submitted its Report to the UGC.

Based on the recommendations of the Expert Committee, the Commission has developed, "Guidelines on Examinations and Academic Calendar for the Universities in View of COVID-19 Pandemic and Subsequent Lockdown" A copy of the same is enclosed for your ready reference. The UGC Guidelines are advisory in nature, covering important dimensions related to examinations, academic calendar, admissions, online teaching-learning and provide flexibility for adoption by the universities. The universities may adopt / adapt and implement these Guidelines uniformly in a transparent manner.

In view of the location and diversity of universities and colleges, their level of preparedness, residential status of the students, status of COVID-19 pandemic spread in different regions / state and other factors, the universities, after making a comprehensive assessment of all such factors, may chart out a plan for the examinations and the academic calendar, to deal with any sort of exigency. It is reiterated that the universities should keep in view the best interests of all the stakeholders, giving highest priority to health and safety of all concerned, following the protocols for preventive measures, while adopting and implementing the Guidelines.

With kind regards,

Encl.: As Above.

To

1. The Vice Chancellors of all Universities
2. The Principals of all Colleges

Copy for kind information to:

1. The Principal Secretary/Secretary to the Governors of all States/Lt. Governors of all Union Territories.
2. The Principal Secretary/Secretary, Department of Higher Education, all State Governments/Union Territories.

Yours sincerely

(Rajnish Jain)

(Rajnish Jain)

# ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਠਿੰਡਾ।

**Sub: PG Thesis and attendance related measures during COVID-19**

In line with UGC directions vide D.O.No.F.1-1/2020(secy) dt 29.4.2020 on the subject UGC Guidelines on "Examination and Academic calendar for the Universities in view of COVID-19 Pandemic and subsequent lockdown"\*, and keeping in view the requests made by HoDs and students, if agreed, kindly-

- Extend the PG Thesis submission of various programs (MTech/MPharm/MSc etc) that was due anytime in the year 2020, upto 31.12.2020.
- Permit, to conduct PG Thesis viva through any video conferencing mode (Google meet, Skype, Microsoft technologies etc) with following conditions-
  - It will be open to be attended by the concerned research board/ Deptt faculty/ R.scholars/any other interested expert/faculty/research scholars besides supervisor and external examiner(s) ~~w~~alongwith timely links to DAA, & CoE, MRSPTU
  - Concerned Deptt HoD shall ensure recording of the same through Supervisor and shall submit a copy to the University Examination cell along with evaluation report duly signed by the expert/examiners as the case may be through the o/o DAA, MRSPTU.
- **Condone minimum 75% attendance requirement** (as per Clause 4b of CBCS-2016\*) for registered students, who have participated in online/offline lecture delievery mechanism and participated in internal evaluation process under the force majeure conditions due to ongoing COVID -19 pandemic as a one time measure not to be quoted as precedence.

\*Clause 4b) CBCS-2016: ELIGIBILITY CRITERIA TO APPEAR IN END SEMESTER UNIVERSITY EXAMINATION OF A COURSE: The student must have registered for that Course and has attended at least 75% of contact hours in that Course for becoming eligible to appear in the End Semester University Examination...

The same shall be put before the AC for ratification in next meeting held.

Submitted for approval, if agreed, and to notify the same

  
 (Dean Academic Affairs)

**Hon'ble Vice-Chancellor-Cum Chairman AC**

- Copy Enclosed

prepare notification. p/o in next ac. /A'

DREA fna. as per 'A' them 14/7/20

Kaitash J

Biopsy Receipt No. 2928  
 Date 13/7/2020  
 Dean Academic Affairs,  
 MRSSTU, Bathinda



# ਮਹਾਰਾਜਾ ਰਣਜੀਤ ਸਿੰਘ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਬਠਿੰਡਾ।

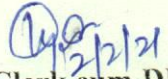
**Sub: Regarding extension of date for submission of PG Thesis upto June 30, 2021.**

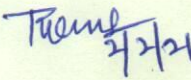
In light of UGC directions vide D.O.No.F.1-1/2020(secy) dt. 29.4.2020 last date for submission of PG Thesis of various programs (MTech/MPharm/MSc etc) was extended upto 31.12.2020 as per the approval granted vide VC/1689 dt 13.7.2020.

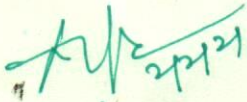
Now, as per UGC Public Notice No. F-1-10/2020(CPP-II) dated 03.12.2020 (copy enclosed), last date for submission of Dissertation/Thesis has been extended upto 30 June 2021 for the students who were supposed to submit their thesis by 31.12.2020. Accordingly, in continuation to notification issued vide no. DAA/MRSPTU/Notifications/96 dated 13.07.2020, extension for submission of PG Thesis of various programs (MTech/MPharm/MSc etc) that was due upto 31.12.2020, may be allowed to be extended upto 30.06.2021.

However, tenure of fellowship (if applicable) will remain same.

Submitted for approval please.

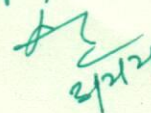
  
Clerk cum DEO

Deputy Registrar (A&R) 

  
(DAA)

VICE CHANCELLOR

  
05/02/21

for records - notifying  


DR(A)

Diary  
Receipt No. ... 3524...  
Date ... 3/2/2021...  
Dean Academic Affairs,  
MRSSTU, Bathinda





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

**Maharaja Ranjit Singh Punjab Technical University**

DABWALI ROAD, BATHINDA-151001

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

ਡੀਨ (ਅਕਾਦਮਿਕ ਮਾਮਲੇ)

DEAN (Academic Affairs)

Ref. No.: DAA/MRSPTU/Notifications/ 96


Date: 13.07.2020

**NOTIFICATION**

**Sub: PG Thesis and attendance related guidelines during COVID-19**

In line with UGC directions vide D.O.No.F.1-1/2020(secy) dt 29.4.2020 on the subject UGC Guidelines on "*Examination and Academic calendar for the Universities in view of COVID-19 Pandemic and subsequent lockdown*", and as per the approval given by Vice Chancellor vide VC/1689 dt 13.7.2020 subjected to ratification in University Academic Council;

1. PG Thesis submission time of various programs (MTech/MPharm/MSc etc) that was due anytime in the year 2020, is extended upto 31.12.2020.
2. PG Thesis viva is permitted to be conducted through any video conferencing mode (Google meet, Skype, Microsoft technologies etc) with following conditions-
  - a. It will be open to be attended by the concerned research board/ Deptt faculty/ R.scholars/any other interested expert/faculty/research scholars besides supervisor and external examiner(s) alongwith timely links to DAA, & CoE, MRSPTU
  - b. Concerned Deptt HoD shall ensure recording of the same through Supervisor and shall submit a copy to the University Examination cell along with evaluation report duly signed by the expert/examiners as the case may be through the o/o DAA, MRSPTU.
3. The minimum 75% attendance requirement (as per Clause 4b of CBCS-2016) is condoned for registered students during Jan-July 2020 session, who have participated in online (during lockdown)/offline (before lockdown) lecture delivery mechanism and participated in Internal evaluation process under the force majeure conditions due to ongoing COVID -19 pandemic. It shall be a one time measure and not to be quoted as precedence.

  
DEAN ACADEMIC AFFAIRS  
(Savina Bansal)

**Copy to:**

1. PA to Vice Chancellor, MRSPTU, Bathinda for information to the Vice Chancellor, please.
2. Registrar, MRSPTU, Bathinda
3. Director, ITES, MRSPTU, Bathinda
4. CoE, MRSPTU, Bathinda
5. All Heads of University Deptts./Directors/Principal of the GZSCCET, MRSPTU, BTL./PITs/ Af-filiated colleges of MRSPTU, Bathinda



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

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

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

ਡੀਨ (ਅਕਾਦਮਿਕ ਮਾਮਲੇ)

DEAN (Academic Affairs)

Ref. No.: DAA/MRSPTU/Notifications/ 109

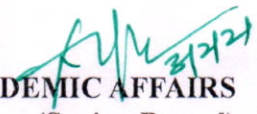
Date: 03.02.2021

**NOTIFICATION**

**Sub: Extension of date for submission of PG Thesis upto June 30, 2021**

In light of UGC Public Notice No. F-1-10/2020(CPP-II) dated 03.12.2020 and in continuation to earlier notification no. DAA/MRSPTU/Notifications/96 dated 13.07.2020, last date for submission of Dissertation/Thesis for various programs (MTech/MPharm/MSc etc) has been further extended upto 30.06.2021. However, tenure of fellowship (if applicable) will remain same.

This has the approval of the competent authority vide no. VC/84 dated 03.02.2021.

  
DEAN ACADEMIC AFFAIRS  
(Savina Bansal)

**Copy to:**

1. PA to Vice Chancellor, MRSPTU, Bathinda for information to the Vice Chancellor, please.
2. Registrar, MRSPTU, Bathinda
3. Director, ITES, MRSPTU, Bathinda
4. CoE, MRSPTU, Bathinda
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