भारतीय प्रौद्योगिकी संस्थान रूड़की
रूड़की – 247 667 (भारत)
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ROORKEE - 247 667 (INDIA)

सीनेट की एकसौएकवीं बैठक हेतु कार्यसूची
AGENDA FOR THE 101st MEETING
OF THE SENATE

बैठक सं0	:	एकसौएकवीं
MEETING NO.	**:**	**101st**
स्थान	:	सीनेट हॉल, भा0प्रौ0सं0रूड़की
VENUE	**:**	**Senate Hall, IIT Roorkee**
दिनांक	:	29 मई 2024
DATE	**:**	**29th May 2024**
समय	:	04.00 बजे अपरान्ह
TIME	**:**	**04.00 P.M.**

भारतीय प्रौद्योगिकी संस्थान रूड़की
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कार्यसूची / AGENDA

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अन्य मुददे अध्यक्ष की अनुमति से/Under any other item with the permission of the Chair.		
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101.17	अध्यक्ष, सीनेट द्वारा दी गई मंजूरी की रिपोर्ट करना। To report the approval accorded by the Chairman, Senate.	320

Item No. 101.1: To confirm the minutes of the 100th Senate meeting held on 06.03.2024.

The minutes of the 100th Senate meetings held on 06.03.2024 were circulated to the members vide e-mail dated 30.03.2024. No comments have been received.

The Senate is requested to consider and confirm the said minutes.

Item No. 101.2: To report on the actions taken to implement the decisions of the Senate taken in its 100th meeting held on 06.03.2024.

Item No.	Reference to the Senate minutes	Extracts of the Minutes	Status of action taken
100.3	To Consider the request of Mr. Suman Narayan, (Enr. No. 20535028), Ex-Ph.D. (CS) student for allowing him to complete M.Tech. degree.	The Senate approved the name restoration of Mr. Suman Narayan from the spring semester 2023-24 and allowed the candidate to work and submit the M.Tech. thesis for consideration of award of M.Tech. degree on the lines of recommendation of IAPC as a special case.	Notified
100.4	To consider the Seat Matrix for admission in the Ph.D. programme in Autumn Semester 2024-2025.	The Senate approved the Seat Matrix as recommended by the IRC. Further, the Senate advised to take necessary efforts to reduce the gap between intake and seat filled in Ph.D. programmes. The year-wise status of registered Ph.D. students was presented. The Senate took a serious note on the delay of completion of Ph.D. work specifically in the cases beyond the 5th year. The Chairman suggested that while admitting the students for Ph.D. programme: i. The core strength of the candidates on three points viz aptitude towards research, capacity to work hard, innovative and adaptability be suitably assessed. ii. There should be bonding between a research scholar and supervisor(s). The mentor mentee relationship is important to ensure the timely completion of work. iii. The mentor-mentee culture is also important among the experienced and young faculty members.	Incorporated in the Admission guidelines.

<table>
<tr><td>100.5</td><td>To consider the change(s) in Minimum Educational Qualification for admission to M.Tech. programmes received from various Departments/ Centres/School.</td><td>The Senate approved the Minimum Educational Qualification (MEQ) for admission to the M.Tech. programmes as recommended by the IAPC</td><td>Notified</td></tr>
<tr><td>100.6</td><td>To consider the eligible GATE disciplines and seat matrix for admission into the M.Tech. programmes through GATE 2024 for the AY 2024-2025.</td><td>The Senate approved the recommendations of IAPC on seat matrix with corresponding GATE disciplines for admission into the M. Tech. programmes for the academic year 2024-2025</td><td>Notified</td></tr>
<tr><td>100.7</td><td>To consider the proposal to introduce a new P.G. Programme by the Department of Metallurgical and Materials Engineering.</td><td>The Senate approved the following new M.Tech. programme along with its course structure.
<table>
<tr><th>Department/ (Code)</th><th>Programmes</th><th>MEQ</th><th>GATE Disciplines</th><th>Seats</th></tr>
<tr><td>Metallurgical & Materials Engg (MTD)</td><td>M.Tech. - Computational Materials Engineering</td><td>B.Tech. Degree in Metallurgy/ Materials/ Mechanical/ Production / Mining/ Computer Science/ Chemical/ Biotechnology/ Ceramics/ Polymer/ Textile/ Aerospace Engg. or equivalent in relevant discipline. M.Sc. degree in Physics/ Chemistry/ Materials Science/ Environmental/ Nanotechnology or equivalent</td><td>MT/AE/BT/ CH/CS/CY/ DA/ES/ ME /MN/PH/PI/ TF/XE</td><td>15</td></tr>
</table></td><td>Notified</td></tr>
</table>

100.8	To consider the proposal of the Department of Design to offer Two-Degrees (M.Des. and Ph.D.) to the students who register for Ph.D. in the Department of Design subject to fulfillment of few criteria.	The Senate approved the proposal to offer Two-Degrees (M.Des. and Ph.D.) to the students who register for Ph.D. in the Department of Design subjected to fulfilment of the notified criteria dated 16.03.2023 aligned to M.Des.	Notified
100.9	To consider the structures for the masters programmes offered by various Departments/Centres /School as per the new PG curriculum to be implemented w.e.f. the AY 2024-2025.	The Senate considered the item and approved the presented structures for the master's programmes. The Senate further suggested the following: i. Each Programme should offer more courses, preferably with L-T-P:2-0-2 loading, in each semester. ii. Departments/Centers/School should utilize the opportunity provided by the new curriculum structure to develop the new courses and new programmes in futuristic and socially/industrially relevant areas. iii. The Department/Centers/School should ensure that the programme structure offers a multidisciplinary approach and provides flexibility to the learners. iv. It can be deliberated in future to reduce the credits for the thesis component and thereby the total credits can be considered to bring into the range of 60-62. v. If desired, a department may be provided with a provision to shift one PEC from the second semester to the first semester so long as the total assigned credits to each component (PEC, PCC, SSC, STAR, ISA, etc.) in the approved PG structure for that model remains the same. Such cases, if any, however, shall be required to be moved through IAPC for approval.	Notified

		vi. Considering that the process for admission to the masters programmes for the AY 2024-2025 have already been started, all departments/centers/ school are advised to submit their programme structure(s) for approval, if not submitted already, by the end of March 2024.	
100.12	To consider the 2nd mercy appeal of Mr. Anmol Raj (Enr. No. 21113019), B.Tech. (CE), III Yr. regarding name restoration and continuation of program.	The Senate accepted the mercy appeal of Mr. Anmol Raj (Enr. No.21113019) for name restoration.	Notified
Item No.100.10 is ratification item and 100.11 is reporting item.			

Item No.101.3: To consider a proposal for the candidates who have obtained B.Tech. or M.Sc. degree with a CGPA of 8.0 and above from any of the Ministry of Education notified CFTIs, without GATE/NET, etc. requirement for the admissions to the PhD Programme at IIT Roorkee.

The IRC, in its 69th meeting, held on 24th April 2024 vide its agenda item no. 69.2.7, after detailed deliberation, recommended that requirement of qualifying any national level exam such as GATE/NET to be waived off for the candidates of B.Tech. degree with a CGPA of 8.0 and above or M.Sc. with a CGPA 8.0 and above obtained from all the CFTIs of the Ministry of Education for admissions to the PhD Programme at IIT Roorkee.

Similar provisions exist in other IITs as well and are given below-

- **IIT Madras**: B.Tech. or BS (Research) 4-year degree holder of CFTI with a minimum CGPA of 8.0 on a 10.0-point scale. **(Appendix-A).**

- **IIT Delhi**: The requirement of qualification in GATE / National Exam is waived for the following categories of applicants: Currently registered students in CFTIs pursuing B.Tech./B.E./Integrated M. Tech/ Integrated M.Sc. Programmes (or any other programme of minimum four-year duration) and Graduates of CFTIs with a final graduation CGPA of more than 8.00 (80% aggregate marks, if marks are the primary mode of evaluation). **(Appendix-B)**

The above is submitted for the consideration and approval of the Senate.

Ph.D in Management:

a) Master's degree or 2 year PG Diploma in a relevant discipline, and a Bachelor's degree with a good academic record (minimum five years of undergraduate and postgraduate education) OR Five year integrated master's degree / dual degree or equivalent in a relevant discipline with a good academic record AND

Qualifying in national level examinations such as GATE/CAT/UGC-JRF/NET/CSIR-JRF or equivalent OR

International level post graduate admission examination such as GMAT/GRE (Non-HTRA) applicable to OCI/NRI/Foreign Nationals.

b) Master's degree in Engineering / Technology with a good academic record or a Master's degree by Research in Engineering / Technology in a relevant discipline.

c) Candidates with MBA or 2 year PG diploma from Centrally Funded Technical Institute (CFTI) with CGPA of 8 and above are exempted from qualifying in National level examinations.

5.1.2 Candidates who have qualified for the award of Bachelor's degree in Engineering/Technology/ Bachelor of Science (Research) of 4 year duration with exceptionally good academic record in an eligible discipline will be considered for **Direct Ph.D. Programme** in various Engineering/Sciences/Humanities & Social Sciences/Management stream as a Regular scholar subject to fulfilling any one of following criteria:

- a B.Tech. degree holder of Centrally Funded Technical Institute with a minimum CGPA of 8.0 on a 10.0 point scale or with a valid GATE score.
- a BS (Research) 4 year degree holder of Centrally Funded Technical Institute with a minimum CGPA of 8.0 on a 10.0 point scale or with a valid GATE score.
- a Bachelor's degree holder in Engineering/Technology with a minimum CGPA of 8.0 on a 10.0 point scale or equivalent from any other University and having a valid GATE score.
- a Bachelor's degree holder in Engineering/Technology with a minimum CGPA of 8.0 on a 10.0 point scale or equivalent from any other University and working in a reputed R & D organization & having a proven research record (External Category).
- a MBBS/BDS degree holder with minimum first class and valid NEET PG qualifying score will be eligible to apply for direct Ph.D. programme under HTRA category in Engineering Design department. If the candidate meets the above degree requirement but doesn't possess valid NEET PG qualifying score then they can apply under NHTRA category (Part-time / External / Project) to the same department.
- Candidates possessing M.Sc (Maths) or M.Sc. (Computer Science) from CFTI or a highly recognized institute such as Indian Statistical Institute and Chennai Mathematical Institute with the minimum CGPA of 8.0 on 10.0 scale and valid GATE (Maths) or GATE (CS) score can apply under HTRA category in Computer Science & Engineering department.
- ***Candidates with B.E/B.Tech/B.S (4 year) admitted directly to Ph.D. programme will be joining a two-degree (M.S+Ph.D) programme in Engineering/Management stream except Sciences/Humanities & Social Sciences stream.***

Minimum Qualifications for admission to Full-time PhD Programmes

Table 1 defines the minimum qualifications required for admission to full-time Ph. D. programmes at IIT Delhi. Please note:

- These are Institute minimum requirements and any Department/Centre/School operating through their DRC/CRC/SRC can specify higher short-listing criteria than what is specified here.
- This table includes most of the degrees, but each DRC/CRC/SRC is free to specify the qualifications and disciplines acceptable for admission to their programmes.

  Candidates in the final year of their programmes and who expect to complete all their qualifying degree requirements before the date of registration are also eligible to apply for admissions. For short-listing purposes, their performance until the preceding semester (preceding year if their programmes are year based) would be considered but their admission would be provisional, subject to their meeting the minimum eligibility criteria after their final qualifying examination results are announced. In any case, all admissions are provisional at first and it is confirmed only after all certificates and previous records are duly checked and verified, a process which may take a few weeks into the starting semester.

Table 1: Minimum Qualification for Admission to full-time PhD Programmes

Qualifying Degree	Minimum performance in qualifying degree for General/OBC (Non-Creamy Layer) category students	Qualification through national level examination requirements
M.Tech./M.E./M.D. or equivalent	60% marks or 6.00 CGPA on a 10-point scale	Nil
M.Sc./MBA/M.A./M.B.B.S. or equivalent	60% marks or 6.00 CGPA on a 10-point scale	Qualified GATE/ CSIR/ UGC/NET/ICAR/ICMR/ DST-INSPIRE Fellowship
B.E./B.Tech. or equivalent	70% marks or 7.00 CGPA on a 10-point scale	Qualified GATE/CSIR/ UGC NET/ICAR/DST-INSPIRE Fellowship

Exemptions, relaxations and clarifications:

1. For **SC/ST/PwD category candidates**, the minimum performance in the qualifying degree (S. No. 1 & 2 in Table 1) is relaxed from 60% to 55% (CGPA relaxed from 6.00 to 5.50).
2. For **SC/ST/PwD category candidates**, the minimum performance in the qualifying degree (Sr. No.3 in Table 1) is relaxed from 70% to 65% (CGPA relaxed from 7.00 to 6.50).
3. Qualifying degree performance is computed by **aggregating performance over all the semesters/years** of the qualifying degree, as per the credit or weightage system approved in the institution/ board where the degree has been completed.
4. Requirement of qualification in GATE / National Exam is waived for the following categories of applicants:

- Currently registered students in Centrally Funded Technical Institutes (CFTIs) pursuing B.Tech./B.E./ Integrated M. Tech/ Integrated M.Sc. Programmes (or any other programme of minimum four year duration, admission to which is on the basis of JEE), who have completed 6 semesters or more, and have CGPA of 8.00 or above (on a 10 point scale). Such students must obtain a CGPA of 8.00 or above at the time of graduation, and before they formally register for the Ph.D. programme (80% aggregate marks, if marks are the primary mode of evaluation);

- Graduates of CFTIs (in the programmes marked under (i)) with a final graduation CGPA of more than 8.00 (80% aggregate marks, if marks are the primary mode of evaluation);

- M.A or M.Sc. graduates from IITs with CGPA 8.00 or above.

- For purposes of shortlisting, the primary method of evaluation (i.e., CGPA/CPI, or aggregate percentage, whichever is appropriate) followed by the institution where candidate has obtained his/her qualifying degree will be used by IIT Delhi for determining whether the candidate meets the final shortlisting requirements.

- For assistantship purposes only (and not for qualification), candidates with M.B.B.S. qualification will be considered equivalent to M. Tech., for admission to Ph.D. programme in Centre for Biomedical Engineering;

- For candidates with M.A. degree in English, a 5% relaxation in marks or 0.5 relaxation in CGPA may be permitted for admission to the Ph.D. programme in Humanities and Social Sciences;

- Candidates holding an MBA degree are eligible for applying to the Ph.D. programme in the Department of Management Studies.

Item No.101.4: To consider the modification in the Minimum Educational Qualification (MEQ) for admission to Ph.D. programme in Institute Instrumentation Centre.

The IRC in its 69th meeting held on 24th April 2024 vide its agenda item no. 69.2.5 considered the request of CRC of IIC and recommended modification in the MEQ as follows:

Existing MEQ	**Proposed MEQ**
(i) M.Sc./M.Tech. in Physics, Applied Physics, Material Science, Chemistry, Electronics & Nanotechnology with NET/GATE	(i) M.Sc./M.Tech. in Physics, Applied Physics, Material Science, Chemistry, Electronics & Nanotechnology with NET/GATE. (ii) M.Sc. in Biological Sciences, Life sciences or related with NET/GATE. (iii) B.Tech / M.Tech (CS, Biotechnology) with NET/GATE

The above is submitted for the consideration and approval of the Senate.

Item No.101.5: To consider the proposed attendance policy for the students.

Student attendance is crucial in an academic institute as it contributes to a positive learning environment, promotes academic success, and maximizes learning opportunities.

The present rules with respect to attendance are placed at **Appendix-A.**

The need has been felt to review the present rules. The IAPC, in its 141st meeting, held on 08.05.2024, deliberated on several proposals for attendance and recommended the following:

1. There is no mandate for a minimum attendance percentage for passing a course.
2. The course coordinator can assign up to 10% of marks in the semester for attendance.
3. The course coordinator needs to announce decision on point 02 above at the beginning of the semester.

The above is submitted for the consideration and approval of the Senate.

			paper report/ note/ communication has been published in a Research Journal widely circulated magazine/ proceedings of conferences/ seminar or a monograph or a book, and or any electronic device shall be recommended by the appropriate committees of the department/institute Standing Committee, as the case may be. The imposition of any such penalty shall be at the discretion of the Director, who, after considering the full facts and the report on the matter (i) may impose the same penalty, (ii) may reduce the penalty, or (iii) may enhance the penalty as recommended by the committee.
Attendance, Absence, Leave and Withdrawals	**28**	(1)	All the students of UG/IDD/IMD programme are expected to be present in every lecture, tutorial, practical or drawing class scheduled for them.
		(2)	The students of UG/ IDD/ IMD must have a minimum attendance of 60% and 75% of the total number of classes including lectures, tutorials and practicals, held in subject in order to be eligible to appear at the mid-term examination (MTE) and end term examination (ETE) respectively, for that subject.
		(3)	A student should meet the above attendance requirement irrespective of the number of days, he/ she is on medical and/ or other leave for any reason whatsoever.
		(4)	Attendance of the students shall be monitored and displayed during a semester as per the guidelines approved by the Academic Board. The guidelines for monitoring the attendance of the students are given in Appendix-H.
		(5)	The names of the students who have remained absent with or without leave, for more than 25% of the actual classes held in a course as specified in section 28(2) will be intimated by the Course Coordinator on the last teaching day, to the Chairman, Department / Academic Committee, who will consolidate the list for all such students for all the courses of a given yearly level of a programme and display it on the notice board of the Department/ Academic Section/ Centre. The list of such students shall also be forwarded to the Dean, Academics. These students shall not be allowed to appear in the end term examination of that course and shall be awarded the grade '**FS**' irrespective of their performance in Class Work Sessional (CWS)/ Mid Term Examination (MTE), etc.
		(6)	If more than 50% students of a class are absent, it will be considered Mass Abstention and suitable disciplinary action will be taken against them. The guidelines for deduction of marks for Mass Abstention are given in Appendix-I.
Second Examination on Medical/ Extra Ordinary Grounds	**29**	(1)	A student, who fails to appear in the Mid Term Examination due to sudden illness or mishap/ accident and is supported by Medical Certificate of the Institute Medical Superintendent or in his/her absence by the Medical Officer of the Institute, may be allowed to take another examination with the permission of Dean, Academics.

Item No.101.6: To consider the Joint proposal of Department of Physics and Department of Electronics and Communication Engineering to establish a new Centre i.e. Centre for Semiconductor Technology.

The Department of Physics and the Department of Electronics and Communication Engineering have submitted a joint proposal for establishing the Centre for Semiconductor Technology at IIT Roorkee. A presentation on the proposal is placed at **Appendix-A.**

The IAPC, in its 139th meeting, held on 10.04.2024, recommended the proposal.

The above is submitted for the consideration and approval of the Senate.

Proposal for Establishing Centre of Excellence in Semiconductor Design & Manufacturing at IIT Roorkee

Department of Electronics & Communication Engineering
I.I.T Roorkee

Department of Physics
I.I.T Roorkee

Key Points in Objective of India Semiconductor Mission

1. **Enable cutting-edge research in semiconductors and display industry** including evolutionary and revolutionary technologies **through grants, global collaborations and other mechanisms in academia/research institutions**, industry, and through establishing Centres of Excellence (CoEs).

2. Enable **collaborations and partnership programs** with national and international agencies, industries and **institutions** for catalyzing collaborative research, commercialization, **and skill development**.

3. Promote and facilitate indigenous **IP generation.**

Key Points of Directives from Ministry of Education

1. Letter Dated June 2021 from MoE **(Sent to all Directors of all I.I.Ts) with Subject:**

Hosting a Centre for Semiconductor with one or more Taiwan Universities as a partner organization to offer a degree Program.

The above Letter is issued after the letter received from the Ministry of External Affairs, dated April 13, 2021, attaching **OM recommending Indian technical institute of standing (preferably IIT or NIT) be selected to quickly host a Centre for semiconductor with one or more Taiwan universities as partner organization to offer degree programme.**

Current Scenario at I.I.T Roorkee

1. A joint M.Tech,. Program in Semiconductor Technology jointly/dual Degree with Three Taiwan University:

National Tsing Hua University (NTHU)
National Yang Ming Chiao Tung University (NYCU) National Taiwan Normal University

Run Jointly by the Department of ECE & Physics (by Joint Coordination Committee)

Sanctioned Strength: 15

Proposal of CoE in Semiconductor Design & Manufacturing

- To take up Joint Masters Degree Program. (Skill Development)
- Research with highly reputed national and international universities as collaborators and stakeholders.
- Research with industry partners as advisors and stakeholders.
- **Creation of IPs** with industry as well as national labs.
- Facilitating the **development of indigenous semiconductor** manufacturing capabilities.
- **Skill Development:** Train and cultivate a highly skilled workforce in semiconductor technology.

-18-

Similar Centres that are already established in other I.I.Ts

- I.I.T Bombay Center for Semiconductor Technologies, SemiX established in 2022.
- Silicon Photonics Research Centre of Excellence in IIT-Madras 2023

Item No.101.7: To consider the mechanism of credit transfer from Taiwanese Universities to IIT Roorkee for the students enrolled under Joint/Dual Master's Degree in Semiconductor Technology program.

The Senate, in its 94th meeting, held on 22.02.2023 and 96th meeting held on 07.06.2023 approved the Joint/Dual M.Tech. programme in 'Semiconductor Technology' in collaboration with three universities {(National Yang Ming Chiao Tung University (NYCU), National Tsing Hua University (NTHU) and National Taiwan Normal University (NTNU)} from Taiwan. The IR office in its meeting held on Feb 01, 2024 discussed the mechanism of credit transfer from Taiwanese Universities to IIT Roorkee for the students enrolled under Joint/Dual Master's Degree in Semiconductor Technology program and recommended the following: **(Appendix-A)**

1. The teaching hours should be translated to credits when courses are taken in universities in Taiwan (the hours of teaching per credit differ in India & Taiwan), as was decided earlier. Accordingly, for credit courses with 04 credits, 56 hours of classroom course is conducted by IIT Roorkee. In Taiwanese Universities 54 hours of classroom course is conducted as they have 18 study hours per credit and each course is of 3 credits. **Therein 3 (three) Credit course of Taiwanese Universities will be transferred as 4 (four) credit course at IIT Roorkee.**

2. Taiwanese universities offer "Seminar course" without any credit. However, IIT Roorkee has "Seminar course" with 2 (two) credits. **Therein students will be awarded 2 (two) credits for the seminar course taken during their two semesters at Taiwanese universities.**

3. Students visiting Taiwanese Universities under the Joint/Dual Master's Degree Program will get approval from their Thesis supervisor & Chairperson, DAPC (Template attached) regarding course selection at Taiwanese Universities.

The IAPC in its 141st meeting held on 08.05.2024, recommended the proposal.

The above is submitted for the consideration and approval of the Senate.

अंतरराष्ट्रीय सम्बन्ध कार्यालय
International Relations Office
भारतीय प्रौद्योगिकी संस्थान रुड़की
Indian Institute of Technology Roorkee
Phone: (01332)-(28) 4871; email: office.ir@iitr.ac.in

डीन (आई० आर०)/ ..... दिनाँक: **Feb 08, 2024**

DAA

IR Office called a meeting recently to discuss mechanism of credit transfer from Taiwanese Universities to IIT Roorkee for the students enrolled under "Joint/Dual Master's Degree in Semiconductor Technology Program" on Feb 01, 2024

During the meeting important following important points were discussed & agreed:
Earlier it was decided that the teaching hours should be translated to credits when courses are taken in universities in Taiwan (the hours of teaching per credit is different in India & Taiwan)

IIT Roorkee has **4 credit course with 56 hours of classroom Course, whereas** Taiwanese Universities have 18 study hour per credit, where **3 credit course means 54 hours of classroom Course.**

It was proposed and agreed that for Credit Transfer from Taiwanese Universities, under the Joint/Dual Masters Degree Agreements, the **Taiwanese Universities 3 (three) Credit course will be transferred as 4 (four) credit course at IIT Roorkee.**

Also Taiwanese Universities have "Seminar Course" without any credit, however IIT Roorkee has "Seminar" as 2 (two) credit course. The students will get 2 (two) credits for the seminar course taken during their two semesters stay at Taiwanese universities.

It was agreed that Students visiting Taiwanese Universities under Joint/Dual Masters Degree Program will get approval from their Master's Dissertation supervisor & DAPC (Template attached) regarding course selection at Taiwanese Universities, during their academic visit.

For the meeting following members participated:

8/02/24
(Prof V. C. Srivastava)
Dean (International Relations)

Please find the following supporting documents

- MoM of Meeting Held on Feb 1 at IR Office– 'F/A'
- Course Approval Form for the students -- 'F/B'

ADoAA (C)
Kindly examine and get it moved in NS.
12/02

Meeting at IR Office regarding Credit Transfer during Joint Master's Degree Program with Taiwanese University (Feb 01, 2024)

IR Office requested faculty members & Joint/Dual Master's Degree in Semiconductor Technology Program coordinators from Department of ECE and Department of Physics to discuss and deliberate on the Joint Master's Degree Program (JMDP) modalities of "Credit Transfer" from and to Taiwanese universities. The meeting was arranged at IR Office on Feb 01, 2024

During the meeting important following important points were discussed & agreed:

- Details of MoM held on Dec 10, 2021 was shared, where it was decided that:
  - The teaching hours should be translated to credits when courses are taken in universities in Taiwan (the hours of teaching per credit is different in India & Taiwan)
  - Semester wise courses available at partner universities will be matched and assessed to avoid the repetition.

It was discussed & agreed that –

- IIT Roorkee has 14 weeks of Study Period per semester, & One Credit is equivalent to 1 study hour per week for 14 weeks (14 hours). Hence **4 credit course means 56 hours of classroom Course at IIT Roorkee**.
- Taiwanese Universities have 18 study hour per credit, Hence **3 credit course means 54 hours of classroom Course at Taiwanese Universities**.
- It was proposed that for Credit Transfer from Taiwanese Universities, under the Joint/Dual Masters Degree Agreements, the ***Taiwanese Universities 3 (three) Credit course will be transferred as 4 (four) credit course at IIT Roorkee.***
- Taiwanese Universities have "Seminar Course" without any credit, however IIT Roorkee has "Seminar" as 2 (two) credit course. The students will get 2 (two) credits for the seminar course taken during their two semesters stay at Taiwanese universities.
- It was agreed that Students visiting Taiwanese Universities under Joint/Dual Masters Degree Program will get approval from their Master's Dissertation supervisor & DAPC (Template attached) regarding course selection at Taiwanese Universities, during their academic visit.

For the meeting following members participated:

Affiliation	Name	Signature
Dept of ECE	Prof Sanjeev Manhas	1/2/24
Dept of Physics	Prof Vivek Malik	
Associate Dean Academic Affairs	Prof Naveen K Navani	
Dean (International Relations)	Prof V. C. Srivastava	01/02/24

Course approval form for Joint/Dual Master's Degree Program

☐ NTHU ☐ NYCU ☐ NTNU

1. Name (As in Passport)	First Name	Last Name
2. Enrollment number/ Year		☐ Male ☐ Female
3. Email		
4. Mobile		
5. Department		
6. Degree		
7. Year		

Supervisor @ IIT Roorkee	Supervisor @ ☐ NTHU ☐ NYCU ☐ NTNU

8. List of courses for the Second Semester at Partner University *

S. No.	Title	Eq. Credits

* To be selected from the course basket

The above courses chosen are admissible and this application is duly recommended

Signature of Chairman DAPC	Signature of Supervisor	Signature of the HoD
PH		PH
ECE		ECE

I declare that the information provided by me in connection with this application is true and complete

Date: _____ Signature of the student: _____

Item No.101.8: To consider the proposal of the Departments/ Centres/ School to reduce minimum requirements of pre-Ph.D. course work for Ph.D. students.

Centre for Photonics and Quantum Communication Technology and Centre for Space Science and Technology (CSST) have proposed 12+2 credit requirements for Pre-Ph.D. courses instead of 24+2 credits. They are of the opinion that if they follow credit requirements 24+2 for Pre-Ph.D. course requirements, then it will be tough to get the new Ph.D. Students.

The IRC in its 69th meeting held on 24th April, 2024 vide item no. 69.2.6 after detailed deliberation, the IRC noted the following:

As per point no.3 of table 1 of Ph.D. Rule R.3.3 **(Appendix -A**), following are the candidacy requirements.

Point No.	Qualification	Credit Requirements	Remarks
3	B.Tech. or equivalent, or M.Sc. or equivalent admitted to any one of the engineering departments/ centres	Minimum 24 credits of P.G. level theory courses	All candidates need to register 02 additional credits for seminar

In order to maintain the uniformity for completing the pre-Ph.D. course work across all the Departments/Centers /School, the IRC recommended to modify the point no. 3 of table 1 of Ph.D. Rule R.3.3 as follows:

Point No.	Qualification	Credit Requirements	Remarks
3	B.Tech. or equivalent admitted to any one of the engineering departments/ centres	Minimum 24+2 credits of P.G. level theory courses	All candidates need to register 02 additional credits for seminar
	M.Sc. or equivalent admitted to any one of the engineering departments/ centres	20 credits of P.G. level theory courses **as per decision of the concerned SRC on case to case basis.**	

The above is submitted for the consideration and approval of the Senate.

9 P.G. level credits earned during those programmes (other than project, dissertation and labs) towards fulfilment of his/her course requirement for the Ph.D. programme on the recommendation of the SRC and approval of the DoAA, provided these credits were in excess of the minimum requirement for earning the said degree.

b. Full exemption from course credits is admissible for candidates who have completed M.Tech./M.Arch./MURP/M.Sc./MBA from IITs, IISc, IISERs, or IIMs with CGPA 8.50 or more on a 10 point scale and are admitted in the relevant stream or discipline.

R.3.2.3 Admitted with Extensive Professional Experience

The credit requirements as recommended by the SRC can be completed in the form of Project for Professionals (08 credits)/ Thesis for Professionals (16 credits) and NPTEL PG courses/Self-study PG courses, along with a course seminar. The project/ thesis credits can be completed across the semesters, within the stipulated period of candidacy **(Item No. 81.13, 81st Senate dt: 08.01.2020)**. There is no minimum residency requirement for such candidates.

R.3.3 Course Credit Requirements

Minimum course credit requirements are given in Table 1 below:

Table 1: Minimum Course credit requirements for candidacy to Ph.D. programme

S. No	Qualification	Credit Requirements	Remarks
1.	M. Tech., M. Arch./MURP, or equivalent	Minimum 9 credits of P.G. level theory courses	a. All candidates need to register 02 additional credits for Seminar. b. Candidates can take at most one self-study theory course/ NPTEL course of P.G. level as approved by DAPC.
2.	M.Sc/M.A./M.B.A. or equivalent, admitted to Science/ HSS/ Management department	Minimum 12 credits of P.G. level theory courses	
3.	B.Tech. or equivalent, or M.Sc. or equivalent, admitted to any one of the engineering departments/ centres	Minimum 24 credits of P.G. level theory courses	

(By Chairman Senate, on the recommendations of 42nd IRC dated 07.11.2020)

R.4 Candidacy for Ph.D.

Once a candidate completes the required course and seminar credits with a CGPA of at least 7.00, s/he shall be admitted to candidacy for Ph.D. after she/he clears a comprehensive examination and her/his research proposal is accepted by the SRC. The comprehensive examination is designed to test the comprehension of student in the broad subject area of research. The syllabus for comprehensive examination shall be defined by the SRC.

फोटोनिक्स एवं क्वांटम संचार प्रौद्योगिकी केंद्र
Centre for Photonics and Quantum Communication Technology
भारतीय प्रौद्योगिकी संस्थान, रुड़की
Indian Institute of Technology, Roorkee
रुड़की / Roorkee - 247667 (उत्तराखंड / Uttarakhand)
Tel: 01332 – 285333 Email: office@cpqct.iitr.ac.in

No.: CPQCT/Minutes of Meeting/2024/22 Dated: 19.02.2024

A discussion took place among all the CPQCT faculty members through emails (7-8 Feb 2024) about the minimum requirements of coursework for Ph.D. students who are from a science background.

All the faculty members unanimously agreed to the 12+2 requirements for the coursework. All the members also agreed that if we follow the 24+2 requirements, then it will be tough to get the new Ph.D. students in the center. All the members have suggested reducing the coursework from 24+2 to 12+2 for the smooth running of the center's research work.

(Ajay Wasan)
Head of the Centre &

Copy to:

1. Director, IIT Roorkee for his kind information.
2. Dean, Academic affairs, IIT Roorkee.
3. All faculty members through email.
4. File

Zimbra **aao-phd@iitr.ac.in**

Fwd: Request regarding the Pre-PhD credit requirement for the Centres

From : Assit RegistrarEvaluation <arevaluation@iitr.ac.in> Fri, Apr 19, 2024 08:47 AM
Subject : Fwd: Request regarding the Pre-PhD credit requirement for the Centres
To : Academic Affairs Office <aao-phd@iitr.ac.in>

please do the needful.

From: "Head CSST" <head@csst.iitr.ac.in>
To: "Dean AcademicAffairs" <daa@iitr.ac.in>
Cc: "Central Research Committee" <crc@csst.iitr.ac.in>, "faculty-csst" <faculty-csst@iitr.ac.in>, "Assit RegistrarEvaluation" <arevaluation@iitr.ac.in>
Sent: Thursday, April 18, 2024 5:48:42 PM
Subject: Request regarding the Pre-PhD credit requirement for the Centres

Dean Academic Affairs

As we have discussed in our 07 CFC meeting held on 26th February 2024 regarding the Pre-PhD credit requirement for the Centre for Space Science and Technology (CSST), the same was forwarded to DAA as per the trailing mail. It would be highly appreciated if you could take it as an agenda for the upcoming IRS, which is scheduled on 24th April 2024.

Thank you
S H Upadhyay
Head, CSST

****
Sanjay H Upadhyay, Ph D
Head, Center for Space Science and Technology (CSST)
Professor, Mechanical and Industrial Engineering Department
Coordinator, ISRO- IIT Roorkee Space Technology Cell (STC)
Indian Institute of Technology Roorkee
ROORKEE - 247 667, Uttarakhand, India
Phone - (01332) 28 5520(O), 8791690340(M)
https://csst.iitr.ac.in/
****

From: "Head CSST" <head@csst.iitr.ac.in>
To: "Dean AcademicAffairs" <daa@iitr.ac.in>
Cc: "Central Research Committee" <crc@csst.iitr.ac.in>, "M V Sunil Krishna" <mv.sunilkrishna@ph.iitr.ac.in>, "C NRamachandran" <ramcn@cy.iitr.ac.in>, "Nachiketa Rai" <n.rai@es.iitr.ac.in>, "Sumanta Sarkhel" <sarkhel@ph.iitr.ac.in>, "Amalendu Patnaik" <amalendu.patnaik@ece.iitr.ac.in>, "sanjay upadhyay" <sanjay.upadhyay@me.iitr.ac.in>
Sent: Monday, February 26, 2024 9:09:52 PM
Subject: Request regarding the Pre-PhD credit requirement for the Centres

Dean Academic Affairs,

The existing PhD regulations mandate students to take pre-PhD course work as per their degree and the department in which they register for PhD are as:

R.3.3 Course Credit Requirements:

Minimum course credit requirements are given in Table 1 below:

Table 1: Minimum Course credit requirements for candidacy to Ph.D. programme

S. No	Qualification	Credit Requirements	Remarks
1.	M. Tech., M. Arch./MURP, or equivalent	Minimum 9 credits of P.G. level theory courses	a. All candidates need to register 02 additional credits for Seminar. b. Candidates can take at most one self-study theory course/ NPTEL course of P.G. level as approved by DAPC.
2.	M.Sc/M.A./M.B.A. or equivalent, admitted to Science/ HSS/ Management department	Minimum 12 credits of P.G. level theory courses	
3.	B.Tech. or equivalent, or M.Sc. or equivalent, admitted to any one of the engineering departments/ centres	Minimum 24 credits of P.G. level theory courses	

(By Chairman Senate, on the recommendations of 42nd IRC dated 07.11.2020)

As per this, any MSc student taking admission into engineering departments, or academic centres has to complete 24 credits of PG level (Sr No 3, Table 1).

In this context, CSST is a Centre with many participating faculty members from PH, MA, CY, ES. If any MSc student joins the Centre for PhD program, although he/she has a post graduate degree he will be required to complete 24 credits.

As natural consequence of this, the student may be inclined to choose their home department instead for registering into PhD program where he is required to complete only 12 credits. This can be highly detrimental for PhD admissions of Centre(s).

In this connection, we may request DoAA to consider our request and please provide appropriate solution so that in the same centre and same program any students can admitted without any discrepancy of the course credits.

With Best Regards
S H Upadhyay
Head, CSST

****

Sanjay H Upadhyay, Ph D
Head, Center for Space Science and Technology (CSST)
Professor, Mechanical and Industrial Engineering Department
Coordinator, ISRO- IIT Roorkee Space Technology Cell (STC)
Indian Institute of Technology Roorkee

ROORKEE - 247 667, Uttarakhand, India
Phone - (01332) 28 5520(O), 8791690340(M)
https://csst.iitr.ac.in/
****

--
Raj Kumar Sharma
Assistant Registrar (Evaluation)
Academic Affairs Office
IIT Roorkee-247667

Item No.101.9: To consider a proposal to review the formula for conversion of CGPA to equivalent percentage and award of First Division.

As per IIT Roorkee regulations, a student with **a CGPA between 6.5 and 8.5** shall be awarded 'First Division' and a student with a CGPA of 8.5 and above shall be awarded 'First Division with Distinction'. **(Appendix-A)**. The formula for converting CGPA to percentage was notified vide Certificate ref no: Aad/Gen/705 dated 03.02.2023 **(Appendix-B)**. Details as follows:

CGPA	**Equivalent Percentage of marks**
4.00≤CGPA≤9.00	10* CGPA+5.00
CGPA>9	95.00

In various government competitive exams, the Public Service Commissions/ Recruiting agencies insist for first division in UG/PG degree as minimum educational qualification. AAO have received requests from alumni who received CGPA between 6 to 6.4 to give certificate of first division.

It is pertinent to mention that in IIT Delhi, the CGPA can notionally be converted to a percentage by multiplying the CGPA by a factor of 10. Further, CGPA 6.0 and above is classified as 'First Class' for employment or requirement of any external body **(Appendix-C)**.

To benefit the students of IIT Roorkee, the IAPC in its 141st meeting held on 08.05.2024, considered and recommended the following proposals:

1. Formula for conversion of CGPA to Percentage (notional): CGPA multiplied by the factor of 10 (CGPA*10)

2. A student with **CGPA between 6.0 and 8.5** shall be awarded 'First Division'.

The above is submitted for the consideration and approval of the Senate.

		(9)	The answer script of the end term examination shall not be shown to a student after finalization of the grades by the Grade Moderation Committee.
		(10)	The practical/field training shall normally be evaluated through the quality of work carried out, the report submission and presentation(s) but the project shall be evaluated normally by mid-term seminar(s), quality of work carried out, project report submission and the viva-voce examinations.
Grading System	23	(1)	The academic performance of a student shall be graded on a 10-point scale following guidelines given in Appendix-B. The letter grades and their equivalent grade points are listed in Table-5.
		(2)	The letter Grades awarded to a student in all the courses (except audit courses) shall be converted into a semester and cumulative performance index called the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA), to be calculated by the procedures given in Appendix-B of these regulations.
		(3)	At the end of the programme, a student with CGPA of 8.5 and above shall be awarded 'First Division with Distinction' and a student with CGPA between 6.5 and 8.5 shall be awarded "First Division".
		(4)	All the passing out students of a class shall be given ranks as **"Rank XX in a class of YY students"**.
		(5)	The equivalent percentage of CGPA at the end of the programme will be calculate as per formula given below:
Courses of Special Nature	24		The UG, IDD and IMD programmes may contain the following courses of special nature in different curricula some of which are already indicated in section 21(3) of these regulations.
		NCC/NSO/NSS/Rangering	
		(1)	Every student shall register for the specified number of credits in the first year, for participation in the NCC / NSO /NSS/ Rangering for the overall development of his/her personality. Students shall be admitted to NCC / NSO /NSS/ Rangering on the basis of their preference and by virtue of their aptitude and abilities as decided by a committee constituted by DOSW. The student shall be continually evaluated for his/her participation and awarded grade following the procedures specified. There shall be at least 80 hours of engagement in an academic year and the attendance regulations for the courses shall apply. This requirement shall be completed in the first year. If, however, a student is not able to complete this requirement in the first year, he/she shall complete it by the end of second year failing which he/she will not be allowed to register in the fifth semester.

CGPA	Equivalent percentage of marks
5.00 ≤ CGPA ≤ 9.00	10 * CGPA + 5.00
CGPA > 9.00	95.00

शैक्षणिक अकैयस कार्यालय
भारतीय प्रौद्योगिकी संस्थान रुड़की
रुड़की–247 667, हरिद्वार (उत्तराखण्ड), भारत
ACADEMIC AFFAIRS OFFICE
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
Roorkee – 247 667, Haridwar (Uttarakhand), INDIA
Website : www.iitr.ac.in

संख्या/No/Acad/Gen./...705..... . दिनांक/Date...03.02.2023.....

TO WHOM IT MAY CONCERN

Calculation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

The letter Grades awarded to a student in all the courses (except audit courses) shall be converted into a semester and cumulative performance index called the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA), to be calculated as follows:

$$\text{S.G.P.A} = \frac{\sum_{i=1}^{n} C_i x P_i}{\sum_{i=1}^{n} C_i}$$

Where,

C_i = Number of credits of the *i* course of a semester for which SGPA is to be calculated

P_i = Grade point obtained in *i* course

i = 1,..... n, represent the number of courses in which a student is registered in the concerned semester.

$$\text{C.G.P.A} = \frac{\sum_{i=1}^{m} C_i x P_i}{\sum_{i-1}^{m} C_i}$$

Where,

C_i = Number of credits of the *i* course, up to the semester for which CGPA is to be calculated. The CGPA shall be calculated taking all the subjects registered including a course in which 'F' grade is awarded till date starting from the beginning but if the student has cleared a course, in which the student had backlog, the new grade will replace the old grade while calculating CGPA.

P_i = Grade point earned in *i* course.

i = 1,..... m; represent the number of courses in which a student was registered till date.

Conversion of CGPA to Percentage

The conversion formula for CGPA to equivalent percentage for training and placement purpose is as follows:

CGPA	Equivalent percentage of marks
4.00 ≤ CGPA ≤ 9.00	10 * CGPA + 5.00
CGPA > 9.00	95.00

Rajeeve

Assistant Registrar (Evaluation)

Appendix 'C'
Item No. Senate / 101.9

अतुल व्यास
Atul Vyas
उप कुलसचिव
Deputy Registrar

भारतीय प्रौद्योगिकी संस्थान दिल्ली
INDIAN INSTITUTE OF TECHNOLOGY DELHI
स्नातकोत्तर अध्ययन एवं अनुसंधान
Postgraduate Studies & Research
हौज खास, नई दिल्ली-110016/ Hauz Khas, New Delhi - 110016
दूरभाष / Tel. : +91-11- 2659 1737
ई-मेल/E-mail : drpgsr@admin.iitd.ac.in, atulvyas@admin.iitd.ac.in
वेबसाइट/Website : www.iitd.ac.in

No. IIITD/A&E(PGS)/A-2/2017/ 69798
Dated: 24th July 2017

TO WHOM IT MAY CONCERN

The CGPA of all IIT Delhi graduates notionally be converted to percentage by multiplying the CGPA by a factor of 10. This is applicable for all graduates since 18.10.1982.

For the purpose of employment or requirement of any external body that IIT Delhi graduate wishes to join, a CGPA of 6.0 or above be taken as First Class.

A. Vyas.
(ATUL VYAS)

Note: This certificate will not be issued to the individual candidates/ agencies for now onwards. It may be downloaded from the website.

Item No.101.10: To consider the program structures received from the various Departments/Centres/School as per the new PG curriculum.

A. The IAPC, in its 139th, 140th and 141st meetings held on 10.04.2024, 17.04.2024 and 08.05.2024 respectively considered and recommended the programme structures of various Departments/Centres/School. The details of the programme structures are placed as **Appendix-A.**

B. The IAPC in its 139th meeting held on 10.04.2024 considered that the following PG programmes are of a special nature, so these can be kept out from the purview of the PG curriculum revision as by design these programs update their structure regularly.

1. M.Tech. (VLSI) for industry professionals
2. M.Tech. Semiconductor Technology
3. Executive MBA (EMBA)

The above is submitted for the consideration and approval of the Senate.

Appendix 'A'
Item No. Senate / 101.10

S. No.	Department/Centre/ School	S. No.	Programme	Model	Annexures	Page No.
1	Computer Science and Engg.	1	M.Tech. Computer Science and Engineering	2	A	36-39
2	Electrical Engg.	2	M.Tech. Instrumentation & Signal Processing	2 & 3	B	40-45
		3	M.Tech. Electric Drives and Power Electronics	2 & 3	B1	46-53
		4	M.Tech. Power System Engineering	1 (b), 2 & 3	B2	54-62
		5	M.Tech. Systems & Control	2 & 3	B3	63-70
		6	M.Tech. Electric Vehicle Technology	2 & 3	B4	71-78
3	Mechanical and Industrial Engg.	7	M.Tech. CAD, CAM and Robotics	2	C	79-83
		8	M.Tech. Machine Design Engineering	2	C1	84-87
		9	M.Tech. Production and Industrial Systems Engineering	2	C2	88-91
		10	M.Tech. Thermal Engineering	2	C3	92-95
		11	M.Tech. Additive and Joining Technologies	2	C4	96-99
4	Hydrology	12	M.Tech. Surface Water Hydrology	2	D	100-103
		13	M.Tech. Ground Water Hydrology	2	D1	104-107
		14	M.Tech. (Watershed Management	2	D2	108-111
5	Mehta Family School of Data Science and Artificial Intelligence	15	M.Tech. Artificial Intelligence	2	E	112-115
		16	M.Tech. Data Science	2	E1	116-119
6	Paper Technology	17	M.Tech. Packaging Technology	2	F	120-123
		18	M.Tech. Pulp and Paper Engineering	2	F1	124-127
7	Hydro and Renewable Energy	19	M.Tech. Renewable and Hydro Energy	2	G	128-131
		20	M.Tech. Environment Management of Rivers and Lakes	2	G1	132-134
8	Electronics and Communication Engineering	21	M.Tech. Communication Systems	2 & 3	H	135-141
		22	M.Tech. Microelectronics & VLSI	2 & 3	H1	142-149
		23	M.Tech. RF and Microwave Engineering	2 & 3	H2	150-157
		24	M.Tech. Terahertz Communication and Sensing	2 & 3	H3	158-164
9	Mathematics	25	M.Sc. Mathematics	1 (a)	I	165-169
10	Physics	26	M.Tech. Solid State Electronic Technology	2	J	170-173

		27	M.Tech. Photonics	2	J1	174-177
		28	M.Sc. Physics	1 (a)	J2	178-182
11	Chemistry	29	M.Sc. Chemistry	1 (a)	K	183-187
12	Earth Sciences	30	M.Sc. Applied Geology	1 (a)	L	188-191
13	Architecture and Planning	31	M.Arch.	2	M	192-195
		32	MURP	2	M1	196-199
14	Management Studies	33	M.B.A[1]	1 (a)	N	200-210
15	Earthquake Engineering	34	M.Tech. Soil Dynamics	2	O	211-213
		35	M.Tech. Structural Dynamics	2	O1	214-216
		36	M.Tech. Seismic Vulnerability and Risk Assessment	2	O2	217-219
16	CTRANS	37	M.Tech. Transportation Systems Management[2]	2	P	220-223

Notes:

1. The IAPC noted that as per revised PG curriculum MBA comes under Model 1(b). However, the Department of Management Studies has requested to allow them to opt for Model 1 (a). The IAPC recommended the same.

2. The structure was approved by the Senate in its 100th meeting. The Centre has proposed minor revision in the structure. The IAPC recommended the revised structure.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Computer Science and Engineering)**
Department: **Department of Computer Science and Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	CSC-501	Advanced Algorithms	PCC	4	3	1	0	3	0
2.	CSC-503	Distributed Systems	PCC	4	3	1	0	3	0
3.	CSC-505	Machine Learning	PCC	4	3	1	0	3	0
4.	CSC-507	Programming Lab	PCC	3	0	0	6	0	6
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**17**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	CSC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Computer Science and Engineering)**
Department: **Department of Computer Science and Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	CSC-691	Internship Social Activity	ISA	4	-	-	-	-	-
2.	CSC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**14**					
Semester-II (Spring)									
1.	CSC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	17	21	14	14
Total Credits	**66**			

M.Tech. (Computer Science and Engineering)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	CSL-510	Network Programming	PEC	4	3	1	0	3	0
2.	CSL-511	Advanced Database Management Systems	PEC	4	3	1	0	3	0
3.	CSL-512	Formal Methods and Software Verification	PEC	4	3	1	0	3	0
4.	CSL-513	Information and Network Security	PEC	4	3	1	0	3	0
5.	CSL-514	Advanced Automata Theory	PEC	4	3	1	0	3	0
6.	CSL-515	Data Mining and Warehousing	PEC	4	3	1	0	3	0
7.	CSL-516	Modelling and Simulation	PEC	4	3	1	0	3	0
8.	CSL-517	Advanced Topics in Software Engineering	PEC	4	3	1	0	3	0
9.	CSL-518	Logic and Automated Reasoning	PEC	4	3	1	0	3	0
10.	CSL-519	Social Network Analysis	PEC	4	3	1	0	3	0
11.	CSL-520	Cloud Computing	PEC	4	3	1	0	3	0
12.	CSL-521	Mobile and Pervasive Computing	PEC	4	3	1	0	3	0
13.	CSL-522	Advanced Graph Theory	PEC	4	3	1	0	3	0
14.	CSL-523	Computational Geometry	PEC	4	3	1	0	3	0
15.	CSL-525	Computer Vision	PEC	4	3	1	0	3	0
16.	CSL-527	Internet of Things	PEC	4	3	1	0	3	0
17.	CSL-528	Natural Language Processing	PEC	4	3	1	0	3	0
18.	CSL-529	Advanced Computer Networks	PEC	4	3	1	0	3	0

19.	CSL-533	Advanced Operating Systems	PEC	4	3	1	0	3	0
20.	CSL-534	Advanced Data Structures	PEC	4	3	1	0	3	0
21.	CSL-535	Complexity Theory	PEC	4	3	1	0	3	0
22.	CSL-536	Distributed Algorithms	PEC	4	3	1	0	3	0
23.	CSL-537	Deep Learning	PEC	4	3	1	0	3	0
24.	CSL-524	Algorithms and Foundations of Chip Design	PEC	4	3	1	0	3	0
25.	CSL-476	Software Project Management	PEC	4	3	1	0	3	0
26.	CSL-538	Multimedia Technologies	PEC	4	3	1	0	3	0
27.	CSL-539	Quantum Computation	PEC	4	3	1	0	3	0
28.	CSL-530	Design and Analysis of Symmetric Cryptosystems	PEC	4	3	1	0	3	0
29.	CSL-531	Dynamic Graph Algorithms	PEC	4	3	1	0	3	0
30.	CSL-532	Data Stream Mining	PEC	4	3	1	0	3	0

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	CST-501	Programming in C/C++	STAR	3	3	0	0	3	0

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Instrumentation and Signal Processing)**
Department: **Department of Electrical Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-531	Intelligent Sensors and Instrumentation	PCC	4	3	0	2	3	0
2.	EEC-533	Advances in Signal and Image Processing	PCC	4	3	0	2	3	0
3.	EEC-535	Concepts of Artificial Intelligence and Machine Learning	PCC	4	3	1	0	3	0
4.	EEC-537	Data Science and Instrumentation	PCC	4	3	0	2	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	EEC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Instrumentation and Signal Processing)**
Department: **Department of Electrical Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	EEC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	EEC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	13	14
Total Credits	**66**			

M.Tech. (Instrumentation and Signal Processing)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EEL-514	AI applications in Signal Processing	PEC	4	3	1	0	3	0
2.	EEL-515	AI applications in Image Processing	PEC	4	3	1	0	3	0
3.	EEL-516	Bioelectric Signals and Processing	PEC	4	3	1	0	3	0
4.	EEL-517	FPGA Applications	PEC	4	3	1	0	3	0
5.	EEL-518	Medical Robotics	PEC	4	3	1	0	3	0
6.	EEL-519	Introduction to AI and ML tools	PEC	4	3	1	0	3	0

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EET-503	Medical Image Processing	STAR	3	2	0	2	3	0

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Instrumentation and Signal Processing**
Department: **Department of Electrical Engineering**
Year: **I**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-531	Intelligent Sensors and Instrumentation	PCC	4	3	0	2	3	0
2.	EEC-533	Advances in Signal and Image Processing	PCC	4	3	0	2	3	0
3.	EEC-535	Concepts of Artificial Intelligence and Machine Learning	PCC	4	3	1	0	3	0
4.	EEC-537	Data Science and Instrumentation	PCC	4	3	0	2	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.	EEC-751A	Thesis Stage-I	THESIS	14	-	-	-	-	-
		Total		**18**					

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Instrumentation and Signal Processing**
Department: **Department of Electrical Engineering**
Year: **II**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-751B	Thesis Stage-II	THESIS	15	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	EEC-751C	Thesis Stage-III	THESIS	16	-	-	-	-	-
		Total		**16**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	18	15	16
Total Credits	**67**			

Master of Science (by Research) in Instrumentation and Signal Processing

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EEL-514	AI applications in Signal Processing	PEC	4	3	1	0	3	0
2.	EEL-515	AI applications in Image Processing	PEC	4	3	1	0	3	0
3.	EEL-516	Bioelectric Signals and Processing	PEC	4	3	1	0	3	0
4.	EEL-517	FPGA Applications	PEC	4	3	1	0	3	0
5.	EEL-518	Medical Robotics	PEC	4	3	1	0	3	0
6.	EEL-519	Introduction to AI and ML tools	PEC	4	3	1	0	3	0

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EET-503	Medical Image Processing	STAR	3	2	0	2	3	0

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Electric Drives and Power Electronics)**
Department: **Department of Electrical Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-511	Advanced Power Electronics	PCC	4	3	1	2/2	3	0
2.	EEC-513	Modeling and Analysis of Electrical Machines	PCC	4	3	0	2	3	0
3.	EEC-515	Power Electronic Controlled Drives	PCC	4	3	0	2	3	0
4.	EEC-517	Power Converters for Sustainable Energy	PCC	4	3	0	2	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	EEC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Electric Drives and Power Electronics)**
Department: **Department of Electrical Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	EEC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	EEC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	13	14
Total Credits	**66**			

M.Tech. (Electric Drives and Power Electronics)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EEL-543	FACTS Devices	PEC	4	3	1	0	3	0
2.	EEL-641	Microcontroller and Its Applications to Power Converters	PEC	4	3	0	2	3	0
3.	EEL-647	Control Techniques in Power Electronics for AC Drives	PEC	4	3	0	2	3	0
4.	EEL-648	Pulse Width Modulation for Power Converters	PEC	4	3	1	0	3	0
5.	EEL-649	Enhanced Power Quality AC-DC Converters	PEC	4	3	0	2	3	0
6.	EEL-650	Switch Mode Power Supply	PEC	4	3	1	0	3	0
7.	EEL-651	Power Quality Improvement Techniques	PEC	4	3	0	2	3	0
8.	EEL-653	Selected Topics in Machines and Transformers	PEC	4	3	0	2	3	0
9.	EEL-654	Synchronous Machines and System Stability	PEC	4	3	1	0	3	0
10.	EEL-655	Special Machines	PEC	4	3	1	0	3	0
11.	EEL-673	Design of WBG Device based Power Converters	PEC	4	3	0	2	3	0
12.	EEL-634	High Power Converters for EV	PEC	4	3	1	0	3	0
13.	EEL-635	Digital Implementation for Power Electronics Systems	PEC	4	3	0	2	3	0
14.	EEL-502	Communication Techniques in Smart Grid	PEC	4	3	1	0	3	0
15.	EEL-542	Advanced Electric Drives	PEC	4	3	0	2/2	3	0
16.	EEL-506	Mathematical Modeling and Control of Power Converters	PEC	4	3	1	0	3	0
17.	EEL-643	Electric Drives for Hybrid Vehicles	PEC	4	3	1	0	3	0

M.Tech. (Electric Drives and Power Electronics)

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EET-501	Electric Drive for Modern Transport Systems	STAR	3	3	0	0	3	0

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Electric Drives and Power Electronics**
Department: **Department of Electrical Engineering**
Year: **I**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-511	Advanced Power Electronics	PCC	4	3	1	2/2	3	0
2.	EEC-513	Modeling and Analysis of Electrical Machines	PCC	4	3	0	2	3	0
3.	EEC-515	Power Electronic Controlled Drives	PCC	4	3	0	2	3	0
4.	EEC-517	Power Converters for Sustainable Energy	PCC	4	3	0	2	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.	EEC-751A	Thesis Stage-I	THESIS	14	-	-	-	-	-
		Total		**18**					

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Electric Drives and Power Electronics**
Department: **Department of Electrical Engineering**
Year: **II**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-751B	Thesis Stage-II	THESIS	15	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	EEC-751C	Thesis Stage-III	THESIS	16	-	-	-	-	-
		Total		**16**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	18	15	16
Total Credits	**67**			

Master of Science (by Research) in Electric Drives and Power Electronics

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EEL-543	FACTS Devices	PEC	4	3	1	0	3	-
2.	EEL-641	Microcontroller and Its Applications to Power	PEC	4	3	0	2	3	-
3.	EEL-647	Control Techniques in Power Electronics for AC Drives	PEC	4	3	0	2	3	-
4.	EEL-648	Pulse Width Modulation for Power Converters	PEC	4	3	1	0	3	-
5.	EEL-649	Enhanced Power Quality AC-DC Converters	PEC	4	3	0	2	3	-
6.	EEL-650	Switch Mode Power Supply	PEC	4	3	1	0	3	-
7.	EEL-651	Power Quality Improvement Techniques	PEC	4	3	0	2	3	-
8.	EEL-653	Selected Topics in Machines	PEC	4	3	0	2	3	-
9.	EEL-654	Synchronous Machines and System Stability	PEC	4	3	1	0	3	-
10.	EEL-655	Special Machines	PEC	4	3	1	0	3	-
11.	EEL-673	Design of WBG Device based Power Converters	PEC	4	3	0	2	3	-
12.	EEL-634	High Power Converters for EV	PEC	4	3	1	0	3	-
13.	EEL-635	Digital Implementation for Power Electronics Systems	PEC	4	3	0	2	3	-
14.	EEL-502	Communication Techniques in Smart Grid	PEC	4	3	1	0	3	-
15.	EEL-542	Advanced Electric Drives	PEC	4	3	0	2/2	3	-
16.	EEL-506	Mathematical modeling and Control of Power Converters	PEC	4	3	1	0	3	-
17.	EEL-643	Electric Drives for Hybrid Vehicles	PEC	4	3	1	0	3	-

Master of Science (by Research) in Electric Drives and Power Electronics

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EET-501	Electric Drive for Modern Transport Systems	STAR	3	3	0	0	3	0

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Electrical Engineering)/(Power System Engineering)**
Department: **Department of Electrical Engineering**
Year: **I**
Model: **1-B**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-501	Computer Aided Power System Analysis	PCC	4	3	0	2	3	0
2.	EEC-503	Power System Operation and Control	PCC	4	3	0	2	3	0
3.	EEC-505	HVDC Transmission Systems	PCC	4	3	1	0	3	0
4.	EEC-507	Advanced Digital Protection	PCC	4	3	0	2	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	EEC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Electrical Engineering)/(Power System Engineering)**
Department: **Department of Electrical Engineering**
Year: **II**
Model: **1-B**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.		Program Elective-V	PPI	4	-	-	-	-	-
3.		Program Elective-VI	PPI	4	-	-	-	-	-
4.		Interdisciplinary Course-I	PPI	4	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	EEC-601	Project	PROJECT	4	-	-	-	-	-
2.		Program Elective-VII	PPI	4	-	-	-	-	-
3.		Program Elective-VIII	PPI	4	-	-	-	-	-
		Total		**12**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	15	12
Total Credits	**66**			

XXX M.Tech. (Electrical Engineering)/(Power System Engineering)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EEL-661	Power System Planning	PEC	4	3	1	0	3	0
2.	EEL-667	Power System Reliability	PEC	4	3	1	0	3	0
3.	EEL-663	Flexible AC Transmission Systems	PEC	4	3	1	0	3	0
4.	EEL-669	Power System Dynamics	PEC	4	3	0	2	3	0
5.	EEL-670	Substation Automation	PEC	4	3	1	0	3	0
6.	EEL-671	Power System Deregulation	PEC	4	3	1	0	3	0
7.	EEL-612	Electrical Transient in Power System	PEC	4	3	1	0	3	0
8.	EEL-672	Smart Grid Technologies	PEC	4	3	0	2	3	0
9.	EEL-695	Modelling and Control of Sustainable Energy Systems	PEC	4	3	1	0	3	0
10.	EEL-520	Cyber Physical Power System	PEC	4	3	0	2	3	0
11.	EEL-513	Microgrid Systems	PEC	4	3	0	2	3	0
12.	EEL-522	AI Techniques to Power System	PEC	4	3	0	2	3	0
13.	EEL-523	Synchro-phasor Technology	PEC	4	3	0	2	3	0
14.	EEL-524	Power System State Estimation	PEC	4	3	0	2	3	0

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Power System Engineering)**
Department: **Department of Electrical Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-501	Computer Aided Power System Analysis	PCC	4	3	0	2	3	0
2.	EEC-503	Power System Operation and Control	PCC	4	3	0	2	3	0
3.	EEC-505	HVDC Transmission Systems	PCC	4	3	1	0	3	0
4.	EEC-507	Advanced Digital Protection	PCC	4	3	0	2	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	EEC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Power System Engineering)**
Department: **Department of Electrical Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	EEC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	EEC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	13	14
Total Credits	**66**			

M.Tech. (Power System Engineering)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EEL-661	Power System Planning	PEC	4	3	1	0	3	0
2.	EEL-667	Power System Reliability	PEC	4	3	1	0	3	0
3.	EEL-663	Flexible AC Transmission Systems	PEC	4	3	1	0	3	0
4.	EEL-669	Power System Dynamics	PEC	4	3	0	2	3	0
5.	EEL-670	Substation Automation	PEC	4	3	1	0	3	0
6.	EEL-671	Power System Deregulation	PEC	4	3	1	0	3	0
7.	EEL-612	Electrical Transient in Power System	PEC	4	3	1	0	3	0
8.	EEL-672	Smart Grid Technologies	PEC	4	3	0	2	3	0
9.	EEL-695	Modelling and Control of Sustainable Energy Systems	PEC	4	3	1	0	3	0
10.	EEL-520	Cyber Physical Power System	PEC	4	3	0	2	3	0
11.	EEL-513	Microgrid Systems	PEC	4	3	0	2	3	0
12.	EEL-522	AI Techniques to Power System	PEC	4	3	0	2	3	0
13.	EEL-523	Synchro-phasor Technology	PEC	4	3	0	2	3	0
14.	EEL-524	Power System State Estimation	PEC	4	3	0	2	3	0

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Power System Engineering**
Department: **Department of Electrical Engineering**
Year: **I**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-501	Computer Aided Power System Analysis	PCC	4	3	0	2	3	0
2.	EEC-503	Power System Operation and Control	PCC	4	3	0	2	3	0
3.	EEC-505	HVDC Transmission Systems	PCC	4	3	1	0	3	0
4.	EEC-507	Advanced Digital Protection	PCC	4	3	0	2	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.	EEC-751A	Thesis Stage-I	THESIS	14	-	-	-	-	-
		Total		**18**					

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Power System Engineering**
Department: **Department of Electrical Engineering**
Year: **II**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-751B	Thesis Stage-II	THESIS	15	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	EEC-751C	Thesis Stage-III	THESIS	16	-	-	-	-	-
		Total		**16**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	18	15	16
Total Credits	**67**			

Master of Science (by Research) in Power System Engineering

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EEL-661	Power System Planning	PEC	4	3	1	0	3	0
2.	EEL-667	Power System Reliability	PEC	4	3	1	0	3	0
3.	EEL-663	Flexible AC Transmission Systems	PEC	4	3	1	0	3	0
4.	EEL-669	Power System Dynamics	PEC	4	3	0	2	3	0
5.	EEL-670	Substation Automation	PEC	4	3	1	0	3	0
6.	EEL-671	Power System Deregulation	PEC	4	3	1	0	3	0
7.	EEL-612	Electrical Transient in Power System	PEC	4	3	1	0	3	0
8.	EEL-672	Smart Grid Technologies	PEC	4	3	0	2	3	0
9.	EEL-695	Modelling and Control of Sustainable Energy Systems	PEC	4	3	1	0	3	0
10.	EEL-520	Cyber Physical Power System	PEC	4	3	0	2	3	0
11.	EEL-513	Microgrid Systems	PEC	4	3	0	2	3	0
12.	EEL-522	AI Techniques to Power System	PEC	4	3	0	2	3	0
13.	EEL-523	Synchro-phasor Technology	PEC	4	3	0	2	3	0
14.	EEL-524	Power System State Estimation	PEC	4	3	0	2	3	0

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Systems and Control)**
Department: **Department of Electrical Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
		Semester-I (Autumn)							
1.	EEC-541	Mathematics for Systems and Control	PCC	4	3	1	0	3	0
2.	EEC-543	Advanced Linear Control Systems	PCC	4	3	1	0	3	0
3.	EEC-545	Nonlinear Systems and Control	PCC	4	3	1	0	3	0
4.	EEC-547	Control System Design Laboratory	PCC	3	0	0	6	0	3
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**17**					
		Semester-II (Spring)							
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	EEC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Systems and Control)**
Department: **Department of Electrical Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
		Semester-I (Autumn)							
1.	EEC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	EEC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
		Semester-II (Spring)							
1.	EEC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	17	21	13	14
Total Credits	**65**			

M.Tech. (Systems and Control)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EEL-508	Machine Learning	PEC	4	3	1	0	3	0
2.	EEL-681	Wide Area System Monitoring Control	PEC	4	3	1	0	3	0
3.	EEL-682	Advanced Digital System Design	PEC	4	3	0	2	3	0
4.	EEL-683	Introduction to Robotics	PEC	4	3	1	0	3	0
5.	EEL-685	Stochastic Systems	PEC	4	3	1	0	3	0
6.	EEL-686	Optimal Control	PEC	4	3	1	0	3	0
7.	EEL-687	Operation Research	PEC	4	3	1	0	3	0
8.	EEL-688	Interval Control Systems	PEC	4	3	1	0	3	0
9.	EEL-689	Modeling and Simulation	PEC	4	3	1	0	3	0
10.	EEL-692	Graph Theory and Applications	PEC	4	3	1	0	3	0
11.	EEL-615	Robust Control	PEC	4	3	1	0	3	0
12.	EEL-694	Advances in Model Order Reduction Techniques	PEC	4	3	1	0	3	0
13.	EEL-696	Intelligent Control of Robotic Systems	PEC	4	3	0	2/2	3	0
14.	EEL-697	Dynamics and Control of Autonomous Vehicles	PEC	4	3	1	2/2	3	0
15.	EEL-525	Sampled-Data Systems	PEC	4	3	1	0	3	0
16.	EEL-613	Sliding Mode Control and Observation	PEC	4	3	1	0	3	0
17.	EEL-620	Process Instrumentation and Control	PEC	4	3	0	2	3	0
18.	EEL-526	Set-Theoretic Methods in Control	PEC	4	3	1	0	3	0
19.	EEL-527	Behavioral Approach to Systems Theory	PEC	4	3	1	0	3	0

20.	EEL-528	Model Predictive Control	PEC	4	3	1	0	3	0
21.	EEL-529	Learning Based Control of Robotics	PEC	4	3	0	2/2	3	0
22.	EEL-530	Advances in PID Controller and its Applications	PEC	4	3	1	2/2	3	0
23.	EEL-531	Data driven methods in Control	PEC	4	3	1	0	3	0
24.	EEL-532	Data Structure and its Applications	PEC	4	3	0	2	3	0
25.	EEL-684	System Reliability	PEC	4	3	1	0	3	0
26.	EEL-533	Advanced Microprocessor and Applications	PEC	4	3	0	2	3	0

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	EET-504	Data Structures	STAR	3	2	0	2	3	0
2.	EET-505	Programming in C++	STAR	3	2	0	2	3	0
3.	EET-506	Reinforcement Learning based Control System Design	STAR	3	2	1	0	3	0
4.	EET-507	Control Theory and its Applications in Renewable Energy Systems	STAR	3	2	1	0	3	0
5.	EET-508	Advanced Robotics	STAR	3	2	0	2	3	0
6.	EET-509	Embedded System Design using FPGA	STAR	3	2	0	2	2	0

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Systems and Control**
Department: **Department of Electrical Engineering**
Year: **I**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-541	Mathematics for Systems and Control	PCC	4	3	1	0	3	0
2.	EEC-543	Advanced Linear Control Systems	PCC	4	3	1	0	3	0
3.	EEC-545	Nonlinear Systems and Control	PCC	4	3	1	0	3	0
4.	EEC-547	Control System Design Laboratory	PCC	3	0	0	6	0	3
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**17**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.	EEC-751A	Thesis Stage-I	THESIS	14	-	-	-	-	-
		Total		**18**					

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Systems and Control**
Department: **Department of Electrical Engineering**
Year: **II**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-751B	Thesis Stage-II	THESIS	15	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	EEC-751C	Thesis Stage-III	THESIS	16	-	-	-	-	-
		Total		**16**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	17	18	15	16
Total Credits	**66**			

Master of Science (by Research) in Systems and Control

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EEL-508	Machine Learning	PEC	4	3	1	0	3	0
2.	EEL-681	Wide Area System Monitoring Control	PEC	4	3	1	0	3	0
3.	EEL-682	Advanced Digital System Design	PEC	4	3	0	2	3	0
4.	EEL-683	Introduction to Robotics	PEC	4	3	1	0	3	0
5.	EEL-685	Stochastic Systems	PEC	4	3	1	0	3	0
6.	EEL-686	Optimal Control	PEC	4	3	1	0	3	0
7.	EEL-687	Operation Research	PEC	4	3	1	0	3	0
8.	EEL-688	Interval Control Systems	PEC	4	3	1	0	3	0
9.	EEL-689	Modeling and Simulation	PEC	4	3	1	0	3	0
10.	EEL-692	Graph Theory and Applications	PEC	4	3	1	0	3	0
11.	EEL-615	Robust Control	PEC	4	3	1	0	3	0
12.	EEL-694	Advances in Model Order Reduction Techniques	PEC	4	3	1	0	3	0
13.	EEL-696	Intelligent Control of Robotic Systems	PEC	4	3	0	2/2	3	0
14.	EEL-697	Dynamics and Control of Autonomous Vehicles	PEC	4	3	1	2/2	3	0
15.	EEL-525	Sampled-Data Systems	PEC	4	3	1	0	3	0
16.	EEL-613	Sliding Mode Control and Observation	PEC	4	3	1	0	3	0
17.	EEL-620	Process Instrumentation and Control	PEC	4	3	0	2	3	0

18.	EEL-526	Set-Theoretic Methods in Control	PEC	4	3	1	0	3	0
19.	EEL-527	Behavioral Approach to Systems Theory	PEC	4	3	1	0	3	0
20.	EEL-528	Model Predictive Control	PEC	4	3	1	0	3	0
21.	EEL-529	Learning Based Control of Robotics	PEC	4	3	0	2/2	3	0
22.	EEL-530	Advances in PID Controller and its Applications	PEC	4	3	1	2/2	3	0
23.	EEL-531	Data driven methods in Control	PEC	4	3	1	0	3	0
24.	EEL-532	Data Structure and its Applications	PEC	4	3	0	2	3	0
25.	EEL-684	System Reliability	PEC	4	3	1	0	3	0
26.	EEL-533	Advanced Microprocessor and Applications	PEC	4	3	0	2	3	0

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Electric Vehicle Technology)**
Department: **Department of Electrical Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-521	Electric Vehicles: Power Train and Drives	PCC	4	3	0	2	3	0
2.	EEC-523	Energy Storage Techniques	PCC	3	3	0	0	3	0
3.	EEC-525	Charging Infrastructure	PCC	4	3	0	2	3	0
4.	EEC-527	Control Systems for Electric Vehicle	PCC	4	3	0	2	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**17**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	EEC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Electric Vehicle Technology)**
Department: **Department of Electrical Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	EEC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	EEC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	17	21	13	14
Total Credits	**65**			

M.Tech. (Electric Vehicle Technology)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EEL-641	Microcontroller and Its Applications to Power Converters	PEC	4	3	0	2	3	0
2.	EEL-542	Advanced Electric Drives	PEC	4	3	0	2	3	0
3.	EEL-643	Electric Drives for Hybrid Vehicles	PEC	4	3	1	0	3	0
4.	EEL-647	Control Techniques in Power Electronics for AC Drives	PEC	4	3	0	2	3	0
5.	EEL-648	Pulse Width Modulation for Power Converters	PEC	4	3	1	0	3	0
6.	EEL-650	Switch Mode Power Supply	PEC	4	3	1	0	3	0
7.	EEL-655	Special Machines	PEC	4	3	1	0	3	0
8.	EEL-611	FPGA Implementation of Signal Processing Systems	PEC	4	3	0	2	3	0
9.	EEL-673	Design of WBG Device based Power Converters	PEC	4	3	0	2	3	0
10.	EEL-508	Machine Learning	PEC	4	3	1	0	3	0
11.	EEL-682	Advanced Digital System Design	PEC	4	3	0	2	3	0
12.	EEL-697	Dynamics and Control of Autonomous Vehicles	PEC	4	3	1	2/2	3	0
13.	EEL-672	Smart Grid Technology	PEC	4	3	0	2	3	0
14.	EEL-510	Digital Control Implementation for Power Converters	PEC	4	3	0	2	3	0
15.	EEL-634	High Power Converters for EV	PEC	4	3	1	0	3	0
16.	EEL-695	Modelling and Control of Sustainable Energy Systems	PEC	4	3	1	0	3	0
17.	EEL-694	Advances in Model Order Reduction Techniques	PEC	4	3	1	0	3	0
18.	EEL-613	Sliding Mode Control and Observation	PEC	4	3	1	0	3	0

19.	EEL-512	Low voltage systems for EVs	PEC	4	3	1	0	3	0
20.	EEL-513	Microgrid systems	PEC	4	3	0	2	3	0

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	EET-502	Electric Vehicle Systems	STAR	3	3	0	0	3	0

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Electric Vehicle Technology**
Department: **Department of Electrical Engineering**
Year: **I**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-521	Electric Vehicles: Power Train and Drives	PCC	4	3	0	2	3	0
2.	EEC-523	Energy Storage Techniques	PCC	3	3	0	0	3	0
3.	EEC-525	Charging Infrastructure	PCC	4	3	0	2	3	0
4.	EEC-527	Control Systems for Electric Vehicle	PCC	4	3	0	2	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**17**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.	EEC-751A	Thesis Stage-I	THESIS	14	-	-	-	-	-
		Total		**18**					

DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Electric Vehicle Technology**
Department: **Department of Electrical Engineering**
Year: **II**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EEC-751B	Thesis Stage-II	THESIS	15	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	EEC-751C	Thesis Stage-III	THESIS	16	-	-	-	-	-
		Total		**16**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	17	18	15	16
Total Credits	**66**			

Master of Science (by Research) in Electric Vehicle Technology

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EEL-641	Microcontroller and Its Applications to Power Converters	PEC	4	3	0	2	3	0
2.	EEL-542	Advanced Electric Drives	PEC	4	3	0	2	3	0
3.	EEL-643	Electric Drives for Hybrid Vehicles	PEC	4	3	1	0	3	0
4.	EEL-647	Control Techniques in Power Electronics for AC Drives	PEC	4	3	0	2	3	0
5.	EEL-648	Pulse Width Modulation for Power Converters	PEC	4	3	1	0	3	0
6.	EEL-650	Switch Mode Power Supply	PEC	4	3	1	0	3	0
7.	EEL-655	Special Machines	PEC	4	3	1	0	3	0
8.	EEL-611	FPGA Implementation of Signal Processing Systems	PEC	4	3	0	2	3	0
9.	EEL-673	Design of WBG Device based Power Converters	PEC	4	3	0	2	3	0
10.	EEL-508	Machine Learning	PEC	4	3	1	0	3	0
11.	EEL-682	Advanced Digital System Design	PEC	4	3	0	2	3	0
12.	EEL-697	Dynamics and Control of Autonomous Vehicles	PEC	4	3	1	2/2	3	0
13.	EEL-672	Smart Grid Technology	PEC	4	3	0	2	3	0
14.	EEL-510	Digital Control Implementation for Power Converters	PEC	4	3	0	2	3	0
15.	EEL-634	High Power Converters for EV	PEC	4	3	1	0	3	0
16.	EEL-695	Modelling and Control of Sustainable Energy Systems	PEC	4	3	1	0	3	0
17.	EEL-694	Advances in Model Order Reduction Techniques	PEC	4	3	1	0	3	0

18.	EEL-613	Sliding Mode Control and Observation	PEC	4	3	1	0	3	0
19.	EEL-512	Low voltage systems for EVs	PEC	4	3	1	0	3	0
20.	EEL-513	Microgrid systems	PEC	4	3	0	2	3	0

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (CAD, CAM and Robotics)**
Department: **Department of Mechanical and Industrial Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	MIC-501	Measurements and Instrumentation	PCC	4	3	0	2	3	0
2.	MIC-503	Finite Element Methods	PCC	4	3	0	2	3	0
3.	MIC-505	Numerical Methods for Engineers	PCC	4	3	1	0	3	0
4.	MIC-507	Continuum Mechanics	PCC	4	3	1	0	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	MIC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (CAD, CAM and Robotics)**
Department: **Department of Mechanical and Industrial Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	MIC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	MIC-701A	Thesis Stage-I	Thesis	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	MIC-701B	Thesis Stage-II	Thesis	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	13	14
Total Credits	**66**			

M.Tech. (CAD, CAM and Robotics)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	MIL-621	Instrumentation and Experimental Methods	PEC	4	3	1	2/2	3	0
2.	MIL-503	Computer Aided Manufacturing	PEC	4	3	1	0	3	0
3.	MIL-502	Robotics and Control	PEC	4	3	1	2/2	3	0
4.	MIL-508	Advanced Automatic Control	PEC	4	3	1	0	3	0
5.	MIL-509	Extended Finite Element Methods	PEC	4	3	1	0	3	0
6.	MIL-515	Manufacturing System Analysis	PEC	4	3	1	0	3	0
7.	MIL-516	Artificial Intelligence	PEC	4	3	1	0	3	0
8.	MIL-517	Automated Materials Handling Systems	PEC	4	3	1	0	3	0
9.	MIL-527	Computational Fluid Dynamics & Heat Transfer	PEC	4	3	1	0	3	0
10.	MIL-547	Product and Process Optimization	PEC	4	3	1	0	3	0
11.	MIL-550	Advanced Machine Design	PEC	4	3	1	0	3	0
12.	MIL-551	Dynamics of Mechanical Systems	PEC	4	3	1	0	3	0
13.	MIL-552	Advanced Mechanics of Solids	PEC	4	3	1	0	3	0
14.	MIL-554	Computer Aided Mechanism Design	PEC	4	3	1	2/2	3	0
15.	MIL-557	Finite Element Methods	PEC	4	3	1	0	3	0
16.	MIL-558	Fracture Mechanics	PEC	4	3	1	0	3	0
17.	MIL-559	Computer Aided Design	PEC	4	3	1	2/2	3	0
18.	MIL-560	Mechanics of Composite Materials	PEC	4	3	1	0	3	0

19.	MIL-561	Advanced Mechanical Vibrations	PEC	4	3	1	2/2	3	0
20.	MIL-563	Mechatronics	PEC	4	3	1	2/2	3	0
21.	MIL-565	Smart Materials, Structures, and Devices	PEC	4	3	1	0	3	0
22.	MIL-566	Computer Aided Analysis of Mechanical Systems	PEC	4	3	1	0	3	0
23.	MIL-567	Computer Graphics	PEC	4	3	1	2/2	3	0
24.	MIL-568	Advanced Robotics	PEC	4	3	1	2/2	3	0
25.	MIL-504	Mechanics of Soft Materials	PEC	4	3	1	0	3	0
26.	MIL-505	Statistical Machine Learning	PEC	4	3	1	0	3	0
27.	MIL-506	Elastic Waves in Solids	PEC	4	3	1	0	3	0
28.	MIL-507	Isogeometric Analysis	PEC	4	3	1	2	3	0
29.	MIL-510	Shock Phenomena	PEC	4	3	1	0	3	0
30.	MIL-511	Materials Behaviors under Extreme Conditions	PEC	4	3	1	0	3	0
31.	MIL-512	Introduction to Biomechanics	PEC	4	3	1	2/2	3	0
32.	MIL-513	Impact Mechanics	PEC	4	3	1	2/2	3	0
33.	MIL-417	Energy and Variational Principles in Engineering Mechanics	PEC	4	3	1	0	3	0
34.	MIL-608	Fatigue in Structures & Materials	PEC	4	3	1	2/2	3	0
Students should mandatorily earn a minimum of 3 credits from practical components in a program. These practical components can be part of a course or a dedicated practical /laboratory course.									

M.Tech. (CAD, CAM and Robotics)

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	MIT-501	Value Engineering	STAR	3	2	1	0	3	0

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Machine Design Engineering)**
Department: **Department of Mechanical and Industrial Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	MIC-501	Measurements and Instrumentation	PCC	4	3	0	2	3	0
2.	MIC-503	Finite Element Methods	PCC	4	3	0	2	3	0
3.	MIC-505	Numerical Methods for Engineers	PCC	4	3	1	0	3	0
4.	MIC-507	Continuum Mechanics	PCC	4	3	1	0	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	MIC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Machine Design Engineering)**
Department: **Department of Mechanical and Industrial Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	MIC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	MIC-701A	Thesis Stage-I	Thesis	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	MIC-701B	Thesis Stage-II	Thesis	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	13	14
Total Credits	**66**			

M.Tech. (Machine Design Engineering)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	MIL-621	Instrumentation and Experimental Methods	PEC	4	3	1	2/2	3	0
2.	MIL-502	Robotics and Control	PCC	4	3	1	2/2	3	0
3.	MIL-508	Advanced Automatic Control	PEC	4	3	1	0	3	0
4.	MIL-509	Extended Finite Element Methods	PEC	4	3	1	0	3	0
5.	MIL-550	Advanced Machine Design	PEC	4	3	1	0	3	0
6.	MIL-551	Dynamics of Mechanical Systems	PEC	4	3	1	0	3	0
7.	MIL-552	Advanced Mechanics of Solids	PEC	4	3	1	0	3	0
8.	MIL-547	Product and Process Optimization	PEC	4	3	1	0	3	0
9.	MIL-553	Industrial Tribology	PEC	4	3	1	0	3	0
10.	MIL-554	Computer Aided Mechanism Design	PEC	4	3	1	2/2	3	0
11.	MIL-555	Experimental Stress Analysis	PEC	4	3	1	2/2	3	0
12.	MIL-556	Dynamics of Road Vehicles	PEC	4	3	1	2/2	3	0
13.	MIL-557	Finite Element Methods	PEC	4	3	1	0	3	0
14.	MIL-558	Fracture Mechanics	PEC	4	3	1	0	3	0
15.	MIL-559	Computer Aided Design	PEC	4	3	1	2/2	3	0
16.	MIL-560	Mechanics of Composite Materials	PEC	4	3	1	0	3	0
17.	MIL-561	Advanced Mechanical Vibrations	PEC	4	3	1	2/2	3	0
18.	MIL-562	Noise Control in Mechanical Systems	PEC	4	3	1	2/2	3	0

19.	MIL-563	Mechatronics	PEC	4	3	1	2/2	3	0
20.	MIL-565	Smart Materials, Structures, and Devices	PEC	4	3	1	0	3	0
21.	MIL-602	Bond Graph Modelling of Engineering Systems	PEC	4	3	1	2/2	3	0
22.	MIL-504	Mechanics of Soft Materials	PEC	4	3	1	0	3	0
23.	MIL-505	Statistical Machine Learning	PEC	4	3	1	0	3	0
24.	MIL-506	Elastic Waves in Solids	PEC	4	3	1	0	3	0
25.	MIL-507	Isogeometric Analysis	PEC	4	3	0	2	3	0
26.	MIL-510	Shock Phenomena	PEC	4	3	1	0	3	0
27.	MIL-511	Materials Behaviors under Extreme Conditions	PEC	4	3	1	0	3	0
28.	MIL-608	Fatigue in Structures & Materials	PEC	4	3	1	2/2	3	0
29.	MIL-512	Introduction to Biomechanics	PEC	4	3	1	2/2	3	0
30.	MIL-513	Impact Mechanics	PEC	4	3	1	2/2	3	0
31.	MIL-417	Energy and Variational Principles in Engineering Mechanics	PEC	4	3	1	0	3	0
Students should mandatorily earn a minimum of 3 credits from practical components in a program. These practical components can be part of a course or a dedicated practical /laboratory course.									

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					**Contact Hours/Week**			**Exam Duration**	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	MIT-501	Value Engineering	STAR	3	2	1	0	3	0

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Production and Industrial Systems Engineering)**
Department: **Department of Mechanical and Industrial Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	MIC-501	Measurements and Instrumentation	PCC	4	3	0	2	3	0
2.	MIC-503	Finite Element Methods	PCC	4	3	0	2	3	0
3.	MIC-505	Numerical Methods for Engineers	PCC	4	3	1	0	3	0
4.	MIC-507	Continuum Mechanics	PCC	4	3	1	0	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	MIC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Production and Industrial Systems Engineering)**
Department: **Department of Mechanical and Industrial Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	MIC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	MIC-701A	Thesis Stage-I	Thesis	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	MIC-701B	Thesis Stage-II	Thesis	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	13	14
Total Credits	**66**			

M.Tech. (Production and Industrial Systems Engineering)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	MIL-514	Operations Management	PEC	4	3	1	0	3	0
2.	MIL-633	Quality Management	PEC	4	3	1	0	3	0
3.	MIL-572	Advanced Manufacturing Processes	PEC	4	3	1	2/2	3	0
4.	MIL-575	Product Design and Development	PEC	4	3	1	0	3	0
5.	MIL-582	Flexible Manufacturing Systems	PEC	4	3	1	0	3	0
6.	MIL-583	Materials Management	PEC	4	3	1	0	3	0
7.	MIL-584	Operations Research	PEC	4	3	1	0	3	0
8.	MIL-585	Supply Chain Management	PEC	4	3	1	0	3	0
9.	MIL-586	Metal Forming	PEC	4	3	1	0	3	0
10.	MIL-587	Metal Casting	PEC	4	3	1	2/2	3	0
11.	MIL-588	Non-traditional Machining Processes	PEC	4	3	1	2/2	3	0
12.	MIL-607	Processing of Non-metals	PEC	4	3	1	0	3	0
13.	MIL-606	Numerical Methods in Manufacturing	PEC	4	3	1	0	3	0
14.	MIL-599	Surface Engineering	PEC	4	3	1	2/2	3	0
15.	MIL-601	Additive Manufacturing	PEC	4	3	1	2/2	3	0
16.	MIL-518	Forming of Sheet Metals	PEC	4	3	1	2/2	3	0
Students should mandatorily earn a minimum of 3 credits from practical components in a program. These practical components can be part of a course or a dedicated practical /laboratory course.									

M.Tech. (Production and Industrial Systems Engineering)

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	MIT-501	Value Engineering	STAR	3	2	1	0	3	0

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Thermal Engineering)**
Department: **Department of Mechanical and Industrial Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	MIC-501	Measurements and Instrumentation	PCC	4	3	0	2	3	0
2.	MIC-503	Finite Element Methods	PCC	4	3	0	2	3	0
3.	MIC-505	Numerical Methods for Engineers	PCC	4	3	1	0	3	0
4.	MIC-507	Continuum Mechanics	PCC	4	3	1	0	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	MIC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Thermal Engineering)**
Department: **Department of Mechanical and Industrial Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	MIC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	MIC-701A	Thesis Stage-I	Thesis	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	MIC-701B	Thesis Stage-II	Thesis	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	13	14
Total Credits	**66**			

M.Tech. (Thermal Engineering)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	MIL-519	Modeling and Simulation	PEC	4	3	1	2/2	3	0
2.	MIL-520	Advanced Thermodynamics	PEC	4	3	1	0	3	0
3.	MIL-521	Advanced Fluid Mechanics	PEC	4	3	1	0	3	0
4.	MIL-522	Advanced Heat Transfer	PEC	4	3	1	0	3	0
5.	MIL-527	Computational Fluid Dynamics & Heat Transfer	PEC	4	3	1	0	3	0
6.	MIL-523	Gas Turbines & Compressors	PEC	4	3	1	0	3	0
7.	MIL-524	Two Phase Flow & Heat Transfer	PEC	4	3	1	0	3	0
8.	MIL-525	Solar Energy	PEC	4	3	1	0	3	0
9.	MIL-632	Advanced Gas Dynamics	PEC	4	3	1	0	3	0
10.	MIL-528	Boundary Layer Theory	PEC	4	3	1	0	3	0
11.	MIL-529	Turbulent Flows	PEC	4	3	1	0	3	0
12.	MIL-531	Hydro-dynamic Machines	PEC	4	3	1	2/2	3	0
13.	MIL-532	Renewable Energy Systems	PEC	4	3	1	2/2	3	0
14.	MIL-533	Refrigeration & Air-Conditioning System Design	PEC	4	3	1	2/2	3	0
15.	MIL-536	Convective Heat and Mass Transfer	PEC	4	3	1	0	3	0
16.	MIL-537	I. C. Engines	PEC	4	3	1	2/2	3	0
17.	MIL-538	I. C. Engine Combustion Processes Modelling	PEC	4	3	1	2/2	3	0
18.	MIL-539	Micro and Nano Scale Thermal Engineering	PEC	4	3	1	0	3	0

19.	MIL-540	Combustion	PEC	4	3	1	2/2	3	0
20.	MIL-541	Bio-Fluid Mechanics	PEC	4	3	1	0	3	0
21.	MIL-542	Energy Management	PEC	4	3	1	0	3	0
22.	MIL-543	Fluid Power Systems	PEC	4	3	1	0	3	0
23.	MIL-544	Design of Heat Exchangers	PEC	4	3	1	0	3	0
24.	MIL-545	Fuel Cells	PEC	4	3	1	0	3	0
25.	MIL-546	Thermal Management of Energy Storage Devices	PEC	4	3	1	0	3	0
26.	MIL-548	Hydrogen Energy	PEC	4	3	1	0	3	0
27.	MIL-604	Fire Dynamics	PEC	4	3	1	0	3	0
28.	MIL-549	Aircraft Propulsion	PEC	4	3	1	0	3	0
29.	MIL-612	Hydrodynamic Stability	PEC	4	3	1	0	3	0
Students should mandatorily earn a minimum of 3 credits from practical components in a program. These practical components can be part of a course or a dedicated practical /laboratory course.									

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					**Contact Hours/Week**			**Exam Duration**	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	MIT-501	Value Engineering	STAR	3	2	1	0	3	0

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Additive and Joining Technologies)**
Department: **Department of Mechanical and Industrial Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	MIC-501	Measurements and Instrumentation	PCC	4	3	0	2	3	0
2.	MIC-503	Finite Element Methods	PCC	4	3	0	2	3	0
3.	MIC-505	Numerical Methods for Engineers	PCC	4	3	1	0	3	0
4.	MIC-507	Continuum Mechanics	PCC	4	3	1	0	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	MIC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Additive and Joining Technologies)**
Department: **Department of Mechanical and Industrial Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	MIC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	MIC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	MIC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	13	14
Total Credits	**66**			

M.Tech. (Additive and Joining Technologies)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	MIL-601	Additive Manufacturing	PEC	4	3	1	2/2	3	0
2.	MIL-613	Fusion Joining Technologies	PEC	4	3	1	2/2	3	0
3.	MIL-614	Solid State Joining Technologies	PEC	4	3	1	2/2	3	0
4.	MIL-615	Material Characterization & Testing	PEC	4	3	1	2/2	3	0
5.	MIL-599	Surface Engineering	PEC	4	3	1	2/2	3	0
6.	MIL-610	Laser Material Processing	PEC	4	3	1	0	3	0
7.	MIL-622	Metallurgical aspects in Joining and Additive Manufacturing	PEC	4	3	1	2/2	3	0
8.	MIL-624	Design and Analysis of Joints	PEC	4	3	1	2/2	3	0
9.	MIL-501	Failure Analysis and Prevention Joints	PEC	4	3	1	2/2	3	0
10.	MIL-627	Hybrid Joining Technologies	PEC	3	2	1	0	3	0
11.	MIL-629	Reverse Engineering and Rapid Tooling	PEC	3	2	0	2/2	3	0
12.	MIL-631	Dissimilar Metal Joining	PEC	4	3	1	0	3	0
Students should mandatorily earn a minimum of 3 credits from practical components in a program. These practical components can be part of a course or a dedicated practical /laboratory course.									

M.Tech. (Additive and Joining Technologies)

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	MIT-501	Value Engineering	STAR	3	2	1	0	3	0

DEPARTMENT OF HYDROLOGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Surface Water Hydrology)/PG Diploma in Surface Water Hydrology**
Department: **Department of Hydrology**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	HYC-501	Open Channel and Fluvial Hydraulics	PCC	3	2	0	2	3	0
2.	HYC-503	Stochastic Hydrology	PCC	3	2	1	0	3	0
3.	HYC-505	Remote Sensing and GIS Applications	PCC	3	2	0	2	3	0
4.	HYC-507	Deterministic Hydrology	PCC	3	2	1	0	3	0
5.	HYC-509	Surface Water Quality Modelling	PCC	3	2	0	2	3	0
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**17**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	3	-	-	-	-	-
2.		Program Elective-II	PEC	3	-	-	-	-	-
3.		Program Elective-III	PEC	3	-	-	-	-	-
4.		Program Elective-IV	PEC	3	-	-	-	-	-
5.		Program Elective-V	PEC	3	-	-	-	-	-
6.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
7.	HYC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**20**					

DEPARTMENT OF HYDROLOGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Surface Water Hydrology)/PG Diploma in Surface Water Hydrology**
Department: **Department of Hydrology**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	HYC-691	Internship Social Activity	ISA	5	-	-	-	-	-
2.	HYC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	HYC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	17	20	15	14
Total Credits	**66**			

M.Tech. (Surface Water Hydrology)/PG Diploma in Surface Water Hydrology

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	HYL-501	Water Resources Planning and Management	PEC	3	2	1	0	3	0
2.	HYL-502	Urban Hydrology	PEC	3	2	1	0	3	0
3.	HYL-503	Irrigation and Drainage Engineering	PEC	3	2	1	0	3	0
4.	HYL-504	Geophysical Investigations	PEC	3	2	0	2	3	0
5.	HYL-505	Surface Water Modelling and Simulation	PEC	3	2	0	2	3	0
6.	HYL-506	Soil and Groundwater Contamination Modelling	PEC	3	2	1	0	3	0
7.	HYL-507	Hydrometeorology and Climate Change	PEC	3	2	1	0	3	0
8.	HYL-508	Vadose Zone Hydrology	PEC	3	2	0	2	3	0
9.	HYL-509	Ecohydrology	PEC	3	2	1	0	3	0
10.	HYL-510	Membranes for Desalination and Purification	PEC	3	2	0	2	3	0
11.	HYL-511	Hydrological Data Collection and Processing	PEC	3	2	0	2	3	0
12.	HYL-512	Numerical Methods in Hydrology	PEC	3	2	1	0	3	0
13.	HYL-513	Environmental Planning and Assessment of Projects	PEC	3	2	1	0	3	0
14.	HYL-514	Soil and Water Remediation	PEC	3	2	0	2	3	0
15.	HYL-515	Hydrogeochemistry	PEC	3	2	0	2	3	0
16.	HYL-516	Soft Computing Techniques	PEC	3	2	0	2	3	0
17.	HYL-517	Multi-phase Flow through Porous Media	PEC	3	2	1	0	3	0
18.	HYL-518	Hydro-informatics	PEC	3	2	0	2	3	0
19.	HYL-519	Watershed Modelling and Simulation	PEC	3	2	0	2	3	0
20.	HYL-520	Isotope Hydrology	PEC	3	2	1	0	3	0

M.Tech. (Surface Water Hydrology)/PG Diploma in Surface Water Hydrology

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	HYT-501	Data Analysis and Numerical Modelling	STAR	3	2	1	0	3	0

Social Science Course Basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	HYS-501	Natural Resources, Society and Environment	SSC	2	2	0	0	2	0
2.	HYS-502	Rural Water Supply and Sanitation	SSC	2	2	0	0	2	0

DEPARTMENT OF HYDROLOGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Ground Water Hydrology)/P.G. Diploma in Ground Water Hydrology**
Department: **Department of Hydrology**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	HYC-505	Remote Sensing and GIS Applications	PCC	3	2	0	2	3	0
2.	HYC-511	Groundwater Hydrology	PCC	3	2	0	2	3	0
3.	HYC-513	Environmental Quality	PCC	3	2	0	2	3	0
4.	HYC-515	Hydrologic Elements and Analysis	PCC	3	2	1	0	3	0
5.	HYC-517	Systems Analysis and Applications in Hydrology	PCC	3	2	0	2	3	0
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**17**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	3	-	-	-	-	-
2.		Program Elective-II	PEC	3	-	-	-	-	-
3.		Program Elective-III	PEC	3	-	-	-	-	-
4.		Program Elective-IV	PEC	3	-	-	-	-	-
5.		Program Elective-V	PEC	3	-	-	-	-	-
6.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
7.	HYC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**20**					

DEPARTMENT OF HYDROLOGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Ground Water Hydrology)/P.G. Diploma in Ground Water Hydrology**
Department: **Department of Hydrology**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	HYC-691	Internship Social Activity	ISA	5	-	-	-	-	-
2.	HYC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	HYC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	17	20	15	14
Total Credits	**66**			

M.Tech. (Ground Water Hydrology)/P.G. Diploma in Ground Water Hydrology

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	HYL-501	Water Resources Planning and Management	PEC	3	2	1	0	3	0
2.	HYL-502	Urban Hydrology	PEC	3	2	1	0	3	0
3.	HYL-503	Irrigation and Drainage Engineering	PEC	3	2	1	0	3	0
4.	HYL-504	Geophysical Investigations	PEC	3	2	0	2	3	0
5.	HYL-505	Surface Water Modelling and Simulation	PEC	3	2	0	2	3	0
6.	HYL-506	Soil and Groundwater Contamination Modelling	PEC	3	2	1	0	3	0
7.	HYL-507	Hydrometeorology and Climate Change	PEC	3	2	1	0	3	0
8.	HYL-508	Vadose Zone Hydrology	PEC	3	2	0	2	3	0
9.	HYL-509	Ecohydrology	PEC	3	2	1	0	3	0
10.	HYL-510	Membranes for Desalination and Purification	PEC	3	2	0	2	3	0
11.	HYL-511	Hydrological Data Collection and Processing	PEC	3	2	0	2	3	0
12.	HYL-512	Numerical Methods in Hydrology	PEC	3	2	1	0	3	0
13.	HYL-513	Environmental Planning and Assessment of Projects	PEC	3	2	1	0	3	0
14.	HYL-514	Soil and Water Remediation	PEC	3	2	0	2	3	0
15.	HYL-515	Hydrogeochemistry	PEC	3	2	0	2	3	0
16.	HYL-516	Soft Computing Techniques	PEC	3	2	0	2	3	0
17.	HYL-517	Multi-phase Flow through Porous Media	PEC	3	2	1	0	3	0
18.	HYL-518	Hydro-informatics	PEC	3	2	0	2	3	0
19.	HYL-519	Watershed Modelling and Simulation	PEC	3	2	0	2	3	0
20.	HYL-520	Isotope Hydrology	PEC	3	2	1	0	3	0

M.Tech. (Ground Water Hydrology)/P.G. Diploma in Ground Water Hydrology

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	HYT-501	Data Analysis and Numerical Modelling	STAR	3	2	1	0	3	0

Social Science Course Basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	HYS-501	Natural Resources, Society and Environment	SSC	2	2	0	0	2	0
2.	HYS-502	Rural Water Supply and Sanitation	SSC	2	2	0	0	2	0

DEPARTMENT OF HYDROLOGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Watershed Management)/P.G. Diploma in Watershed Management**
Department: **Department of Hydrology**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	HYC-509	Surface Water Quality Modelling	PCC	3	2	0	2	3	0
2.	HYC-511	Groundwater Hydrology	PCC	3	2	0	2	3	0
3.	HYC-515	Hydrologic Elements and Analysis	PCC	3	2	1	0	3	0
4.	HYC-517	Systems Analysis and Applications in Hydrology	PCC	3	2	0	2	3	0
5.	HYC-521	Watershed Behaviour and Conservation Practices	PCC	3	2	1	0	3	0
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**17**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	3	-	-	-	-	-
2.		Program Elective-II	PEC	3	-	-	-	-	-
3.		Program Elective-III	PEC	3	-	-	-	-	-
4.		Program Elective-IV	PEC	3	-	-	-	-	-
5.		Program Elective-V	PEC	3	-	-	-	-	-
6.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
7.	HYC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**20**					

DEPARTMENT OF HYDROLOGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Watershed Management)/P.G. Diploma in Watershed Management**
Department: **Department of Hydrology**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	HYC-691	Internship Social Activity	ISA	5	-	-	-	-	-
2.	HYC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	HYC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	17	20	15	14
Total Credits	**66**			

M.Tech. (Watershed Management)/P.G. Diploma in Watershed Management

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	HYL-501	Water Resources Planning and Management	PEC	3	2	1	0	3	0
2.	HYL-502	Urban Hydrology	PEC	3	2	1	0	3	0
3.	HYL-503	Irrigation and Drainage Engineering	PEC	3	2	1	0	3	0
4.	HYL-504	Geophysical Investigations	PEC	3	2	0	2	3	0
5.	HYL-505	Surface Water Modelling and Simulation	PEC	3	2	0	2	3	0
6.	HYL-506	Soil and Groundwater Contamination Modelling	PEC	3	2	1	0	3	0
7.	HYL-507	Hydrometeorology and Climate Change	PEC	3	2	1	0	3	0
8.	HYL-508	Vadose Zone Hydrology	PEC	3	2	0	2	3	0
9.	HYL-509	Ecohydrology	PEC	3	2	1	0	3	0
10.	HYL-510	Membranes for Desalination and Purification	PEC	3	2	0	2	3	0
11.	HYL-511	Hydrological Data Collection and Processing	PEC	3	2	0	2	3	0
12.	HYL-512	Numerical Methods in Hydrology	PEC	3	2	1	0	3	0
13.	HYL-513	Environmental Planning and Assessment of Projects	PEC	3	2	1	0	3	0
14.	HYL-514	Soil and Water Remediation	PEC	3	2	0	2	3	0
15.	HYL-515	Hydrogeochemistry	PEC	3	2	0	2	3	0
16.	HYL-516	Soft Computing Techniques	PEC	3	2	0	2	3	0
17.	HYL-517	Multi-phase Flow through Porous Media	PEC	3	2	1	0	3	0
18.	HYL-518	Hydro-informatics	PEC	3	2	0	2	3	0
19.	HYL-519	Watershed Modelling and Simulation	PEC	3	2	0	2	3	0
20.	HYL-520	Isotope Hydrology	PEC	3	2	1	0	3	0

M.Tech. (Watershed Management)/P.G. Diploma in Watershed Management

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	HYT-501	Data Analysis and Numerical Modelling	STAR	3	2	1	0	3	0

Social Science Course Basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	HYS-501	Natural Resources, Society and Environment	SSC	2	2	0	0	2	0
2.	HYS-502	Rural Water Supply and Sanitation	SSC	2	2	0	0	2	0

MEHTA FAMILY SCHOOL OF DATA SCIENCE AND ARTIFICIAL INTELLIGENCE
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Artificial Intelligence)**
Department: **Mehta Family School of Data Science and Artificial Intelligence**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	DAC-501	Machine Learning	PCC	4	3	1	0	3	0
2.	DAC-503	Essential Mathematics for AI	PCC	4	3	1	0	3	0
3.	DAC-505	Advanced Data Structures and Algorithms	PCC	4	3	1	0	3	0
4.	DAC-507	Programming for AI	PCC	3	0	0	6	0	3
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**17**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	DAC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

MEHTA FAMILY SCHOOL OF DATA SCIENCE AND ARTIFICIAL INTELLIGENCE
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Artificial Intelligence)**
Department: **Mehta Family School of Data Science and Artificial Intelligence**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	DAC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	DAC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	DAC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	17	21	13	14
Total Credits	**65**			

M.Tech. (Artificial Intelligence)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	DAL-501	Convex Optimization in Machine Learning	PEC	4	3	1	0	3	0
2.	DAL-502	Deep Learning	PEC	4	3	1	0	3	0
3.	MAL-526	Numerical Optimization	PEC	4	3	1	0	3	0
4.	DAL-503	Introduction to Compressive Sensing	PEC	4	3	1	0	3	0
5.	DAL-504	Neuromorphic Computing with Emerging Memories and Architectures	PEC	4	3	1	0	3	0
6.	DAL-558	Data Stream Mining	PEC	4	3	1	0	3	0
7.	DAL-559	Stochastic Processes and their Applications	PEC	4	3	1	0	3	0
8.	DAL-522	Computer Architecture for AI	PEC	4	3	1	0	3	0
9.	DAL-505	Artificial Intelligence for Decision Making	PEC	4	3	1	0	3	0
10.	DAL-561	AI for Earth Observations	PEC	4	3	1	0	3	0
11.	DAL-506	Applications of AI in Physics	PEC	4	3	1	0	3	0
12.	DAL-565	Computer Vision	PEC	4	3	1	0	3	0
13.	DAL-507	Game Theory	PEC	4	3	1	0	3	0
14.	DAL-567	Introduction to Materials Informatics	PEC	4	3	1	0	3	0
15.	ECL-526	Statistical Machine Learning for Variation- Aware Electronic Device and Circuit Simulation	PEC	4	3	1	0	3	0
16.	EEL-581	Intelligent Control Techniques	PEC	4	3	0	2	3	0
17.	DAL-508	Applications of AI in Biology	PEC	4	3	1	0	3	0
18.	DAL-509	VLSI Architectures for AI in CMOS Technology	PEC	4	3	1	0	3	0

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	DAT-501	Applications of AI/ML	STAR	3	3	0	0	3	0

MEHTA FAMILY SCHOOL OF DATA SCIENCE AND ARTIFICIAL INTELLIGENCE
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Data Science)**
Department: **Mehta Family School of Data Science and Artificial Intelligence**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	DAC-501	Machine Learning	PCC	4	3	1	0	3	0
2.	DAC-511	Mathematics for Data Science	PCC	4	3	1	0	3	0
3.	DAC-513	Data Structures and Algorithms	PCC	4	3	1	0	3	0
4.	DAC-515	Programming for Data Science	PCC	3	0	0	6	-	-
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**17**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	DAC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

MEHTA FAMILY SCHOOL OF DATA SCIENCE AND ARTIFICIAL INTELLIGENCE
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Data Science)**
Department: **Mehta Family School of Data Science and Artificial Intelligence**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
Semester-I (Autumn)									
1.	DAC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	DAC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	DAC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	17	21	13	14
Total Credits	**65**			

M.Tech. (Data Science)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	DAL-571	Big Data Analytics	PEC	4	3	1	0	3	0
2.	DAL-502	Deep Learning	PEC	4	3	1	0	3	0
3.	DAL-510	Ethics in Data Science	PEC	4	3	1	0	3	0
4.	MAL-552	Evolutionary Algorithms	PEC	4	3	1	0	3	0
5.	DAL-511	Intrusion Detection Systems	PEC	4	3	1	0	3	0
6.	MAL-515	Advanced Operations Research	PEC	4	3	1	0	3	0
7.	DAL-512	Reinforcement Learning	PEC	4	3	1	0	3	0
8.	DAL-513	Spreadsheet Modeling and Simulation	PEC	4	3	1	0	3	0
9.	MAL-551	Soft Computing	PEC	4	3	1	0	3	0
10.	MAL-544	Statistical Inference	PEC	4	3	1	0	3	0
11.	DAL-514	Time Series Data Analysis	PEC	4	3	1	0	3	0
12.	DAL-515	Principles of Database Systems	PEC	4	3	0	2	3	0
13.	DAL-516	Blockchain Technology	PEC	4	3	1	0	3	0
14.	DAL-568	ML and AI Applications in Earth Sciences	PEC	4	3	1	0	3	0
15.	DAL-576	Data Science in Bioinformatics	PEC	4	3	1	0	3	0
16.	DAL-517	Digital Image Processing	PEC	4	3	1	0	3	0
17.	DAL-518	Graphs Algorithms in Data Science	PEC	4	3	1	0	3	0
18.	DAL-579	Leveraging Data Science for Finance	PEC	4	3	1	0	3	0
19.	DAL-523	Multi-Objective and Multi-Criteria Decision Making	PEC	4	3	1	0	3	0

20.	MAL-550	Parallel Computing	PEC	4	3	1	0	3	0
21.	DAL-520	Pattern Recognition	PEC	4	3	1	0	3	0
22.	DAL-521	Recommender Systems	PEC	4	3	0	2	3	0
23.	DAL-583	Data-driven Analytics for Smart Transportation Systems	PEC	4	3	1	0	3	0

DEPARTMENT OF PAPER TECHNOLOGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Packaging Technology)**
Department: **Department of Paper Technology**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	PPC-521	Packaging Principles, Processes and Sustainability	PCC	2	2	0	0	2	0
2.	PPC-523	Packaging Materials	PCC	3	3	0	2/2	3	0
3.	PPC-525	Converting Processes for Packaging	PCC	3	3	0	0	3	0
4.	PPC-527	Package Performance	PCC	3	0	0	6	0	0
5.	PPC-529	Package Design	PCC	2	2	0	0	2	0
6.	PPC-531	Food and Pharmaceutical Packaging	PCC	3	3	0	0	3	0
7.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	3	-	-	-	-	-
2.		Program Elective-II	PEC	3	-	-	-	-	-
3.		Program Elective-III	PEC	3	-	-	-	-	-
4.		Program Elective-IV	PEC	3	-	-	-	-	-
5.		Program Elective-V	PEC	3	-	-	-	-	-
6.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
7.	PPC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**20**					

DEPARTMENT OF PAPER TECHNOLOGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Packaging Technology)**
Department: **Department of Paper Technology**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	PPC-691	Internship Social Activity	ISA	5	-	-	-	-	-
2.	PPC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	PPC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	**18**	**20**	**15**	**14**
Total Credits	**67**			

M.Tech. (Packaging Technology)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	PPL-517	Smart Packaging	PEC	3	3	0	0	3	0
2.	PPL-518	Robotics and Automated Packaging	PEC	3	3	0	0	3	0
3.	PPL-519	Distribution Packaging Dynamics	PEC	3	3	0	0	3	0
4.	PPL-520	Sustainable Packaging and Life Cycle Assessment	PEC	3	3	0	0	3	0
5.	PPL-521	Hazardous Material Packaging	PEC	3	3	0	0	3	0
6.	PPL-522	Industrial Packaging	PEC	3	3	0	0	3	0
7.	PPL-523	Lamination and Functional Coatings	PEC	3	3	0	0	3	0
8.	PPL-524	Nanotechnology Application in Packaging	PEC	3	3	0	0	3	0
9.	PPL-525	Economics in Packaging	PEC	3	3	0	0	3	0
10.	PPL-526	Advanced Packaging Materials Characterization	PEC	3	3	0	2/2	3	0
11.	PPL-527	Business Law	PEC	3	3	0	0	3	0
12.	PPL-528	Logistics and Supply Chain Management	PEC	3	3	0	0	3	0
13.	PPL-529	Industrial Design	PEC	3	3	0	0	3	0
14.	PPL-530	Printing Technology	PEC	3	3	0	0	3	0
15.	PPL-531	Advanced Numerical Methods and Statistics	PEC	3	3	0	0	3	0

M.Tech. (Packaging Technology)

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	PPT-501	Pulp, Paper & Packaging	STAR	3	3	0	0	3	0
2.	PPT-502	Environmental Control	STAR	3	3	0	0	3	0

DEPARTMENT OF PAPER TECHNOLOGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Pulp and Paper Engineering)**
Department: **Department of Paper Technology**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	PPC-501	Pulping	PCC	3	3	0	2/2	3	0
2.	PPC-503	Washing and Bleaching	PCC	2	2	0	2/2	2	0
3.	PPC-505	Chemical Recovery Process	PCC	2	2	0	2/2	2	0
4.	PPC-507	Paper Making	PCC	2	2	0	2/2	2	0
5.	PPC-509	Stock Preparation	PCC	2	2	0	0	2	0
6.	PPC-511	Paper Properties	PCC	2	2	0	0	2	0
7.	PPC-513	Stock Preparation and Paper Properties	PCC	3	0	0	6	0	0
8.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	3	-	-	-	-	-
2.		Program Elective-II	PEC	3	-	-	-	-	-
3.		Program Elective-III	PEC	3	-	-	-	-	-
4.		Program Elective-IV	PEC	3	-	-	-	-	-
5.		Program Elective-V	PEC	3	-	-	-	-	-
6.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
7.	PPC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**20**					

DEPARTMENT OF PAPER TECHNOLOGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Pulp and Paper Engineering)**
Department: **Department of Paper Technology**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	PPC-691	Internship Social Activity	ISA	5	-	-	-	-	-
2.	PPC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	PPC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	**18**	**20**	**15**	**14**
Total Credits	**67**			

M.Tech. (Pulp and Paper Engineering)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	PPL-501	Process Equipment and Design	PEC	3	3	0	0	3	0
2.	PPL-502	Pulp Mill Calculations	PEC	3	3	0	0	3	0
3.	PPL-503	Paper Mill Calculations	PEC	3	3	0	0	3	0
4.	PPL-504	Chemical Recovery Process Calculations	PEC	3	3	0	0	3	0
5.	PPL-505	Secondary Fiber Processing	PEC	3	3	0	0	3	0
6.	PPL-506	Bio-Process and its Application	PEC	3	3	0	0	3	0
7.	PPL-507	Electro kinetics in Paper Making	PEC	3	3	0	0	3	0
8.	PPL-508	Coated and Specialty Papers	PEC	3	3	0	0	3	0
9.	PPL-509	Risk Analysis and Management in Industry	PEC	3	3	0	0	3	0
10.	PPL-510	System Closure	PEC	3	3	0	0	3	0
11.	PPL-511	Advanced Paper and Packaging Materials Characterization	PEC	3	3	0	0	3	0
12.	PPL-512	Papermaking Chemistry	PEC	3	3	0	0	3	0
13.	PPL-513	Process Integration in Pulp and Paper Industry	PEC	3	3	0	0	3	0
14.	PPL-514	Environmental Management	PEC	3	3	0	0	3	0
15.	PPL-515	Printing Operations	PEC	3	3	0	0	3	0
16.	PPL-516	Packaging Papers and Boards	PEC	3	3	0	0	3	0

M.Tech. (Pulp and Paper Engineering)

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	PPT-501	Pulp, Paper & Packaging	STAR	3	3	0	0	3	0
2.	PPT-502	Environmental Control	STAR	3	3	0	0	3	0

DEPARTMENT OF HYDRO AND RENEWABLE ENERGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Renewable and Hydro Energy)**
Department: **Department of Hydro and Renewable Energy**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	HRC-501	Hydro Power Planning and Management	PCC	4	3	1	0	3	0
2.	HRC-503	Renewable Energy Resources Development Technology	PCC	3	3	0	0	3	0
3.	HRC-505	Grid Integration of Renewable Energy	PCC	3	3	0	0	3	0
4.	HRC-507	Renewable and Hydro Energy Lab.	PCC	3	0	0	6	0	3
5.	HRC-509	Finance, Policy and Regulations for Renewable Energy	PCC	3	3	0	0	3	0
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	HRC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF HYDRO AND RENEWABLE ENERGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Renewable and Hydro Energy)**
Department: **Department of Hydro and Renewable Energy**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S. No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	HRC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	HRC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	HRC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	13	14
Total Credits	**66**			

M.Tech. (Renewable and Hydro Energy)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	HRL-511	Hydro Electric Equipment	PEC	4	3	1	2/2	3	0
2.	HRL-512	Design of Hydropower Structures	PEC	4	3	1	0	3	0
3.	HRL-513	Hydro mechanical Equipment	PEC	4	3	1	2/2	3	0
4.	HRL-514	Modelling, Simulation and Computer Applications	PEC	4	3	1	2/2	3	0
5.	HRL-503	Environmental Planning and Management	PEC	4	3	1	0	3	0
6.	HRL-515	Wind Energy Application Technology	PEC	4	3	1	0	3	0
7.	HRL-516	Instrumentation for Hydro Power Plants	PEC	4	3	1	2/2	3	0
8.	HRL-517	Rural Electrical Energy System Planning and Design	PEC	4	3	1	0	3	0
9.	HRL-518	Remote Sensing and GIS for Renewable Energy Planning	PEC	4	3	0	2	3	0
10.	HRL-519	Construction Planning and Management	PEC	4	3	1	0	3	0
11.	HRL-520	Biomass, Bioenergy and Biofuels	PEC	4	3	1	0	3	0
12.	HRL-521	Solar Photo-Voltaic Design and Application	PEC	4	3	1	0	3	0
13.	HRL-522	Energy Conservation and Management	PEC	4	3	1	0	3	0
14.	HRL-523	Climate Change and Water Resources	PEC	4	3	1	0	3	0
15.	HRL-502	Energy-water-food Nexus	PEC	4	3	1	0	3	0
16.	HRL-524	Electric Vehicular Technology	PEC	4	3	1	0	3	0
17.	HRL-525	Energy Storage Systems	PEC	4	3	1	0	3	0
18.	HRL-526	Hydrogen Technology and Economy	PEC	4	3	1	2/2	3	0
19.	HRL-527	Advanced Modelling for Renewable Energy Power Systems	PEC	4	3	1	2/2	3	0

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	HRT-501	Modeling of turbulence in Turbines	STAR	3	3	0	0	3	0
2.	HRT-502	System Dynamics Modelling	STAR	3	3	0	0	3	0
3.	HRT-503	Modeling and stability analysis of DC-DC converters	STAR	3	3	0	0	3	0
4.	HRT-504	Quantitative Investigations of Flows	STAR	3	3	0	0	3	0

Social Science Course Basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	HRS-501	Environmental and Social Sustainability	SSC	2	3	0	0	3	0
2.	HRS-502	Energy Economics	SSC	2	3	0	0	3	0

DEPARTMENT OF HYDRO AND RENEWABLE ENERGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Environment Management of Rivers and Lakes)**
Department: **Department of Hydro and Renewable Energy**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	HRC-511	Integrated Management of Water Bodies	PCC	4	3	1	2/2	3	0
2.	HRC-513	Project Formulation & Implementation	PCC	3	3	0	0	3	0
3.	HRC-515	Waste Water Collection, Treatment and Disposal	PCC	3	3	0	0	3	0
4.	HRC-517	Laboratory Course	PCC	2	0	0	3	0	3
5.	HRC-519	Aquatic Ecology	PCC	4	3	1	2/2	3	0
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	3/4	-	-	-	-	-
4.		Program Elective-IV	PEC	3/4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	HRC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**19/21**					

DEPARTMENT OF HYDRO AND RENEWABLE ENERGY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Environment Management of Rivers and Lakes)**
Department: **Department of Hydro and Renewable Energy**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	HRC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	HRC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	HRC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	19/21	13	14
Total Credits	**64/66**			

M.Tech. (Environment Management of Rivers and Lakes)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	HRL-503	Environmental Planning and Management	PEC	4	3	1	0	3	0
2.	HRL-522	Energy Conservation and Management	PEC	4	3	1	0	3	0
3.	HRL-523	Climate Change and Water Resources	PEC	4	3	1	0	3	0
4.	HRL-528	Hydrology and Modeling of Water Bodies	PEC	4	3	1	0	3	0
5.	HRL-529	Environmental Laws, Public Participation and Institutional Development	PEC	4	3	1	0	3	0
6.	HRL-530	Coastal Pollution Monitoring and Impact Assessment	PEC	4	3	1	0	3	0
7.	HRL-531	Planning and Management of Environmental Facility	PEC	4	3	1	0	3	0
8.	HRL-532	Application of RS & GIS in Environment Management	PEC	4	3	1	0	3	0
9.	HRL-533	Environmental Modelling, Simulation and Computer Applications	PEC	4	3	1	2/2	3	0
10.	HRL-534	Biodiversity Conservation	PEC	3	3	0	0	3	0
11.	CEL-603	Industrial and Hazardous Waste Management	PEC	4	3	1	0	3	0
12.	CEL-604	Environment Impact and Risk Assessment	PEC	4	3	1	0	3	0
13.	CEL-605	Solid Waste Management	PEC	4	3	1	0	3	0
14.	HYC-511	Groundwater Hydrology	PEC	3	3	0	0	3	0
15.	HYC-521	Watershed Behavior and Conservation Practices	PEC	3	3	0	0	3	0
16.	HYL-502	Urban Hydrology	PEC	3	3	0	0	3	0

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Communication Systems)**
Department: **Department of Electronics and Communication Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-505	Linear Algebra and Random Processes	PCC	4	3	1	0	3	0
2.	ECC-511	Digital Signal Processing and Communication Techniques	PCC	4	3	0	2	3	0
3.	ECC-513	Principles of Wireless Communication	PCC	4	3	1	0	3	0
4.	ECC-515	Information and Coding Theory	PCC	4	3	1	0	3	0
5.		Program Elective-I	PEC	2	0	0	3	0	3
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**20**					
Semester-II (Spring)									
1.		Program Elective-II	PEC	4	-	-	-	-	-
2.		Program Elective-III	PEC	4	-	-	-	-	-
3.		Program Elective-IV	PEC	4	-	-	-	-	-
4.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
5.	ECC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**17**					

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Communication Systems)**
Department: **Department of Electronics and Communication Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-691	Internship Social Activity	ISA	3-5	-	-	-	-	-
2.	ECC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13-15**					
Semester-II (Spring)									
1.	ECC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	20	17	13-15	14
Total Credits	**64-66**			

M.Tech. (Communication Systems)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	ECL-554	Communication Laboratory	PEC	2	0	0	3	0	3
2.	ECL-555	Signal Processing Laboratory	PEC	2	0	0	3	0	3
3.	ECL-514	Detection and Estimation Theory	PEC	4	3	1	0	3	0
4.	ECL-614	Adaptive Signal Processing Techniques	PEC	4	3	1	0	3	0
5.	ECL-556	5G Standards and 6G Wireless Technologies	PEC	4	3	1	0	3	0
6.	ECL-557	Principles of Sparse Recovery and Compressed Sensing	PEC	4	3	1	0	3	0
7.	ECL-558	Wireless Communication: Advanced Concepts and Applications	PEC	4	3	1	0	3	0
8.	ECL-562	Optical Wireless Communication	PEC	4	3	1	0	3	0
9.	ECL-563	Machine Learning and Signal Processing for Neuroinformatics	PEC	4	3	1	0	3	0

M.Tech. (Communication Systems)

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	ECT-501	Inference and Learning Algorithms	STAR	3	3	0	0	3	0
2.	ECT-502	Semiconductor Technology and its Applications	STAR	3					
3.	ECT-503	5G/6G Technology and its Societal Applications	STAR	3					
4.	ECT-504	Applications of RF Technology in Defence and Space Applications	STAR	3					

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Communication Systems**
Department: **Department of Electronics and Communication Engineering**
Year: **I**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-505	Linear Algebra and Random Processes	PCC	4	3	1	0	3	0
2.	ECC-511	Digital Signal Processing and Communication Techniques	PCC	4	3	0	2	3	0
3.	ECC-513	Principles of Wireless Communication	PCC	4	3	1	0	3	0
4.	ECC-515	Information and Coding Theory	PCC	4	3	1	0	3	0
5.		Program Elective-I	PEC	2	0	0	3	0	3
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**20**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.	ECC-751A	Thesis Stage-I	THESIS	13	-	-	-	-	-
		Total		**17**					

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Communication Systems**
Department: **Department of Electronics and Communication Engineering**
Year: **II**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-751B	Thesis Stage-II	THESIS	15	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	ECC-751C	Thesis Stage-III	THESIS	16	-	-	-	-	-
		Total		**16**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	20	17	15	16
Total Credits	**68**			

Master of Science (by Research) in Communication Systems

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	ECL-554	Communication Laboratory	PEC	2	0	0	3	0	3
2.	ECL-555	Signal Processing Laboratory	PEC	2	0	0	3	0	3
3.	ECL-514	Detection and Estimation Theory	PEC	4	3	1	0	3	0
4.	ECL-614	Adaptive Signal Processing Techniques	PEC	4	3	1	0	3	0
5.	ECL-556	5G Standards and 6G Wireless Technologies	PEC	4	3	1	0	3	0
6.	ECL-557	Principles of Sparse Recovery and Compressed Sensing	PEC	4	3	1	0	3	0
7.	ECL-558	Wireless Communication: Advanced Concepts and Applications	PEC	4	3	1	0	3	0
8.	ECL-562	Optical Wireless Communication	PEC	4	3	1	0	3	0
9.	ECL-563	Machine Learning and Signal Processing for Neuroinformatics	PEC	4	3	1	0	3	0

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Microelectronics and VLSI)**
Department: **Department of Electronics and Communication Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-531	Digital VLSI Circuit Design	PCC	4	3	0	2	3	0
2.	ECC-533	VLSI Technology	PCC	4	3	0	2	3	0
3.	ECC-535	Foundations of Semiconductor Device Physics	PCC	4	3	0	2	3	0
4.	ECC-537	Analog VLSI Circuit Design	PCC	4	3	1	0	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	ECC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Microelectronics and VLSI)**
Department: **Department of Electronics and Communication Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-691	Internship Social Activity	ISA	3-5	-	-	-	-	-
2.	ECC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13-15**					
Semester-II (Spring)									
1.	ECC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	13-15	14
Total Credits	**66-68**			

M.Tech. (Microelectronics and VLSI)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	ECL-532	Power Electronic Devices, Circuits and Systems	PEC	4	3	1	0	3	0
2.	ECL-525	Hardware Architecture for Deep-Learning	PEC	4	3	1	0	3	0
3.	ECL-526	Statistical Machine Learning for Variation-Aware Electronic Device and Circuit Simulation	PEC	4	3	1	0	3	0
4.	ECL-561	Compact Modeling of Semiconductor Devices	PEC	4	3	1	0	3	0
5.	ECL-533	Semiconductor Device Modeling	PEC	4	3	1	0	3	0
6.	ECL-534	MOS Device Physics	PEC	4	3	1	0	3	0
7.	ECL-535	Digital System Design	PEC	4	3	1	0	3	0
8.	ECL-536	Semiconductor Microwave Devices & Applications	PEC	4	3	1	0	3	0
9.	ECL-537	Optoelectronic Materials & Devices	PEC	4	3	1	0	3	0
10.	ECL-538	Mixed Signal Circuit Design	PEC	4	3	1	0	3	0
11.	ECL-539	VLSI System Design	PEC	4	3	1	0	3	0
12.	ECL-540	Device & Circuit Interaction	PEC	4	3	1	0	3	0
13.	ECL-587	Nanoscale Devices	PEC	4	3	1	0	3	0
14.	ECL-541	Performance and Reliability of VLSI Circuits	PEC	4	3	1	0	3	0
15.	ECL-543	Advanced VLSI Interconnects	PEC	4	3	1	0	3	0
16.	ECL-545	Organic Electronics	PEC	4	3	1	0	3	0
17.	ECL-591	VLSI Physical Design	PEC	4	3	1	0	3	0

18.	ECL-546	Compound Semiconductors and RF Devices	PEC	4	3	1	0	3	0
19.	ECL-547	CAD for VLSI	PEC	4	3	1	0	3	0
20.	ECL-548	VLSI Digital Signal Processing	PEC	4	3	1	0	3	0
21.	ECL-549	VLSI Testing and Testability	PEC	4	3	1	0	3	0
22.	ECL-551	MEMS and NEMS	PEC	4	3	1	0	3	0
23.	ECL-552	Low Voltage CMOS Circuit Operation	PEC	4	3	1	0	3	0
24.	ECL-635	Magnetic Random Access Memory	PEC	4	3	1	0	3	0
25.	ECL-553	Advanced Analog IC Design	PEC	4	3	1	0	3	0

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					**Contact Hours/Week**			**Exam Duration**	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	ECT-501	Inference and Learning Algorithms	STAR	3	3	0	0	3	0
2.	ECT-502	Semiconductor Technology and its Applications	STAR	3					
3.	ECT-503	5G/6G Technology and its Societal Applications	STAR	3					
4.	ECT-504	Applications of RF Technology in Defence and Space Applications	STAR	3					

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Microelectronics and VLSI**
Department: **Department of Electronics and Communication Engineering**
Year: **I**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-531	Digital VLSI Circuit Design	PCC	4	3	0	2	3	0
2.	ECC-533	VLSI Technology	PCC	4	3	0	2	3	0
3.	ECC-535	Foundations of Semiconductor Device Physics	PCC	4	3	0	2	3	0
4.	ECC-537	Analog VLSI Circuit Design	PCC	4	3	1	0	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.	ECC-751A	Thesis Stage-I	THESIS	13	-	-	-	-	-
		Total		**17**					

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Microelectronics and VLSI**
Department: **Department of Electronics and Communication Engineering**
Year: **II**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-751B	Thesis Stage-II	THESIS	15	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	ECC-751C	Thesis Stage-III	THESIS	16	-	-	-	-	-
		Total		**16**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	17	15	16
Total Credits	**66**			

Master of Science (by Research) in Microelectronics and VLSI

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	ECL-532	Power Electronic Devices, Circuits and Systems	PEC	4	3	1	0	3	0
2.	ECL-525	Hardware Architecture for Deep-Learning	PEC	4	3	1	0	3	0
3.	ECL-526	Statistical Machine Learning for Variation-Aware Electronic Device and Circuit Simulation	PEC	4	3	1	0	3	0
4.	ECL-561	Compact Modeling of Semiconductor Devices	PEC	4	3	1	0	3	0
5.	ECL-533	Semiconductor Device Modeling	PEC	4	3	1	0	3	0
6.	ECL-534	MOS Device Physics	PEC	4	3	1	0	3	0
7.	ECL-535	Digital System Design	PEC	4	3	1	0	3	0
8.	ECL-536	Semiconductor Microwave Devices & Applications	PEC	4	3	1	0	3	0
9.	ECL-537	Optoelectronic Materials & Devices	PEC	4	3	1	0	3	0
10.	ECL-538	Mixed Signal Circuit Design	PEC	4	3	1	0	3	0
11.	ECL-539	VLSI System Design	PEC	4	3	1	0	3	0
12.	ECL-540	Device & Circuit Interaction	PEC	4	3	1	0	3	0
13.	ECL-587	Nanoscale Devices	PEC	4	3	1	0	3	0
14.	ECL-541	Performance and Reliability of VLSI Circuits	PEC	4	3	1	0	3	0
15.	ECL-543	Advanced VLSI Interconnects	PEC	4	3	1	0	3	0
16.	ECL-545	Organic Electronics	PEC	4	3	1	0	3	0
17.	ECL-591	VLSI Physical Design	PEC	4	3	1	0	3	0

18.	ECL-546	Compound Semiconductors and RF Devices	PEC	4	3	1	0	3	0
19.	ECL-547	CAD for VLSI	PEC	4	3	1	0	3	0
20.	ECL-548	VLSI Digital Signal Processing	PEC	4	3	1	0	3	0
21.	ECL-549	VLSI Testing and Testability	PEC	4	3	1	0	3	0
22.	ECL-551	MEMS and NEMS	PEC	4	3	1	0	3	0
23.	ECL-552	Low Voltage CMOS Circuit Operation	PEC	4	3	1	0	3	0
24.	ECL-635	Magnetic Random Access Memory	PEC	4	3	1	0	3	0
25.	ECL-553	Advanced Analog IC Design	PEC	4	3	1	0	3	0

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (RF and Microwave Engineering)**
Department: **Department of Electronics and Communication Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
Semester-I (Autumn)									
1.	ECC-521	Antenna Theory and Design	PCC	4	3	1	0	3	0
2.	ECC-523	Advanced EMFT	PCC	3	3	0	0	3	0
3.	ECC-525	Microwave Engineering	PCC	3	3	0	0	3	0
4.	ECC-527	Introduction to Microwave Measurements	PCC	4	2	0	4	3	2
5.	ECC-529	Microwave Engineering Lab.	PCC	2	0	0	3	0	3
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	2	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	ECC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**19**					

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (RF and Microwave Engineering)**
Department: **Department of Electronics and Communication Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-691	Internship Social Activity	ISA	3-5	-	-	-	-	-
2.	ECC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13-15**					
Semester-II (Spring)									
1.	ECC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	19	13-15	14
Total Credits	**64-66**			

M.Tech. (RF and Microwave Engineering)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	ECL-542	Microwave Integrated Circuits	PEC	4	3	1	0	3	0
2.	ECL-512	High Power mm/THz Wave Engineering	PEC	4	3	1	0	3	0
3.	ECL-544	Advanced Radar Engineering	PEC	4	3	1	0	3	0
4.	ECL-513	Fiber Optic Systems	PEC	4	3	1	0	3	0
5.	ECL-559	Advanced Maths	PEC	4	3	1	0	3	0
6.	ECL-516	Microwave and mm-wave Circuits	PEC	4	3	1	0	3	0
7.	ECL-517	Microwave Imaging	PEC	4	3	1	0	3	0
8.	ECL-518	Digital Communication Systems	PEC	4	3	1	0	3	0
9.	ECL-510	Nonionizing Radiations and Health Risks	PEC	4	3	1	0	3	0
10.	ECL-511	Microwave Photonic ICs	PEC	4	3	1	0	3	0
11.	ECL-521	RF Integrated Circuit Design for mmWave Radio	PEC	4	3	1	0	3	0
12.	ECL-522	Computational Techniques for Microwaves	PEC	4	3	1	0	3	0
13.	ECL-523	RF Power Amplifier and Transmitter Design	PEC	4	3	1	0	3	0
14.	ECL-524	RF & Microwave MEMS	PEC	4	3	1	0	3	0
15.	ECL-527	RF CMOS Transceiver Design	PEC	4	3	1	0	3	0
16.	ECL-550	Radar Signal Processing	PEC	4	3	1	0	3	0
17.	ECL-528	Adaptive Beam Forming and Smart Antennas	PEC	4	3	1	0	3	0

18.	ECL-529	Soft Computing Techniques for RF Engineering	PEC	4	3	1	0	3	0
19.	ECL-530	Advanced Digital Communication Techniques	PEC	4	3	1	0	3	0
20.	ECL-531	Advanced Millimeter-Wave Characterization and Techniques	PEC	4	3	1	0	3	0
21.	ECL-560	Industry Oriented RFM Lab.	PEC	2	0	0	3	0	3
22.	ECL-567	Wireless Communication Lab.	PEC	2	0	0	3	0	3
23.	ECL-565	THz CAD Lab.	PEC	2	0	0	3	0	3

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					**Contact Hours/Week**			**Exam Duration**	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	ECT-501	Inference and Learning Algorithms	STAR	3	3	0	0	3	0
2.	ECT-502	Semiconductor Technology and its Applications	STAR	3					
3.	ECT-503	5G/6G Technology and its Societal Applications	STAR	3					
4.	ECT-504	Applications of RF Technology in Defence and Space Applications	STAR	3					

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in RF and Microwave Engineering**
Department: **Department of Electronics and Communication Engineering**
Year: **I**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-521	Antenna Theory and Design	PCC	4	3	1	0	3	0
2.	ECC-523	Advanced EMFT	PCC	3	3	0	0	3	0
3.	ECC-525	Microwave Engineering	PCC	3	3	0	0	3	0
4.	ECC-527	Introduction to Microwave Measurements	PCC	4	2	0	4	3	2
5.	ECC-529	Microwave Engineering Lab.	PCC	2	0	0	3	0	3
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.	ECC-751A	Thesis Stage-I	THESIS	13	-	-	-	-	-
		Total		**17**					

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in RF and Microwave Engineering**
Department: **Department of Electronics and Communication Engineering**
Year: **II**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-751B	Thesis Stage-II	THESIS	15	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	ECC-751C	Thesis Stage-III	THESIS	16	-	-	-	-	-
		Total		**16**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	17	15	16
Total Credits	**66**			

Master of Science (by Research) in RF and Microwave Engineering

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	ECL-542	Microwave Integrated Circuits	PEC	4	3	1	0	3	0
2.	ECL-512	High Power mm/THz Wave Engineering	PEC	4	3	1	0	3	0
3.	ECL-544	Advanced Radar Engineering	PEC	4	3	1	0	3	0
4.	ECL-513	Fiber Optic Systems	PEC	4	3	1	0	3	0
5.	ECL-559	Advanced Maths	PEC	4	3	1	0	3	0
6.	ECL-516	Microwave and mm-wave Circuits	PEC	4	3	1	0	3	0
7.	ECL-517	Microwave Imaging	PEC	4	3	1	0	3	0
8.	ECL-518	Digital Communication Systems	PEC	4	3	1	0	3	0
9.	ECL-510	Nonionizing Radiations and Health Risks	PEC	4	3	1	0	3	0
10.	ECL-511	Microwave Photonic ICs	PEC	4	3	1	0	3	0
11.	ECL-521	RF Integrated Circuit Design for mmWave Radio	PEC	4	3	1	0	3	0
12.	ECL-522	Computational Techniques for Microwaves	PEC	4	3	1	0	3	0
13.	ECL-523	RF Power Amplifier and Transmitter Design	PEC	4	3	1	0	3	0
14.	ECL-524	RF & Microwave MEMS	PEC	4	3	1	0	3	0
15.	ECL-527	RF CMOS Transceiver Design	PEC	4	3	1	0	3	0
16.	ECL-550	Radar Signal Processing	PEC	4	3	1	0	3	0
17.	ECL-528	Adaptive Beam Forming and Smart Antennas	PEC	4	3	1	0	3	0

18.	ECL-529	Soft Computing Techniques for RF Engineering	PEC	4	3	1	0	3	0
19.	ECL-530	Advanced Digital Communication Techniques	PEC	4	3	1	0	3	0
20.	ECL-531	Advanced Millimeter-Wave Characterization and Techniques	PEC	4	3	1	0	3	0
21.	ECL-560	Industry Oriented RFM Lab.	PEC	2	0	0	3	0	3
22.	ECL-567	Wireless Communication Lab.	PEC	2	0	0	3	0	3
23.	ECL-565	THz CAD Lab.	PEC	2	0	0	3	0	3

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Terahertz Communication and Sensing)**
Department: **Department of Electronics and Communication Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-501	Electromagnetic Field Theory and Scattering	PCC	3	3	0	0	3	0
2.	ECC-503	THz Electronics	PCC	3	3	0	0	3	0
3.	ECC-505	Linear Algebra and Random Processes	PCC	4	3	1	0	3	0
4.	ECC-507	Essential Concepts in THz Communication	PCC	4	3	1	0	3	0
5.	ECC-509	THz Design Lab.	PCC	2	0	0	3	0	3
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	2	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	ECC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**19**					

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Terahertz Communication and Sensing)**
Department: **Department of Electronics and Communication Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
Semester-I (Autumn)									
1.	ECC-691	Internship Social Activity	ISA	3-5	-	-	-	-	-
2.	ECC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13-15**					
Semester-II (Spring)									
1.	ECC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	19	13-15	14
Total Credits	**64-66**			

M.Tech. (Terahertz Communication and Sensing)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	ECL-503	Terahertz Communication Systems	PEC	4	3	1	0	3	0
2.	ECL-504	Millimeter Wave and Terahertz Antenna Design	PEC	4	3	1	0	3	0
3.	ECL-514	Detection and Estimation Theory	PEC	4	3	1	0	3	0
4.	ECL-505	High Speed Semiconductor Devices	PEC	4	3	1	0	3	0
5.	ECL-506	Surface Electromagnetics	PEC	4	3	1	0	3	0
6.	ECL-507	High-Frequency Dielectric Guides	PEC	4	3	1	0	3	0
7.	ECL-508	Terahertz Sensing and Imaging	PEC	4	3	1	0	3	0
8.	ECL-509	Microwave and Millimeter Wave Circuits	PEC	4	3	1	0	3	0
9.	ECL-510	Nonionizing Radiations and Health Risks	PEC	4	3	1	0	3	0
10.	ECL-511	Microwave Photonic ICs	PEC	4	3	1	0	3	0
11.	ECL-618	Wireless Technologies: 5G and Beyond	PEC	4	3	1	0	3	0
12.	ECL-620	Advanced Wireless Communication	PEC	4	3	1	0	3	0
13.	ECL-564	Industry Oriented THz Lab.	PEC	2	0	0	3	0	3
14.	ECL-565	THz CAD Lab.	PEC	2	0	0	3	0	3
15.	ECL-566	6G Communication Lab.	PEC	2	0	0	3	0	3

M.Tech. (Terahertz Communication and Sensing)

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	ECT-501	Inference and Learning Algorithms	STAR	3	3	0	0	3	0
2.	ECT-502	Semiconductor Technology and its Applications	STAR	3					
3.	ECT-503	5G/6G Technology and its Societal Applications	STAR	3					
4.	ECT-504	Applications of RF Technology in Defence and Space Applications	STAR	3					

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Terahertz Communication and Sensing**
Department: **Department of Electronics and Communication Engineering**
Year: **I**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
Semester-I (Autumn)									
1.	ECC-501	Electromagnetic Field Theory and Scattering	PCC	3	3	0	0	3	0
2.	ECC-503	THz Electronics	PCC	3	3	0	0	3	0
3.	ECC-505	Linear Algebra and Random Processes	PCC	4	3	1	0	3	0
4.	ECC-507	Essential Concepts in THz Communication	PCC	4	3	1	0	3	0
5.	ECC-509	THz Design Lab.	PCC	2	0	0	3	0	3
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.	ECC-751A	Thesis Stage-I	THESIS	13	-	-	-	-	-
		Total		**17**					

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Science (by Research) in Terahertz Communication and Sensing**
Department: **Department of Electronics and Communication Engineering**
Year: **II**
Model: **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-751B	Thesis Stage-II	THESIS	15	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	ECC-751C	Thesis Stage-III	THESIS	16	-	-	-	-	-
		Total		**16**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	17	15	16
Total Credits	**66**			

Master of Science (by Research) in Terahertz Communication and Sensing

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	ECL-503	Terahertz Communication Systems	PEC	4	3	1	0	3	0
2.	ECL-504	Millimeter Wave and Terahertz Antenna Design	PEC	4	3	1	0	3	0
3.	ECL-514	Detection and Estimation Theory	PEC	4	3	1	0	3	0
4.	ECL-505	High Speed Semiconductor Devices	PEC	4	3	1	0	3	0
5.	ECL-506	Surface Electromagnetics	PEC	4	3	1	0	3	0
6.	ECL-507	High-Frequency Dielectric Guides	PEC	4	3	1	0	3	0
7.	ECL-508	Terahertz Sensing and Imaging	PEC	4	3	1	0	3	0
8.	ECL-509	Microwave and Millimeter Wave Circuits	PEC	4	3	1	0	3	0
9.	ECL-510	Nonionizing Radiations and Health Risks	PEC	4	3	1	0	3	0
10.	ECL-511	Microwave Photonic ICs	PEC	4	3	1	0	3	0
11.	ECL-618	Wireless Technologies: 5G and Beyond	PEC	4	3	1	0	3	0
12.	ECL-620	Advanced Wireless Communication	PEC	4	3	1	0	3	0
13.	ECL-564	Industry Oriented THz Lab.	PEC	2	0	0	3	0	3
14.	ECL-565	THz CAD Lab.	PEC	2	0	0	3	0	3
15.	ECL-566	6G Communication Lab.	PEC	2	0	0	3	0	3

DEPARTMENT OF MATHEMATICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Sc. (Mathematics)**
Department: **Department of Mathematics**
Year: **I**
Model: **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	MAC-401	Abstract Algebra	PCC	4	3	1	0	3	0
2.	MAC-403	Linear Algebra	PCC	4	3	1	0	3	0
3.	MAC-405	Real Analysis	PCC	4	3	1	0	3	0
4.	MAC-501	Probability and Statistics	PCC	4	3	0	2	3	0
5.	MAC-503	Ordinary Differential Equations	PCC	4	3	1	0	3	0
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**22**					
Semester-II (Spring)									
1.	MAC-402	Topology	PPI	4	3	1	0	3	0
2.	MAC-404	Functional Analysis	PPI	4	3	1	0	3	0
3.	MAC-502	Complex Analysis	PPI	4	3	1	0	3	0
4.	MAC-504	Partial Differential Equations	PPI	4	3	1	0	3	0
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	MAC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF MATHEMATICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Sc. (Mathematics)**
Department: **Department of Mathematics**
Year: **II**
Model: **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	MAC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	MAC-511	Numerical Analysis	PPI	4	3	0	2	3	0
3.	MAC-513	Operations Research	PPI	4	3	0	2	3	0
4.		Program Elective-I	PPI	3/4	-	-	-	-	-
5.		Program Elective-II	PPI	3/4	-	-	-	-	-
		Total		**17/19**					
Semester-II (Spring)									
1.	MAC-601	Project	PROJECT	8	-	-	-	-	-
2.		Program Elective-III	PEC	3/4	-	-	-	-	-
3.		Program Elective-IV	PEC	3/4	-	-	-	-	-
		Total		**14/16**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	22	21	17/19	14/16
Total Credits	**74/78**			

M.Sc. (Mathematics)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	MAL-410	Computer Programming	PEC	4	3	1	0	3	0
2.	MAL-411	Analytic Number Theory	PEC	4	3	1	0	3	0
3.	MAL-412	Combinatorial Mathematics	PEC	4	3	1	0	3	0
4.	MAL-413	Credit Risk Modeling	PEC	4	3	1	0	3	0
5.	MAL-414	Differential Geometry	PEC	4	3	1	0	3	0
6.	MAL-416	Graph Theory	PEC	4	3	1	0	3	0
7.	MAL-417	Mathematical Image Processing	PEC	4	3	1	0	3	0
8.	MAL-418	Mathematical Modeling and Simulation	PEC	4	3	1	0	3	0
9.	MAL-419	Number Theory	PEC	4	3	1	0	3	0
10.	MAL-420	Statistical Machine Learning	PEC	4	3	1	0	3	0
11.	MAL-511	Abstract Harmonic Analysis	PEC	4	3	1	0	3	0
12.	MAL-512	Advanced Complex Analysis	PEC	4	3	1	0	3	0
13.	MAL-513	Advanced Matrix Theory	PEC	4	3	1	0	3	0
14.	MAL-514	Advanced Numerical Analysis	PEC	4	3	1	0	3	0
15.	MAL-515	Advanced Operations Research	PEC	4	3	1	0	3	0
16.	MAL-516	Advanced Partial Differential Equations	PEC	4	3	1	0	3	0
17.	MAL-517	Algebraic Number Theory	PEC	4	3	1	0	3	0

18.	MAL-518	Algebraic Topology	PEC	4	3	1	0	3	0
19.	MAL-519	Approximation Theory	PEC	4	3	1	0	3	0
20.	MAL-520	Coding Theory	PEC	4	3	1	0	3	0
21.	MAL-521	Commutative Algebra	PEC	4	3	1	0	3	0
22.	MAL-522	Computational Fluid Dynamics	PEC	4	3	1	0	3	0
23.	MAL-523	Control Theory	PEC	4	3	1	0	3	0
24.	MAL-524	Dynamical Systems	PEC	4	3	1	0	3	0
25.	MAL-525	Fluid Dynamics	PEC	4	3	1	0	3	0
26.	MAL-526	Fourier Analysis and Applications	PEC	4	3	1	0	3	0
27.	MAL-527	Fuzzy Sets and Fuzzy Systems	PEC	4	3	1	0	3	0
28.	MAL-528	Hyperbolic Conservation Laws	PEC	4	3	1	0	3	0
29.	MAL-529	Integral Equations and Calculus of Variations	PEC	4	3	1	0	3	0
30.	MAL-530	Finite Element Methods	PEC	4	3	1	0	3	0
31.	MAL-531	Mathematical Biology	PEC	4	3	1	0	3	0
32.	MAL-532	Mathematical Cryptography	PEC	4	3	1	0	3	0
33.	MAL-533	Measure Theory	PEC	4	3	1	0	3	0
34.	MAL-534	Multivariate Techniques	PEC	4	3	1	0	3	0
35.	MAL-535	Numerical Linear Algebra	PEC	4	3	1	0	3	0
36.	MAL-536	Operator Theory	PEC	4	3	1	0	3	0
37.	MAL-537	Optimal Control Theory	PEC	4	3	1	0	3	0
38.	MAL-538	Orthogonal Polynomials and Special Functions	PEC	4	3	1	0	3	0
39.	MAL-539	Portfolio Optimization	PEC	4	3	1	0	3	0
40.	MAL-540	Regularization Theory for Inverse Problems	PEC	4	3	1	0	3	0
41.	MAL-541	Representation Theory of Finite Groups	PEC	4	3	1	0	3	0
42.	MAL-542	Semigroup Theory and Applications	PEC	4	3	1	0	3	0
43.	MAL-543	Sobolev Spaces and Applications	PEC	4	3	1	0	3	0

44.	MAL-544	Statistical Inference	PEC	4	3	1	0	3	0
45.	MAL-545	Stochastic Differential Equations	PEC	4	3	1	0	3	0
46.	MAL-546	Stochastic Partial Differential Equations	PEC	4	3	1	0	3	0
47.	MAL-547	Stochastic Calculus	PEC	4	3	1	0	3	0
48.	MAL-548	Ergodic Theory	PEC	4	3	1	0	3	0
49.	MAL-549	Financial Mathematics	PEC	4	3	1	0	3	0
50.	MAL-550	Financial Risk Management	PEC	4	3	1	0	3	0
51.	MAL-551	Numerical Optimization	PEC	4	3	1	0	3	0
52.	MAL-552	Probability Theory	PEC	3	3	0	0	3	0
53.	MAL-553	Ergodic Theory	PEC	3	3	0	0	3	0
54.	MAL-554	Introduction to Operator Algebra	PEC	3	3	0	0	3	0
55.	MAL-555	Parallel Computing	PEC	4	3	1	0	3	0
56.	MAL-556	Soft Computing	PEC	4	3	1	0	3	0
57.	MAL-557	Evolutionary Algorithms	PEC	4	3	1	0	3	0

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	MAT-501	Computational Methods for AI and ML	STAR	3	2	1	0	3	0

DEPARTMENT OF PHYSICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Solid State Electronic Technology)**
Department: **Department of Physics**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	PHC-501	Numerical Analysis and Computational Techniques	PCC	3	2	0	2	3	0
2.	PHC-503	Fabrication and Characterization Techniques	PCC	3	3	0	0	3	0
3.	PHC-505	Laboratory Work in Solid-State Electronic Materials	PCC	3	0	0	6	0	6
4.	PHC-507	Semiconductor Device Physics	PCC	4	3	1	0	3	0
5.	PHC-509	Science and Technology of Thin Films	PCC	3	3	0	0	3	0
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	PHC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF PHYSICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Solid State Electronic Technology)**
Department: **Department of Physics**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	PHC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	PHC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	PHC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	13	14
Total Credits	**66**			

M.Tech. (Solid State Electronic Technology)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	PHL-541	Materials for Renewable Energy and Storage	PEC	4	3	1	0	3	0
2.	PHL-542	Analog Integrated Circuit Design	PEC	4	3	1	0	3	0
3.	PHL-543	Digital Signal Processing	PEC	4	3	1	0	3	0
4.	PHL-544	Thin Film Technology	PEC	4	3	1	0	3	0
5.	PHL-545	Nanoscience and Nanotechnology	PEC	4	3	1	0	3	0
6.	PHL-546	Functional Properties of Materials & Devices	PEC	4	3	1	0	3	0
7.	PHL-547	Engineered Materials for Device Application	PEC	4	3	1	0	3	0
8.	PHL-548	Semiconductor Micro-electronic Technology	PEC	4	3	1	0	3	0
9.	PHL-549	Nano-electronics and Photonics	PEC	4	3	1	0	3	0
10.	PHL-550	Solar Photovoltaic and Energy Storage	PEC	4	3	1	0	3	0
11.	PHL-551	Advance Fuel Cell and Battery Technology	PEC	4	3	1	0	3	0
12.	PHL-552	MEMS and NEMS	PEC	4	3	1	0	3	0
13.	PHL-553	Advanced Ceramics and Composites	PEC	4	3	1	0	3	0

M.Tech. (Solid State Electronic Technology)

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	PHT-501	Advanced Materials for Energy Harvesting and Storage	STAR	3	3	0	0	3	0
2.	PHT-502	Functional Materials	STAR	3	3	0	0	3	0
3.	PHT-503	Fundamentals of Nanoscience and Technology	STAR	3	3	0	0	3	0
4.	PHT-504	Computational Science with Python	STAR	3	2	0	2	3	0
5.	PHT-505	Quantum Simulations	STAR	3	2	0	2	3	0
6.	PHT-506	Superconducting Qubits-based Quantum Computing	STAR	3	3	0	0	3	0

DEPARTMENT OF PHYSICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Photonics)**
Department: **Department of Physics**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	PHC-501	Numerical Analysis and Computational Techniques	PCC	3	2	0	2	3	0
2.	PHC-507	Semiconductor Device Physics	PCC	4	3	1	0	3	0
3.	PHC-511	Laboratory Work in Photonics	PCC	3	0	0	6	0	6
4.	PHC-513	Optical Electronics	PCC	4	3	1	0	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**16**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	PHC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF PHYSICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Photonics)**
Department: **Department of Physics**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	PHC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	PHC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	PHC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	16	21	13	14
Total Credits	**64**			

M.Tech. (Photonics)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	PHL-542	Analog Integrated Circuit Design	PEC	4	3	1	0	3	0
2.	PHL-543	Digital Signal Processing	PEC	4	3	1	0	3	0
3.	PHL-549	Nano-electronics and Photonics	PEC	4	3	1	0	3	0
4.	PHL-550	Solar Photovoltaic and Energy Storage	PEC	4	3	1	0	3	0
5.	PHL-554	Radiation Detection and Measurements	PEC	4	3	1	0	3	0
6.	PHL-555	Optical Communication System	PEC	4	3	1	0	3	0
7.	PHL-556	Optical Networks	PEC	4	3	1	0	3	0
8.	PHL-557	Solid State Lighting	PEC	4	3	1	0	3	0
9.	PHL-558	Display Technology	PEC	4	3	1	0	3	0
10.	PHL-559	Photonic Sensors	PEC	4	3	1	0	3	0
11.	PHL-560	Photonic Analysis and Design	PEC	4	3	1	0	3	0
12.	PHL-561	Silicon Photonics	PEC	4	3	1	0	3	0
13.	PHL-562	Quantum Photonics	PEC	4	3	1	0	3	0

M.Tech. (Photonics)

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	PHT-501	Advanced Materials for Energy Harvesting and Storage	STAR	3	3	0	0	3	0
2.	PHT-502	Functional Materials	STAR	3	3	0	0	3	0
3.	PHT-503	Fundamentals of Nanoscience and Technology	STAR	3	3	0	0	3	0
4.	PHT-504	Computational Science with Python	STAR	3	2	0	2	3	0
5.	PHT-505	Quantum Simulations	STAR	3	2	0	2	3	0
6.	PHT-506	Superconducting Qubits-based Quantum Computing	STAR	3	3	0	0	3	0

DEPARTMENT OF PHYSICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Sc. (Physics)**
Department: **Department of Physics**
Year: **I**
Model: **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	PHC-521	Quantum Mechanics-I	PCC	4	3	1	0	3	0
2.	PHC-523	Advanced Mathematical Physics	PCC	4	3	1	0	3	0
3.	PHC-525	Classical Electrodynamics	PCC	4	3	1	0	3	0
4.	PHC-527	Classical Mechanics	PCC	4	3	1	0	3	0
5.	PHC-529	Atomic, Molecular and Laser Physics	PCC	3	3	0	0	3	0
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**21**					
Semester-II (Spring)									
1.	PHC-531	Condensed Matter Physics	PPI	3	3	0	0	3	0
2.	PHC-533	Statistical Mechanics	PPI	3	3	0	0	3	0
3.	PHC-535	Laboratory Work	PPI	3	0	0	6	0	4
4.	PHC-537	Elements of Nuclear and Particle Physics	PPI	3	3	0	0	3	0
5.	PHC-539	Physics of Earth's Atmosphere	PPI	2	2	0	0	2	0
6.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
7.	PHC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**19**					

DEPARTMENT OF PHYSICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Sc. (Physics)**
Department: **Department of Physics**
Year: **II**
Model: **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	PHC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	PHC-543	Computational Physics	PPI	3	2	0	2	3	0
3.	PHC-545	Semiconductor Devices and Applications	PPI	3	3	0	0	3	0
4.	PHC-547	Quantum Mechanics - II	PPI	3	3	0	0	3	0
5.		Program Elective-I	PPI	4	-	-	-	-	-
6.		Program Elective-II	PPI	3	-	-	-	-	-
7.		Project-I	PROJECT	2					
		Total		**21**					
Semester-II (Spring)									
1.		Program Elective-III	PEC	4	-	-	-	-	-
2.		Program Elective-IV	PEC	4	-	-	-	-	-
3.	PHC-602	Project-II	PROJECT	9	-	-	-	-	-
		Total		**17**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	21	19	21	17
Total Credits	**78**			

M.Sc. (Physics)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	PHL-502	Physics of Nanosystems	PEC	4	3	1	0	3	0
2.	PHL-504	Fiber and Nonlinear Optics	PEC	4	3	1	0	3	0
3.	PHL-505	Quantum Optics	PEC	4	3	1	0	3	0
4.	PHL-508	Introduction to Superstring Theory	PEC	4	3	1	0	3	0
5.	PHL-510	Advanced Characterization Techniques	PEC	4	3	1	0	3	0
6.	PHL-511	Atomic and Molecular Collision Physics	PEC	4	3	1	0	3	0
7.	PHL-513	Astrophysics	PEC	4	3	1	0	3	0
8.	PHL-514	Solar-Terrestrial Physics	PEC	4	3	1	0	3	0
9.	PHL-515	General Relativity	PEC	4	3	1	0	3	0
10.	PHL-516	Computational Nuclear Physics	PEC	4	3	1	0	3	0
11.	PHL-517	Particle Physics	PEC	4	3	1	0	3	0
12.	PHL-521	Weather Forecasting	PEC	4	3	1	0	3	0
13.	PHL-522	Nuclear Instrumentation	PEC	4	3	1	0	3	0
14.	PHL-523	Physics and Technology of Thin Films	PEC	4	3	1	0	3	0
15.	PHL-524	Advanced Nuclear Reactions	PEC	4	3	1	0	3	0
16.	PHL-525	Semiconductor Photonics	PEC	4	3	1	0	3	0
17.	PHL-526	Advanced Light Sources	PEC	4	3	1	0	3	0

18.	PHL-527	Superconducting Radio Frequency for Particle Accelerators	PEC	4	3	1	0	3	0
19.	PHL-528	Advanced Condensed Matter Physics	PEC	4	3	0	3	3	0
20.	PHL-529	Advanced Atmospheric Physics	PEC	4	3	0	3	3	0
21.	PHL-530	Advanced Laser Physics	PEC	4	3	0	3	3	0
22.	PHL-531	Advanced Nuclear Physics	PEC	4	3	0	3	3	0
23.	PHL-532	Advanced Quantum Field Theory	PEC	4	3	1	0	3	0
24.	PHL-533	Quantum Computing for Many Body Systems	PEC	4	3	1	0	3	0
25.	PHL-534	Nuclear Astrophysics	PEC	3	3	0	0	3	0
26.	PHL-535	Superfluidity and Superconductivity	PEC	3	3	0	0	3	0
27.	PHL-536	Advanced Topics in Mathematical Physics	PEC	3	3	0	0	3	0
28.	PHL-537	Advanced Electroceramics Technology	PEC	3	3	0	0	3	0
29.	PHL-538	A Primer in Quantum Field Theory	PEC	3	3	0	0	3	0
30.	PHL-539	Advanced Atomic and Molecular Physics	PEC	3	3	0	0	3	0
31.	PHL-540	Quantum Theory of Solids	PEC	3	3	0	0	3	0

M.Sc. (Physics)

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	PHT-501	Advanced Materials for Energy Harvesting and Storage	STAR	3	3	0	0	3	0
2.	PHT-502	Functional Materials	STAR	3	3	0	0	3	0
3.	PHT-503	Fundamentals of Nanoscience and Technology	STAR	3	3	0	0	3	0
4.	PHT-504	Computational Science with Python	STAR	3	2	0	2	3	0
5.	PHT-505	Quantum Simulations	STAR	3	2	0	2	3	0
6.	PHT-506	Superconducting Qubits-based Quantum Computing	STAR	3	3	0	0	3	0

DEPARTMENT OF CHEMISTRY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Sc. (Chemistry)**
Department: **Department of Chemistry**
Year: **I**
Model: **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	CYC-501	Quantum Chemistry, Symmetry and Group Theory	PCC	4	3	1	0	3	0
2.	CYC-503	Thermodynamics, Interfaces and Solids	PCC	3	3	0	0	3	0
3.	CYC-505	Advanced Analytical Methods	PCC	3	3	0	0	3	0
4.	CYC-507	Structure and Reactivity of Organic Molecules	PCC	3	3	0	0	3	0
5.	CYC-509	Coordination Chemistry	PCC	3	3	0	0	3	0
6.	CYC-511	Organic Chemistry Laboratory	PCC	3	0	0	6	0	6
7.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**21**					
Semester-II (Spring)									
1.	CYC-502	Advanced Organometallic Chemistry	PPI	3	3	0	0	3	0
2.	CYC-504	Kinetics and Photochemistry	PPI	3	3	0	0	3	0
3.	CYC-506	Organic Reaction Mechanisms	PPI	3	3	0	0	3	0
4.	CYC-508	Molecular Spectroscopy	PPI	3	2	0	2	3	0
5.	CYC-510	Inorganic Chemistry Laboratory	PPI	3	0	0	6	0	6
6.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
7.	CYC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**20**					

DEPARTMENT OF CHEMISTRY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Sc. (Chemistry)**
Department: **Department of Chemistry**
Year: **II**
Model: **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	CYC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	CYC-513	Physical Chemistry Laboratory	PPI	3	0	0	6	0	6
3.		Program Elective-I	PPI	3	-	-	-	-	-
4.		Program Elective-II	PPI	3	-	-	-	-	-
5.		Program Elective-III	PPI	3	-	-	-	-	-
6.		Program Elective-IV	PPI	3	-	-	-	-	-
7.	CYC-601	Project-I	PROJECT	2	0	0	4	0	0
		Total		**20**					
Semester-II (Spring)									
1.		Program Elective-V	PEC	3	-	-	-	-	-
2.		Program Elective-VI	PEC	3	-	-	-	-	-
3.	CYC-602	Project-II	PROJECT	10	0	0	20	0	0
		Total		**16**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	21	20	20	16
Total Credits	**77**			

M.Sc. (Chemistry)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	CYL-501	Chemistry of Main Group and Transition Metals	PEC	3	3	0	0	3	0
2.	CYL-502	Drug Design and Synthesis	PEC	3	3	0	0	3	0
3.	CYL-512	Nuclear and Radiochemistry	PEC	3	3	0	0	3	0
4.	CYL-518	Structure, Bonding and Properties of Solids	PEC	3	3	0	0	3	0
5.	CYL-520	Inorganic Rings and Polymers	PEC	3	3	0	0	3	0
6.	CYL-522	Synthesis and Properties of Materials	PEC	3	3	0	0	3	0
7.	CYL-606	Total Synthesis	PEC	3	3	0	0	3	0
8.	CYL-607	Electroanalytical Chemistry	PEC	3	3	0	0	3	0
9.	CYL-608	Chemical Biology	PEC	3	3	0	0	3	0
10.	CYL-609	Inorganic Biochemistry and Reaction Mechanism	PEC	3	3	0	0	3	0
11.	CYL-610	Molecular Modelling and Simulations	PEC	3	2	0	2	2	0
12.	CYL-612	Carbon Nanomaterials and their Applications	PEC	3	3	0	0	3	0
13.	CYL-613	Frontiers in Inorganic Biochemistry	PEC	3	3	0	0	3	0
14.	CYL-614	Asymmetric Synthesis	PEC	3	3	0	0	3	0
15.	CYL-615	Crystal and Molecular Structure	PEC	3	2	0	2	2	0
16.	CYL-617	Supramolecular Chemistry	PEC	3	3	0	0	3	0
17.	CYL-621	Organic Structure Determination	PEC	3	3	0	0	3	0

18.	CYL-623	Organic Semiconductors	PEC	3	3	0	0	3	0
19.	CYL-625	Proteins and Polypeptides	PEC	3	3	0	0	3	0
20.	CYL-627	Solid State Chemistry and Applications	PEC	3	3	0	0	3	0
21.	CYL-629	Advanced Topics in Statistical Mechanics, and Quantum Chemistry	PEC	3	3	0	0	3	0
22.	CYL-633	Nanoscale Materials: Properties and Applications	PEC	3	3	0	0	3	0
23.	CYL-635	Advanced Magnetic Resonance Spectroscopy	PEC	3	3	0	0	3	0
24.	CYL-638	Reactivity, Structure Determination, Devices and Electronic Structure of Solids	PEC	3	2	0	2	3	0
25.	CYL-640	Organic Materials	PEC	3	2	0	2	3	0
26.	CYL-642	Computational Methods in Material Science	PEC	3	2	0	2	3	0
27.	CYL-644	High Energy Density Materials	PEC	3	3	0	0	3	0
28.	CYL-646	Fluorescence and Ultrafast Spectroscopy	PEC	3	3	0	0	3	0
29.	CYL-648	Synthesis and Applications of Tetrapyrroles	PEC	3	3	0	0	3	0
30.	CYL-703	Advanced Material Characterization Techniques	PEC	4	3	1	0	3	0
31.	CYL-902	Advanced Inorganic Chemistry	PEC	3	3	0	0	3	0
32.	CYL-903	Advanced Organic Chemistry	PEC	3	3	0	0	3	0
33.	CYL-904	Advanced Physical Chemistry	PEC	3	3	0	0	3	0
34.	CYL-905	Spectroscopic Methods of Structural Elucidation	PEC	4	3	1	0	3	0

M.Sc. (Chemistry)

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	CYT-501	Computational Approaches to Catalysis & Reaction Design	STAR	3	2	0	2	3	0
2.	CYT-502	Materials Chemistry: Synthesis and Application	STAR	3	3	0	0	3	0
3.	CYT-503	Advanced Instrumentation Techniques in Scientific Research	STAR	3	3	0	0	3	0

DEPARTMENT OF EARTH SCIENCES
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

ProgramCode: **XXX M.Sc. (Applied Geology)**
Department: **Department of Earth Sciences**
Year: **I**
Model: **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ESC-501	Mineralogy	PCC	4	3	0	2	3	0
2.	ESC-503	Geochemistry	PCC	4	3	0	2	3	0
3.	ESC-505	Igneous Petrology	PCC	4	3	0	2	3	0
4.	ESC-507	Structural Geology	PCC	4	3	0	2	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.	ESC-502	Field Training-I	PPI	2	-	-	-	-	-
2.	ESC-504	Applied Paleontology	PPI	3	2	0	2	3	0
3.	ESC-506	Metamorphic Petrology	PPI	3	2	0	2	3	0
4.	ESC-508	Geomorphology	PPI	3	2	1	0	3	0
5.	ESC-510	Economic and Ore Geology	PPI	3	2	0	2	3	0
6.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
7.	ESC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**19**					

DEPARTMENT OF EARTH SCIENCES
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Sc. (Applied Geology)**
Department: **Department of Earth Sciences**
Year: **II**
Model: **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.		Internship Social Activity	ISA	3	-	-	-	-	-
2.	ESC-511	Sedimentology and Stratigraphy	PPI	4	3	0	2	3	0
3.	ESC-513	Geophysical Prospecting	PPI	3	2	0	2	3	0
4.		Program Elective-I	PPI	3	2	1	0	3	0
5.		Program Elective-II	PPI	3	2	1	0	3	0
6.		Program Elective-III	PPI	3	2	1	0	3	0
		Total		**19**					
Semester-II (Spring)									
1.	ESC-601	Project	Project	8	-	-	-	-	-
2.	ESC-602	Field Training-II	Project	2	-	-	-	-	-
3.		Program Elective-IV	PEC	4	3	1	0	3	-
4.		Program Elective-V	PEC	4	3	1	0	3	-
		Total		**18**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	**18**	**19**	**19**	**18**
Total Credits	**74**			

M.Sc. (Applied Geology)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	ESL-501	Himalayan Geodynamics	PEC	3	2	1	0	3	0
2.	ESL-502	Computational Thermodynamic Modelling	PEC	3	2	1	0	3	0
3.	ESL-503	Shear Zone Processes	PEC	3	2	1	0	3	0
4.	ESL-504	Plate Tectonics	PEC	3	2	1	0	3	0
5.	ESL-505	Paleoecology	PEC	3	2	1	0	3	0
6.	ESL-506	Geohydrology	PEC	3	2	1	0	3	0
7.	ESL-507	Contaminant Hydrology	PEC	3	2	1	0	3	0
8.	ESL-508	Mineral Exploration and Mining Exploration	PEC	3	2	1	0	3	0
9.	ESL-509	Petroleum Geology	PEC	3	2	1	0	3	0
10.	ESL-510	Well Logging	PEC	3	2	1	0	3	0
11.	ESL-511	Oceanography	PEC	3	2	1	0	3	0
12.	ESL-512	Carbonate Sequence Stratigraphy	PEC	3	2	1	0	3	0
13	ESL-513	Basin Analysis	PEC	4	3	1	0	3	0
14.	ESL-514	Remote Sensing	PEC	4	3	1	0	3	0
15.	ESL-515	Isotope Geochemistry	PEC	4	3	1	0	3	0
16.	ESL-516	Engineering Geology	PEC	4	3	1	0	3	0
17.	ESL-517	Principles of GIS	PEC	4	3	1	0	3	0
18.	ESL-518	Coal Petrology	PEC	4	3	1	0	3	0
19.	ESL-519	Reservoir Geomechanics	PEC	4	3	1	0	3	0
20.	ESL-520	Analytical Techniques in Geosciences	PEC	4	3	1	0	3	0

M.Sc. (Applied Geology)

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EST-501	Computer Programming and Numerical Techniques in Geosciences	STAR	3	2	1	0	3	0
2.	EST-502	Fundamentals of ML in Geosciences	STAR	3	2	1	0	3	0

DEPARTMENT OF ARCHITECTURE AND PLANNING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Architecture**
Department: **Department of Architecture and Planning**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ARC-611	Sustainable Built Environment	PCC	3	2	1	0	3	0
2.	ARC-613	Advanced Building Technologies	PCC	3	2	1	0	3	0
3.	ARC-615	Urban Design	PCC	3	2	1	0	3	0
4.	ARC-617	Contemporary World Architecture	PCC	3	2	1	0	3	0
5.	ARC-619	Architectural Design Studio-I	PCC	4	1	0	8	-	-
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	3	-	-	-	-	-
3.		Program Elective-III	PEC	3	-	-	-	-	-
4.		Program Elective-IV	PEC	3	-	-	-	-	-
5.		Program Elective-V	PEC	3	-	-	-	-	-
6.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
7.	ARC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF ARCHITECTURE AND PLANNING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Architecture**
Department: **Department of Architecture and Planning**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ARC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	ARC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	ARC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	13	14
Total Credits	**66**			

Master of Architecture

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	ARL-601	Architectural Design Studio-II	PEC	4	0	0	8	0	0
2.	ARL-602	Sustainable Materials and Technologies	PEC	3	2	1	0	3	0
3.	ARL-603	Building Performance Evaluation	PEC	3	2	1	0	3	0
4.	ARL-604	Megastructures and Futuristic Construction Technologies	PEC	3	2	1	0	3	0
5.	ARL-605	Construction Planning and Management	PEC	3	2	1	0	3	0
6.	ARL-606	Building Operations & Management	PEC	3	2	1	0	3	0
7.	ARL-607	Digital Forms and Generative Architecture	PEC	3	2	1	2/2	3	0
8.	ARL-608	Contemporary Indian Architecture	PEC	3	2	1	0	3	0
9.	ARL-609	Architectural Theory and Criticism	PEC	3	2	1	0	3	0
10.	ARL-610	Design Thinking for Built Environment	PEC	3	2	1	0	3	0
11.	ARL-611	Architecture and Urban Conservation	PEC	3	2	1	0	3	0
12.	ARL-612	Vernacular Architecture	PEC	3	2	1	0	3	0
13.	ARL-613	Interior Architecture and Material Culture	PEC	3	2	1	0	3	0
14.	ARL-614	Urban Public Spaces	PEC	3	2	1	0	3	0
15.	ARL-615	Universal Accessibility and Inclusion in Built Environment	PEC	3	2	1	0	3	0
16.	ARL-616	Cities for Mental Well Being	PEC	3	2	1	0	3	0
17.	ARL-617	Designing for Urban Childhoods	PEC	3	2	1	0	3	0

18.	ARL-618	Built Environment for Ageing Futures	PEC	3	2	1	0	3	0
19.	ARL-619	Ecology and Sustainable Development	PEC	3	2	1	0	3	0
20.	ARL-620	Climate Change, Policies and Regulations for Sustainability	PEC	3	2	1	0	3	0
21.	ARL-621	Research Methods in Architecture and Planning	PEC	3	2	1	0	3	0

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	ART-501	Building Information Modelling	STAR	3	2	1	0	3	0

Social Sciences Course Basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	ARS-501	Architecture and Society	SSC	2	2	0	0	2	0
2.	ARS-502	Visual Narratives and Photo Essays in Built Environment	SSC	2	2	0	0	2	0
3.	ARS-503	Environment and Behaviour Studies	SSC	2	2	0	0	2	0

DEPARTMENT OF ARCHITECTURE AND PLANNING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Urban and Rural Planning**
Department: **Department of Architecture and Planning**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ARC-621	Planning Legislation and Governance	PCC	3	2	1	0	3	0
2.	ARC-623	Planning Theory	PCC	3	2	1	0	3	0
3.	ARC-625	Infrastructure Planning	PCC	3	2	1	0	3	0
4.	ARC-627	GIS and Remote Sensing Techniques	PCC	3	2	1	0	3	0
5.	ARC-629	Planning Studio-I	PCC	4	0	0	8	-	-
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	3	-	-	-	-	-
3.		Program Elective-III	PEC	3	-	-	-	-	-
4.		Program Elective-IV	PEC	3	-	-	-	-	-
5.		Program Elective-V	PEC	3	-	-	-	-	-
6.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
7.	ARC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

DEPARTMENT OF ARCHITECTURE AND PLANNING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Urban and Rural Planning**
Department: **Department of Architecture and Planning**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ARC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	ARC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	ARC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	13	14
Total Credits	**66**			

Master of Urban and Rural Planning

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	ARL-622	Planning Studio-II	PEC	4	0	0	8	0	0
2.	ARL-623	Sustainable Urban Transport Planning	PEC	3	2	1	0	3	0
3.	ARL-624	Urban Utilities and Services	PEC	3	2	1	0	3	0
4.	ARL-625	Mega Infrastructure	PEC	3	2	1	0	3	0
5.	ARL-626	Housing Policy and Planning	PEC	3	2	1	0	3	0
6.	ARL-627	Land Management	PEC	3	2	1	0	3	0
7.	ARL-628	Real Estate Management	PEC	3	2	1	0	3	0
8.	ARL-629	Urbanization and Globalization	PEC	3	2	1	0	3	0
9.	ARL-630	Regional Planning	PEC	3	2	1	0	3	0
10.	ARL-631	Rural Planning and Development	PEC	3	2	1	0	3	0
11.	ARL-632	Climate Change Adaptation and Disaster Risk Resilience	PEC	3	2	1	0	3	0
12.	ARL-633	Environmental Impact Assessment	PEC	3	2	1	0	3	0
13.	ARL-619	Ecology and Sustainable Development	PEC	3	2	1	0	3	0
14.	ARL-634	Big Data and Urban Analytics	PEC	3	2	1	0	3	0
15.	ARL-635	AI and ML Application in Planning	PEC	3	2	1	0	3	0
16.	ARL-636	Urban Dynamics	PEC	3	2	1	0	3	0
17.	ARL-637	Advanced Strategic Decision Making	PEC	3	2	1	0	3	0

18.	ARL-638	Urban Economics	PEC	3	2	1	0	3	0
19.	ARL-639	Infrastructure Project Finance and Management	PEC	3	2	1	0	3	0
20.	ARL-640	Public Policy Analysis	PEC	3	2	1	0	3	0
21.	ARL-641	Professional Practice in Planning	PEC	3	2	1	0	3	0
22.	ARL-642	Urban Management	PEC	3	2	1	0	3	0
23.	ARL-643	Research Methodology for Planning and Architecture	PEC	3	2	1	0	3	0

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	ART-502	Fundamental of Town Planning	STAR	3	2	1	0	3	0

Social Sciences Course Basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	ARS-504	Socio Economic for Planning	SSC	2	2	0	0	2	0

DEPARTMENT OF MANAGEMENT STUDIES
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Business Administration**
Department: **Department of Management Studies**
Year: **I**
Model: **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Term-I (Autumn)									
1.	BMC-501	Principles and Practice of Management	PCC	1.5	3	0	0	2	0
2.	BMC-502	Managerial Economics	PCC	2.0	4	0	0	3	0
3.	BMC-503	Financial Accounting	PCC	2.0	3	1	0	3	0
4.	BMC-504	Marketing Management-1	PCC	1.5	3	0	0	2	0
5.	BMC-505	Business Statistics	PCC	2.0	2	0	2	2	0
6.	BMC-506	IT and Organisation	PCC	1.5	3	0	0	2	0
7.		Social Science Course	SSC	-	-	-	-	-	-
		Total		**10.5**					
Term-II (Autumn)									
1.	BMC-507	Managerial Communication	PCC	1.5	0	0	3	0	0
2.	BMC-508	Marketing Management-2	PCC	1.5	3	0	0	2	0
3.	BMC-509	Organisational Behaviour	PCC	1.5	3	0	0	2	0
4.	BMC-510	Management Accounting	PCC	2.0	3	1	0	3	0
5.	BMC-511	Production and Operations Management-1	PCC	1.5	3	0	0	2	0
6.	BMC-512	Business Environment	PCC	1.5	2	1	0	2	0
7.		Social Science Course	SSC	2.0	-	-	-	-	-
		Total		**11.5**					

DEPARTMENT OF MANAGEMENT STUDIES
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Business Administration**
Department: **Department of Management Studies**
Year: **I**
Model: **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Term-III (Spring)									
1.	BMC-513	Production and Operations Management-2	PPI	1.5	3	0	0	2	0
2.	BMC-514	Financial Management	PPI	2.0	3	1	0	3	0
3.	BMC-515	Operations Research	PPI	1.5	2	1	0	2	0
4.	BMC-516	Digital Transformation	PPI	1.5	3	0	0	2	0
5.	BMC-517	Strategic Management-1	PPI	2.0	4	0	0	3	0
6.		Science, Technology, and Advanced Research-tools	STAR	-	-	-	-	-	-
7.	BMC-700	Seminar	SEM	2.0	-	-	-	-	-
		Total		**10.5**					
Term-IV (Spring)									
1.	BMC-518	Strategic Management-2	PPI	1.5	3	0	0	2	0
2.	BMC-519	Human Resource Management	PPI	1.5	3	0	0	2	0
3.	BMC-520	Business Research Methods	PPI	1.5	2	1	0	2	0
4.	BMC-521	Data Science for Managers	PPI	1.5	0	0	3	0	2
5.	BMC-522	Legal Aspect of Business	PPI	1.5	3	0	0	2	0
6.		Science, Technology, and Advanced Research-tools	STAR	3.0	-	-	-	-	-
		Total		**10.5**					

DEPARTMENT OF MANAGEMENT STUDIES
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Business Administration**
Department: **Department of Management Studies**
Year: **II**
Model: **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Term-V (Autumn)									
1.	BMC-523	Capstone Project	Project	1.5	0	0	6	0	0
2.	BMC-691	Internship Social Activity	ISA	2.0	-	-	-	-	-
3.		Program Elective-I	PPI	1.5	-	-	-	-	-
4.		Program Elective-II	PPI	1.5	-	-	-	-	-
5.		Program Elective-III	PPI	1.5	-	-	-	-	-
6.		Program Elective-IV	PPI	1.5	-	-	-	-	-
		Total		**9.5**					
Term-VI (Autumn)									
1.	BMC-692	Internship Social Activity^{++}	ISA	1.0	-	-	-	-	-
2.		Program Elective-V	PPI	1.5	-	-	-	-	-
3.		Program Elective-VI	PPI	1.5	-	-	-	-	-
4.		Program Elective-VII	PPI	1.5	-	-	-	-	-
5.		Program Elective-VIII	PPI	1.5	-	-	-	-	-
6.		Program Elective-IX	PPI	1.5	-	-	-	-	-
7.		Program Elective-X	PPI	1.5	-	-	-	-	-
		Total		**10.0**					

DEPARTMENT OF MANAGEMENT STUDIES
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX Master of Business Administration**
Department: **Department of Management Studies**
Year: **II**
Model: **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Term-VII (Spring)									
1.		Program Elective-XI	PEC	1.5	-	-	-	-	-
2.		Program Elective-XII	PEC	1.5	-	-	-	-	-
3.		Program Elective-XIII	PEC	1.5	-	-	-	-	-
4.		Program Elective-XIV	PEC	1.5	-	-	-	-	-
5.		Program Elective-XV	PEC	1.5	-	-	-	-	-
		Total		**7.5**					
Term-VIII (Spring)									
1.	BMC-601	Project	Project	6.0	-	-	-	-	-
		Total		**6.0**					

* SSC(Term 1&2) and STAR (Term 3&4) course will be conducted across two terms.
++ This 1 credit will be evaluated on the basis of participation in workshops organized for the topics under managerial skill enhancement basket.

- Award of specialisation: A student must earn 10 credits for a specialisation.
- Credit requirements for the specialisation will be completed using PECs/ STAR/ 8th term Project.

Master of Business Administration

Program Elective Courses

Open Electives

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	BML-501	Knowledge Management	PEC	1.5	3	0	0	2	-
2.	BML-502	Entrepreneurship Development	PEC	1.5	3	0	0	2	-
3.	BML-503	Industrial Waste Management	PEC	1.5	3	0	0	2	-
4.	BML-504	Management of Large Systems	PEC	1.5	3	0	0	2	-
5.	BML-505	Environment Management	PEC	1.5	3	0	0	2	-
6.	BML-506	Advanced Optimization Techniques for Management	PEC	1.5	3	0	0	2	-
7.	BML-507	Basics of Management of Information	PEC	1.5	3	0	0	2	-
8.	BML-508	Soft Computing Techniques for Management	PEC	1.5	3	0	0	2	-
9.	BML-509	Technology Management	PEC	1.5	3	0	0	2	-
10.	BML-510	Sustainable Development Goals	PEC	1.5	3	0	0	2	-

Managerial Skills Enhancement Basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	BML-586	Business Ethics	PEC	0	-	-	-	-	-
2.	BML-587	Hands on Experience on Product Development Tools	PEC	0	-	-	-	-	-
3.	BML-588	Working with Spreadsheet	PEC	0	-	-	-	-	-
4.	BML-589	Innovation and Creativity	PEC	0	-	-	-	-	-
A student has to complete courses of this basket which will be non-credit but part of transcript.									

Specialization Electives

(1) Human Resource Management

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	BML-511	Human Resource Planning and Development	PEC	1.5	3	0	0	2	-
2.	BML-512	Organisational Development	PEC	1.5	3	0	0	2	-
3.	BML-513	Labour Legislation and Industrial Relations	PEC	1.5	3	0	0	2	-
4.	BML-514	Career Planning and Performance Management	PEC	1.5	3	0	0	2	-
5.	BML-515	Training and Talent Development	PEC	1.5	3	0	0	2	-
6.	BML-516	Competency Management	PEC	1.5	3	0	0	2	-

7.	BML-517	Management of Change	PEC	1.5	3	0	0	2	-
8.	BML-518	Managing Innovation and Creativity	PEC	1.5	3	0	0	2	-
9.	BML-519	Management of Self and Interpersonal Dynamics	PEC	1.5	3	0	0	2	-
10.	BML-520	Strategic Human Resource Management	PEC	1.5	3	0	0	2	-
11.	BML-521	Human Resource Analytics	PEC	1.5	3	0	0	2	-
12.	BML-522	Training of Trainers	PEC	1.5	3	0	0	2	-
13.	BML-523	Leadership and Team Management	PEC	1.5	3	0	0	2	-
14.	BML-524	Talent Acquisition and Management	PEC	1.5	3	0	0	2	-
15.	BML-525	Future of Work	PEC	1.5	3	0	0	2	-
16.	BML-526	Managing Workforce Diversity	PEC	1.5	3	0	0	2	-

(2) Operations

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	BML-527	Manufacturing Strategy	PEC	1.5	3	0	0	2	-
2.	BML-528	Service Operations Management	PEC	1.5	3	0	0	2	-
3.	BML-529	Supply Chain Management	PEC	1.5	3	0	0	2	-
4.	BML-530	Supply Chain Analytics	PEC	1.5	3	0	0	2	-
5.	BML-531	Operations Analytics	PEC	1.5	3	0	0	2	-
6.	BML-532	Project Management	PEC	1.5	3	0	0	2	-
7.	BML-533	Essential AI for Managers	PEC	1.5	3	0	0	2	-
8.	BML-534	Advanced AI for Managers	PEC	1.5	3	0	0	2	-
9.	BML-535	Game Theory for Strategic Advantage	PEC	1.5	3	0	0	2	-

10.	BML-536	Quality Management	PEC	1.5	3	0	0	2	-
11.	BML-537	Queuing Systems and Simulation	PEC	1.5	3	0	0	2	-
12.	BML-538	Advanced Quality Management	PEC	1.5	3	0	0	2	-
13.	BML-539	Case Studies in Application of Decision Models	PEC	1.5	3	0	0	2	-
14.	BML-540	Circular Supply Chain for Sustainability	PEC	1.5	3	0	0	2	-
15.	BML-541	Industrial Internet of Things for Managers	PEC	1.5	3	0	0	2	-
16.	BML-542	Spreadsheet Modelling	PEC	1.5	3	0	0	2	-
17.	BML-543	Business Analytics	PEC	1.5	3	0	0	2	-
18.	BML-544	Logistics Management	PEC	1.5	3	0	0	2	-
19.	BML-545	Logistics Analytics	PEC	1.5	3	0	0	2	-

(3) Information Technology

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	BML-546	Management of Information Technology	PEC	1.5	3	0	0	2	-
2.	BML-547	Enterprise Business Applications	PEC	1.5	3	0	0	2	-
3.*	BML-548	Information Technology Project Management	PEC	1.5	3	0	0	2	-
4.	BML-549	Software Engineering and Management of Software Development	PEC	1.5	3	0	0	2	-
5.	BML-550	Design of On-Line Systems	PEC	1.5	3	0	0	2	-
6.	BML-551	Decision Support and Experts Systems	PEC	1.5	3	0	0	2	-
7.	BML-552	Business Process Management	PEC	1.5	3	0	0	2	-
8.*	BML-553	Electronic Commerce and Applications	PEC	1.5	3	0	0	2	-
***These courses are in PEC basket of MBA specializations i.e. Information System and Marketing & Information System and Operations.**									

(4) Marketing

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	BML-554	Consumer Behavior Analysis	PEC	1.5	3	0	0	2	-
2.	BML-555	Brand Management	PEC	1.5	3	0	0	2	-
3.	BML-556	Integrated Marketing Communications	PEC	1.5	3	0	0	2	-
4.	BML-557	Sales and Distribution Management	PEC	1.5	3	0	0	2	-
5.	BML-558	Pricing Strategies	PEC	1.5	3	0	0	2	-
6.	BML-559	Business to Business Marketing	PEC	1.5	3	0	0	2	-
7.	BML-560	Services Marketing	PEC	1.5	3	0	0	2	-
8.	BML-561	Digital Marketing	PEC	1.5	3	0	0	2	-
9.	BML-562	Global Marketing Management	PEC	1.5	3	0	0	2	-
10.	BML-563	Retail Management	PEC	1.5	3	0	0	2	-
11.	BML-564	Rural Marketing	PEC	1.5	3	0	0	2	-
12.	BML-565	Marketing Strategy	PEC	1.5	3	0	0	2	-
13.	BML-566	AI in Marketing	PEC	1.5	2	0	1	2	1
14.	BML-567	International Business	PEC	1.5	3	0	0	2	-
15.	BML-568	Product Management	PEC	1.5	3	0	0	2	-

(5) Financial

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	BML-569	Basics of Quantitative Finance	PEC	1.5	3	0	0	2	-
2.	BML-570	Working Capital Management	PEC	1.5	3	0	0	2	-
3.	BML-571	Security Analysis and Portfolio Management	PEC	1.5	3	0	0	2	-
4.	BML-572	Indian Financial System	PEC	1.5	3	0	0	2	-
5.	BML-573	International Corporate Finance	PEC	1.5	3	0	0	2	-
6.	BML-574	Financial Engineering	PEC	1.5	3	0	0	2	-
7.	BML-575	Applications of Quantitative Finance	PEC	1.5	3	0	0	2	-
8.	BML-576	Financial Risk Management	PEC	1.5	3	0	0	2	-
9.	BML-577	Financial Modelling	PEC	1.5	3	0	0	2	-
10.	BML-578	Banking and Bank Finance	PEC	1.5	3	0	0	2	-
11.	BML-579	Modern Financial Markets and Market Microstructure	PEC	1.5	3	0	0	2	-
12.	BML-580	Behavioral Finance	PEC	1.5	3	0	0	2	-
13.	BML-581	Business Valuation	PEC	1.5	3	0	0	2	-
14.	BML-582	Infrastructure and Project Finance	PEC	1.5	3	0	0	2	-
15.	BML-583	Money and Central Banking	PEC	1.5	3	0	0	2	-
16.	BML-584	Fintech	PEC	1.5	3	0	0	2	-
17.	BML-585	Foreign Exchange Risk Management	PEC	1.5	3	0	0	2	-

(6) Information System

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	BML-533	Essential AI for Managers	PEC	1.5	3	0	0	2	-
2.	BML-534	Advanced AI for Managers	PEC	1.5	3	0	0	2	-
3.	BML-535	Game Theory for Strategic Advantage	PEC	1.5	3	0	0	2	-
4.	BML-539	Case Studies in Application of Decision Models	PEC	1.5	3	0	0	2	-
5.	BML-541	Industrial Internet of Things for Managers	PEC	1.5	3	0	0	2	-
6.	BML-542	Spreadsheet Modelling	PEC	1.5	3	0	0	2	-
7.	BML-543	Business Analytics	PEC	1.5	3	0	0	2	-

DEPARTMENT OF EARTHQUAKE ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Soil Dynamics)**
Department: **Department of Earthquake Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EQC-501	Dynamics of Soil and Structures	PCC	4	3	0	2	3	0
2.	EQC-503	Finite Element Method	PCC	4	3	0	2	3	0
3.	EQC-505	Geotechnical Earthquake Engineering	PCC	4	3	0	2	3	0
4.	EQC-507	Earthquake Resistant Design of Foundations	PCC	3	2	1	0	3	0
5.		Program Elective-I	PEC	4	-	-	-	-	-
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**21**					
Semester-II (Spring)									
1.		Program Elective-II	PEC	4	-	-	-	-	-
2.		Program Elective-III	PEC	4	-	-	-	-	-
3.		Program Elective-IV	PEC	4	-	-	-	-	-
4.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
5.	EQC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**17**					

DEPARTMENT OF EARTHQUAKE ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Soil Dynamics)**
Department: **Department of Earthquake Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EQC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	EQC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	EQC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	21	17	13	14
Total Credits	**65**			

M.Tech. (Soil Dynamics)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EQL-501	Dynamic Soil Structure Interaction	PEC	4	3	1	0	3	0
2.	EQL-502	Ground Improvement Techniques	PEC	4	3	1	0	3	0
3.	EQL-503	Machine Foundation	PEC	4	3	1	0	3	0
4.	EQL-504	Seismic Slope Stability: Earth Dams & Retaining Walls	PEC	4	3	1	0	3	0
5.	EQL-505	Constitutive Modelling in Soil Dynamics	PEC	4	3	1	0	3	0
6.	EQL-506	Offshore Geotechnical Engineering	PEC	4	3	1	0	3	0
7.	EQL-507	Numerical Methods for Dynamic Systems	PEC	4	3	1	0	3	0

DEPARTMENT OF EARTHQUAKE ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Structural Dynamics)**
Department: **Department of Earthquake Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EQC-503	Finite Element Method	PCC	4	3	0	2	3	0
2.	EQC-511	Structural Dynamics	PCC	4	3	0	2	3	0
3.	EQC-513	Earthquake Resistant Design of Structures	PCC	4	3	0	2	3	0
4.	EQC-515	Continuum Mechanics of Solids	PCC	3	2	1	0	3	0
5.		Program Elective-I	PEC	4	-	-	-	-	-
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**21**					
Semester-II (Spring)									
1.		Program Elective-II	PEC	4	-	-	-	-	-
2.		Program Elective-III	PEC	4	-	-	-	-	-
3.		Program Elective-IV	PEC	4	-	-	-	-	-
4.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
5.	EQC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**17**					

DEPARTMENT OF EARTHQUAKE ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Structural Dynamics)**
Department: **Department of Earthquake Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EQC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	EQC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	EQC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	21	17	13	14
Total Credits	**65**			

M.Tech. (Structural Dynamics)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EQL-507	Numerical Methods for Dynamic Systems	PEC	4	3	1	0	3	0
2.	EQL-508	Advanced Earthquake Resistant Design of Structures	PEC	4	3	1	0	3	0
3.	EQL-509	Earthquake Resistant Design of Masonry Structures	PEC	4	3	1	0	3	0
4.	EQL-510	Seismic Evaluation and Retrofitting of Structures	PEC	4	3	1	0	3	0
5.	EQL-511	Earthquake Resistant Design of Bridges	PEC	4	3	1	0	3	0
6.	EQL-512	Earthquake Resistant Design of Steel Structures	PEC	4	3	1	0	3	0
7.	EQL-513	Structural Response Control for Seismic Protection	PEC	4	3	1	0	3	0
8.	EQL-514	Random Vibration	PEC	4	3	1	0	3	0
9.	EQL-515	Reliability Based Design	PEC	4	3	1	0	3	0
10.	EQL-516	Earthquake Resistant Design of Special Structures	PEC	4	3	1	0	3	0
11.	EQL-517	Experimental Techniques in Earthquake Engineering	PEC	4	3	0	2	3	0

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EQT-501	High Performance Scientific Computing	STAR	3	3	0	0	3	0

EDEPARTMENT OF EARTHQUAKE ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Seismic Vulnerability and Risk Assessment)**
Department: **Department of Earthquake Engineering**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EQC-511	Structural Dynamics	PCC	4	3	0	2	3	0
2.	EQC-521	Seismological Modelling and Simulation	PCC	4	3	0	2	3	0
3.	EQC-523	Seismic Vulnerability and Risk Analysis	PCC	4	3	0	2	3	0
4.	EQC-525	Seismic Hazard Assessment	PCC	3	2	1	0	3	0
5.		Program Elective-I	PEC	4	-	-	-	-	-
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**21**					
Semester-II (Spring)									
1.		Program Elective-II	PEC	4	-	-	-	-	-
2.		Program Elective-III	PEC	4	-	-	-	-	-
3.		Program Elective-IV	PEC	4	-	-	-	-	-
4.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
5.	EQC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**17**					

DEPARTMENT OF EARTHQUAKE ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Seismic Vulnerability and Risk Assessment)**
Department: **Department of Earthquake Engineering**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	EQC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	EQC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	EQC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	21	17	13	14
Total Credits	**65**			

M.Tech. (Seismic Vulnerability and Risk Assessment)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EQL-518	Mechanics of Deformable Media	PEC	4	3	1	0	3	0
2.	EQL-519	Seismic Microzonation	PEC	4	3	1	0	3	0
3.	EQL-520	Earthquake Precursors and Early Warning Systems	PEC	4	3	1	0	3	0
4.	EQL-521	Physics of Earthquakes	PEC	4	3	1	0	3	0
5.	EQL-522	Geoinformatics	PEC	4	3	1	0	3	0
6.	EQL-523	Risk Management and Insurance	PEC	4	3	1	0	3	0

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	EQT-502	Dynamical Systems with Machine Learning	STAR	3	2	1	0	3	0

CENTRE FOR TRANSPORTATION SYSTEMS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Transportation Systems Management)**
Centre: **Centre for Transportation Systems**
Year: **I**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	TSC-501	Transport Infrastructure Planning	PCC	3	2	1	0	3	0
2.	TSC-503	Transportation Systems Analytics	PCC	3	2	1	0	3	0
3.	TSC-505	Intelligent Transportation System	PCC	3	2	1	0	3	0
4.	TSC-507	Transportation and Health	PCC	3	2	1	0	3	0
5.	TSC-509	Transportation Planning and Management	PCC	4	0	0	8	0	0
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	3	-	-	-	-	-
2.		Program Elective-II	PEC	3	-	-	-	-	-
3.		Program Elective-III	PEC	3	-	-	-	-	-
4.		Program Elective-IV	PEC	3	-	-	-	-	-
5.		Program Elective-V	PEC	3/4	-	-	-	-	-
6.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
7.	TSC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**20/21**					

CENTRE FOR TRANSPORTATION SYSTEMS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XXX M.Tech. (Transportation Systems Management)**
Centre: **Centre for Transportation Systems**
Year: **II**
Model: **2**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	TSC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	TSC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13**					
Semester-II (Spring)									
1.	TSC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	20/21	13	14
Total Credits	**65/66**			

M.Tech. (Transportation Systems Management)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	TSL-501	Public Transport Operations and Management	PEC	3	2	1	0	3	0
2.	TSL-502	Freight Transportation Planning and Management	PEC	3	2	1	0	3	0
3.	TSL-503	Advance Transportation Analytics	PEC	3	2	1	0	3	0
4.	TSL-504	Management of Transportation Projects	PEC	3	2	1	0	3	0
5.	TSL-505	Planning and Management of Non-motorized Transport	PEC	3	2	1	0	3	0
6.	TSL-506	Geographical Information System (GIS) Applications in transportation Systems	PEC	4	3	0	2	3	0
7.	TSL-507	Active Mobility and Health	PEC	3	2	1	0	3	0
8.	TSL-508	Design and Rejuvenation of Urban Transport	PEC	3	2	1	0	3	0
9.	TSL-509	Sustainable Transportation Systems	PEC	3	2	1	0	3	0
10.	TSL-510	Ropeway Infrastructure Planning and Design	PEC	3	2	1	0	3	0
11.	TSL-511	Multimodal Transportation	PEC	3	2	1	0	3	0
12.	TSL-512	Inland Navigation and Water Transport	PEC	3	2	1	0	3	0
13.	TSL-513	Advance Transport Planning	PEC	3	2	1	0	3	0
14.	TSL-514	Airport Planning and Design	PEC	3	2	1	0	3	0
15.	TSL-515	Road Traffic Safety	PEC	4	3	0	2	3	0
16.	TSL-516	Transport Economics	PEC	3	2	1	0	3	0
17.	TSL-517	EV Charging Infrastructure	PEC	3	2	1	0	3	0

M.Tech. (Transportation Systems Management)

Science, Technology, and Advanced Research-tools basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	TST-501	Sustainable Transportation Systems	STAR	3	2	1	0	3	0

Item No.101.11: To consider the proposal for organizing the forthcoming Convocation.

A convocation ceremony is organized annually and degrees are conferred upon graduating students. Medals and awards to the winners are also presented during the Convocation.

Until the last Convocation, the medals, awards and degrees were presented on the stage for around 2000 students and is increasing every year. The entire Ceremony takes about 6-7 hours. This year, around 2400 students are expected to be graduating and eligible for degrees.

The Senate in its 98th meeting suggested that the following medals and awards be presented in the Convocation: -

i- The Five Institute Awards:

1. President's Gold Medal,
2. Director's Gold Medal,
3. Institute Silver Medal,
4. Institute Bronze Medal,
5. The President of India Dr. Shankar Dayal Sharma Gold Medal.

ii- All awards with an amount of INR 50000/- or more.

As per information received from SCSP office, presently following 06 awards are of INR 50000 or above.

1. Excellence in Doctoral Research Award :04 maximum
2. Professional Development and Innovation Award
3. Dr. Sushil Sharma Excellence in Doctoral Research Award
4. Singhal's Tech for Society Award
5. Smt. Santosh Rani Tandon Memorial Award
6. A.K. Goel Green Energy Prize & Gold Medal

In order to optimize the schedule of the Convocation ceremony, the practices of sister IITs were studied and the following modalities are proposed-

The Convocation ceremony will be conducted in two sessions on the same day.

<u>Session-I:</u> Main Ceremony:

The main ceremony will be conducted in the first half by presenting the medals and awards, as mentioned above and PhD degrees (approx.250 numbers) at the stage. All the students registered for the convocation will attend the main ceremony.

<u>Session-II:</u> Departmental Ceremonies:

- The second session will allow the Departments to conduct individualized degree awarding ceremonies for undergraduate (UG) and postgraduate (PG) programs.
- Departments may invite dignitaries as the Chief Guest to participate in these ceremonies.
- Flexibility will be given to the Departments in the degree distribution, allowing them for individual or combined ceremonies with other departments as per their choice.
- Larger departments may opt for auditorium venues such as MAC, OP Jain, Biotech, etc., while smaller departments can utilize spaces like LHC or collaborate with other departments to optimize resources. The tentative grouping of the Departments/Centres/Schools was presented before the IAPC for its perusal. The same is placed as **Appendix-A.**
- The Degree Certificates of the registered students will be handed over to the HoDs of the Departments concerned a day before the Convocation by the AAO. Upon completion of the ceremony at the departments, the Degree Certificates of the students who have not turned up will be handed over to the AAO to dispatch the degrees to the students concerned through Speed Post.
- Department ceremonies will be commenced simultaneously during convocation day in order to optimize the resources.

The IAPC in its 139th meeting held on 10.04.2024, recommended the above proposal.

The above is submitted for the consideration and approval of the Senate.

List of Proposed Venues

Sl.No.		Department	No. of Student (PG)	No. of Student (UG)	Total	Grand Total at Venue	Venue (with capacity)
1	I	Chemistry (CY)	42	14	56	236	APJ AKB 004 (248)
	II	Computer Science and Engineering (CS)	33	123	156		
	III	Paper Technology (PP)	24	NA	24		
2	I	International Centre of Excellence for Dams (ICED)	23	NA	23	246	APJ AKB 005 (248)
	II	Management Studies (BM)	82	NA	82		
	III	Mehta Family School for Data Science and Artificial Intelligence (AI)	26	NA	26		
	IV	Polymer and Process Engineering (PE)	20	NA	20		
	V	Physics (PH)	35	60	95		
3	I	Electrical Engineering (EE)	55	179	234	234	APJ AKB 405 (248)
4	I	Electronics and Communication Engineering (EC)	46	126	172	242	APJ AKB 205 (248)
	II	Transportation Systems (TS)	8	NA	8		
	III	Water Resources Development and Management (WR)	62	NA	62		
5	I	Architecture and Planning (AR)	29	30	59	213	APJ AKB 507 (248)
	II	Disaster Mitigation & Management (DM)	11	NA	11		
	III	Earth Sciences (ES)	17	63	80		
	IV	Earthquake Engineering (EQ)	31	NA	31		
	V	Hydrology (HY)	23	NA	23		
	VI	Nanotechnology (NT)	9	NA	9		

List of Proposed Venues

Sl.No.		Department	No. of Student (PG)	No. of Student (UG)	Total	Grand Total at Venue	Venue (with capacity)
5	I	Department of Design (DD)	21	NA	21	295	MAC (400)
	II	Mechanical and Industrial Engineering (ME)	52	222	274		
6	I	Chemical Engineering (CH)	15	147	162	186	CH AUDI (210)
	II	Hydro and Renewable Energy (AH)	24	NA	24		
7	I	Humanities and Social Sciences (HS)	10	NA	10	87	HS AUDI (120)
	II	Mathematics (MA)	36	41	77		
8	I	Civil Engineering (CE)	67	191	258	258	OPJAIN (260)
9	I	Biosciences and Bioengineering (BE)	29	39	68	171	BE AUDI (200)
	II	Metallurgical and Materials Engineering (MT)	7	96	103		
		Grand Total	837	1331	2168	2168	

Item No.101.12: To consider a report of the Committee constituted to review the policy on awards/ prizes/scholarships.

Senate in its 98th meeting held on 11.10.2023 advised to constitute a three member Committee to review the policy on awards/ prizes/scholarships.

The following committee was constituted to review the policy on awards/prizes/scholarships.

1. Prof. Naveen Kumar Navani, DoAA - Chairman
2. Prof. R.D. Garg, DoRA - Member
3. Prof. Yogesh Vijay Hote, Chairman, SCSP - Member

The recommendations of the Committee are as under:

a) Convocation Award to be distributed in the Convocation –

   i. The five Institute Awards: President's Gold Medal, Director's Gold Medal, Institute Silver Medal, Institute Bronze Medal, The President of India Dr. Shankar Dayal Sharma Gold Medal.

   ii. All awards with amount of INR 50000/- or more. Further it is to be noted that only those awards will be distributed as above, in which there is a single recipient of award. In case a team/group is getting award, that award will be distributed at Departmental Level.

b) Non-Convocation Awards to be distributed in Departmental Level:-
   i. All Convocation Awards other than mentioned in point (i) and (ii), above.
   ii. All Non Convocation Award.

The report of the Committee is placed at **Appendix-A.**

The above is submitted for the consideration and approval of the Senate.

Minutes of the Meeting of three-member Committee constituted to review the policy on awards/prizes/scholarships held on 15.05.2024 at 1:00 P.M. in the Dean (Academic Affairs) Office

The following members attended the meeting:

1. Prof. Prof. Naveen Kumar Navani, Dean (Academic Affairs) (Chairman)
2. Prof. R.D. Garg, Dean (Resources and Alumni Affairs) (Member)
3. Prof. Yogesh Vijay Hote, Chairman, SCSP(Member)

1. **Discussion over Convocation and Non-Convocation Awards.**
   With reference to **Item No. 98.16** of 98th Senate meeting held on 11.10.2023, It has been unanimously proposed by members that from Convocation-2024 onwards:

   I. The five Institute Awards: President's Gold Medal, Director's Gold Medal, Institute Silver Medal, Institute Bronze Medal and The President of India Dr. Shankar Dayal Sharma Gold Medal shall be distributed in Institute Convocation.

   II. All Convocation awards with amount of Rs. 50,000/- or more shall be distributed in Institute Convocation. Further it is to be noted that only those awards will be distributed as above, in which there is a single recipient of award. In case a team/group is getting award, that award will be distributed at Departmental Level.

   III. All Convocation Awards other than mentioned in point I. & II. above, shall be distributed in Departmental Level.

   IV. All Non-Convocation Awards shall be distributed at Departmental Level.

The meeting ended with a vote of thanks to the chair.

16 MAY 2024
Chairman

Copy forwarded to:

1. Deputy Director
2. Dean (Academic Affairs)
3. Dean (Resources and Alumni Affairs)
4. All members of SCSP
5. Office SCSP

Item No.101.13: To consider a proposal to review the selection criteria of Departmental Gold medal and Best Project Award.

The Senate in its 97th meeting held on 24.07.2023 made the following observations:

1. Review the selection criteria to limit the Department Gold medal maximum one for each Department.
2. Best Project Award should be finalized at department level with a review of its selection criteria to limit maximum one student for each project, irrespective of number of students in the project.

The SCSP Committee reviewed the above observations and made the following recommendations:

1. As most of the departments run both UG and PG Programmes. So it may be difficult to select only one Department Gold Medal. Therefore, Department Gold Medal may be given for both UG and PG programmes separately. Further, some departments are running more than one UG programme. In such cases, separate Department Gold Medals may be given for each UG programme considering the class strength.

   Further, in case of tie in highest CGPA:

   (i) UG Gold Medal Award: Merit will be decided based on student earning maximum no. of A+ grades. Even though, there is tie, then department will decide any other criterion.

   (ii) PG Gold Medal Award: Department should decide criteria based on Publications/Patents or any other criteria

2. The Best Project Award may be given at department level to entire team of project.

The above is submitted for the consideration and approval of the Senate.

Item No.101.14: To present the Sectoral Vision statements for a purpose to develop and prepare a document to achieve the goals for Viksit Bharat@2047.

The Senate in its 95th meeting had deliberated and invited the suggestions to draft an IIT Roorkee Vision Document for the next 25 years. The theme of discussion was on connect between Education, Research, Industry and Society.

For a purpose to prepare a comprehensive vision document, the Deans were also requested to provide the Vision statement of their respective domain, to envisage the development, growth, progress, sustainability and good governance.

The following Deans have shared their ideas, suggestions and innovative ideas for nation-building and contribute to achieving the goals of Viksit Bharat 2047. **(Appendix-A)**

1. Dean of Academic Affairs
2. DOFA
3. DOSW
4. Dean Administration
5. Dean Finance
6. Dean Infrastructure
7. Dean Infrastructure-R&D Infrastructure
8. Advancements in Sustainability and Innovation at Saharanpur Campus
9. Strengthening Alumni- Alma Mater Connection- DORA

The Ministry has also shared the following 5 themes on Sectoral Vision for Viksit Bharat@2047 to transform India into a developed nation:

1. Empowered Citizens (Health, Education, Nari Shakti, Sports, Culture, Caring Society)
2. Thriving and Sustainable Economy (Industry, Energy, Agriculture, Infrastructure, Services, Green Economy, Cities)
3. Technology & Innovation Leadership (Research and Development, startups, Digitial)
4. Effective Governance
5. Bharat as Vishwabandhu

The above is placed before the Senate.

15th May 2024

Deans Committee Meeting

Academic Affairs

Convocation – Proposal for Decentralized mode

- Presently, at IIT Roorkee, all the degree awardees (around 2000) were given the degree certificates on the stage.
- Entire ceremony takes about 6-7 hours.
- Approximate numbers of Institute Medals, Departmental Gold Medals and other Awards(more than of Rs. 50,000)- 10
- Approx. number of degrees to be awarded-

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Courses	No. of Students
UG	1331
PG	837
PhD	250
Total	2418

IAPC has recommended the proposal

Proposed Model for IIT Roorkee

Session- I

- Main Ceremony can be planned in First half with award of all Institute Medals and other Awards(more than of Rs. 50,000) [10 Nos] and PhD degrees(approx.250 nos) at the stage.

Session-II

- The second session of the convocation will facilitate individualized degree awarding ceremonies for UG and PG programs in each department.
- liberty to departments to invite dignitaries as Chief Guests for these ceremonies.
- flexibility in how degrees are distributed, allowing for either individual or combined ceremonies based on the department's preference.
- Proposal for big departments to utilize MAC, OP Jain, Biotech, etc., while smaller departments can utilize spaces like LHC or collaborate with other departments to optimize resources.
- Degree Certificates of registered students will be given to the Heads of Departments (HoDs) a day prior to the Convocation by the Academic Affairs Office (AAO).
- Certificates of students who did not attend will be given to the AAO for dispatch through Speed Post.

List of Proposed Venues

Sl.No.		Department	No. of Student (PG)	No. of Student (UG)	Total	Grand Total at Venue	Venue (with capacity)
1	I	Chemistry (CY)	42	14	56	236	APJ AKB 004 (248)
	II	Computer Science and Engineering (CS)	33	123	156		
	III	Paper Technology (PP)	24	NA	24		
2	I	International Centre of Excellence for Dams (ICED)	23	NA	23	246	APJ AKB 005 (248)
	II	Management Studies (BM)	82	NA	82		
	III	Mehta Family School for Data Science and Artificial Intelligence (AI)	26	NA	26		
	IV	Polymer and Process Engineering (PE)	20	NA	20		
	V	Physics (PH)	35	60	95		
3	I	Electrical Engineering (EE)	55	179	234	234	APJ AKB 405 (248)
4	I	Electronics and Communication Engineering (EC)	46	126	172	242	APJ AKB 205 (248)
	II	Transportation Systems (TS)	8	NA	8		
	III	Water Resources Development and Management (WR)	62	NA	62		
5	I	Architecture and Planning (AR)	29	30	59	213	APJ AKB 507 (248)
	II	Disaster Mitigation & Management (DM)	11	NA	11		
	III	Earth Sciences (ES)	17	63	80		
	IV	Earthquake Engineering (EQ)	31	NA	31		
	V	Hydrology (HY)	23	NA	23		
	VI	Nanotechnology (NT)	9	NA	9		
		Total	**576**	**595**	**1171**	**1171**	

List of Proposed Venues

Sl.No.		Department	No. of Student (PG)	No. of Student (UG)	Total	Grand Total at Venue	Venue (with capacity)
5	I	Department of Design (DD)	21	NA	21	295	MAC (400)
	II	Mechanical and Industrial Engineering (ME)	52	222	274		
6	I	Chemical Engineering (CH)	15	147	162	186	CH AUDI (210)
	II	Hydro and Renewable Energy (AH)	24	NA	24		
-236-	I	Humanities and Social Sciences (HS)	10	NA	10	87	HS AUDI (120)
	II	Mathematics (MA)	36	41	77		
8	I	Civil Engineering (CE)	67	191	258	258	OPJAIN (260)
9	I	Biosciences and Bioengineering (BE)	29	39	68	171	BE AUDI (200)
	II	Metallurgical and Materials Engineering (MT)	7	96	103		
		Total	**261**	**736**	**997**	**997**	
		Grand Total	**837**	**1331**	**2168**	**2168**	

Implementation of NEP 2020
Strengthening Tinkering and Mentoring

1. **Projects will be assigned on theme based and the projects can be requested from the department, student technical council, industry and startups.**

2. **Minimum 30 UG TAs may be required in this project as they have better outreach to the 1st year UG.**

3. **Top 5 or 10 cherry picked projects will be presented and felicitated on Institute research day.**

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Strengthening - Tinkering and Mentoring

4. Project costs may be increased up to Rs. 20000/- for some better implementations. (Last time there were 333 projects(4 students each). Max Project cost was Rs. 5000/- per project with some exceptional deviation up to 10000/-project.)

5. This time we can also ask some startup's to provide some problems so that they can later motivate and take up the IPs if interested in successful completion of their projects.

6. A larger execution committee may be formed which will also arrange evaluators for these projects in MTE and ETE.

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7. Grading of Tinkering and Mentoring should be independent and not combined considering the practical nature of the Tinkering part.

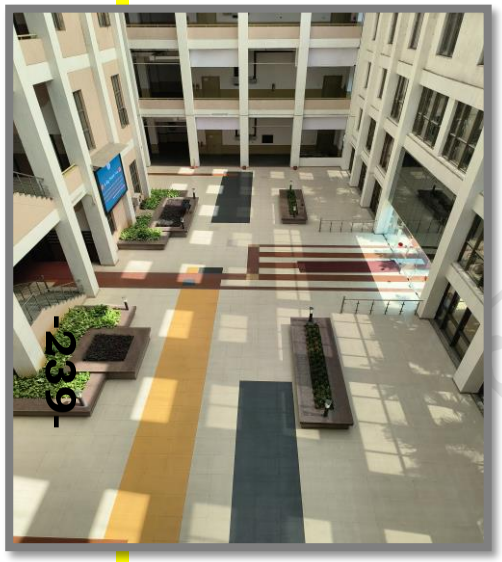
8. Departments to acknowledge the teaching load of coordinators and execution committee members involved in this course as it requires huge efforts.

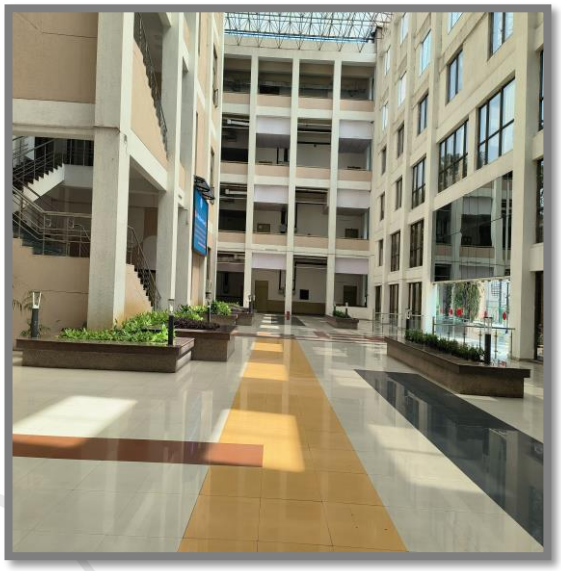
Industrial Tour (3rd Year Btech)

Only to companies having MOU with IITR

Student Engagement

- Interaction spaces in LHC





- Target increased student engagement in classrooms
- Reorganize Shiru Café for off-time access to students
- 2% attendance relaxation for girl students

Faculty Profile at IIT Roorkee

- Total Faculty Strength –939
- Faculty on-roll as on date -537 (SC- 14, ST- 4, OBC-64, EWS – 1, UR- 454)
- Faculties Joined in last 2 years– 49 (SC- 1, ST- 0, OBC-10, EWS – 1, UR- 37)
- No. of Faculties Promoted in last two years- 66
- IIT Roorkee implemented the CEI Act, 2019 w.e.f 07-03-2019. As per CEI Act, Reservation is followed for all posts in direct recruitment. A single roster is followed for direct recruitments at all levels.
- IIT Roorkee advertised Special Recruitment Drives in 2023 for reserved categories and for women to ensure diversity and inclusivity.

Maintenance of Reservation Register

- The CEI Act came into force w.e.f 07-03-2019. As per the BoG resolution, a single roster is followed for direct recruitment at all levels w.e.f. 07/03/2019. As and when the posts are filled up, the selected candidates will be adjusted against the relevant roster point.
- As per the reservation brochure issued by the DoPT, 13 point roster is applicable for a cadre having the sanctioned strength of 13 posts or lesser. In case of cadres having more than 13 posts, Reservation register needs to be maintained as per the format prescribed by the DoPT. As the total sanctioned strength of faculty is 939, IITR has prepared the Reservation Register.
- As on the date of implementation of CEI Act i.e. as on 07-03-2019, the faculty strength was 423. Reservation will not be applied for these 423 posts. The reservation for SC/ST/OBC/EWS will apply for the remaining 516 posts. As per the reservation register, the category-wise reservation for 516 posts are SC(15%)-77, ST(7.5%)-38, OBC(27%)-139, EWS(10%)-51 & the remaining posts of 211 for UR. These 516 posts (point No.424 to 939) should be filled up as per the above calculation of SC/ST/OBC to complete the cycle-1 of the reservation. The vacancies aroused from 07-03-2019 can be filled-up in the cycle-2 after completing the cycle-1 by recruiting the prescribed number of SC/ST/OBC as per the reservation register.
- So far, we have filled-up 145 posts under UR. Now, only 66 posts are vacant under UR. However, in respect of reserved posts, we have filled up only 42 posts under SC/ST/OBC and a large number of posts (212 posts) are still lying vacant.

Future Faculty Outlook

- Vacant Positions as per Dec 2023 Roster – **349** (SC- 75, ST- 36, OBC-109, EWS – 50, UR- 79)
- Number of faculty positions to be filled in next 2 years – **60**

- **Strategies for recruitment and retention of quality faculty.**

1. **Continuous Advertisement:** Rolling advertisements are kept open throughout the year for faculty applicants.
2. **Special Recruitment Drives:** IITR advertises special recruitment drives annually for reserved categories and female candidates.
3. **Promotions:** Advertisement releases for promotions occur twice a year.
4. **Seeking Suggestions:** The DOFA office has arranged meetings with DFSC members to seek suggestions for soliciting good applications and improving the recruitment process.
5. **Engagement with New Faculty:** The DOFA office is organizing meetings with faculty members who joined in the last five years to discuss various topics related to research, teaching, settling down on campus, faculty welfare, etc.

Digital Transformation in Faculty Affairs

- A new portal for faculty affairs is in its final stage and is about to be launched. This will enhance transparency, facilitate quick request processing, reduce paperwork, and improve accessibility.

  Here's a list of the functionalities of the portal:

1. Faculty Performance Appraisal Report.
2. Probation clearance & Pay Level movement.
3. No Objection Certificate (NOC) for outside jobs, passport, visa, etc.
4. Experience certificate, address proof certificate, etc.
5. Request for Medical booklet for self & dependents.
6. Request for ID Card.
7. Employee ID generation form.
8. Utilization of Professional Development Allowance (PDA) grant.
9. Children Education Allowance.
10. Any other matter related to faculty affairs.

Challanges

- **Space allocation for Labs.**

Currently, there are 537 faculty members on the rolls at IIT Roorkee, and accommodating their requests for separate lab spaces poses a significant challenge for the institute. However, we are actively exploring potential solutions. In the interim, sharing lab space is a more sustainable and suitable option.

Involvement of Ph.D. students in teaching.

It has come to our attention that Ph.D. students are being involved in teaching, which is not considered a best practice. Therefore, there is a need to raise awareness among faculty members about the potential repercussions of this practice.

DoSW: Vision Document

For Next 2 Years

Vision Statement

To provide safe, comfortable, motivating and enriching environment on campus to enhance meaningful involvement, nurture a sense of pride and belonging and develop meaningful life skills for encouraging personal achievement and developing responsible citizens

Existing Infrastructure

Hostels at Roorkee Campus

Boys: 9
Girls: 3
Co-ed Hostel: 1

Married Hotels: 5
Private Messes: 13

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Residing Bachelor Students: 8895
Boys: 6735
Single : 3978 (59%)
Double: 2054 (30.50%)
Triple: 703 (10.50%)
Girls: 2160
Single: 1588 (73.70%)
Double: 566 (26.00%)
Triple: 06 (0.30%)

Residing Married Students

Male: 245
Female: 74
Total: 319

Future Plans (Hostel)

- Renovation of old hostels
- Promoting intra-hostel recreational activities
- To enhance inclusive environment in hostels
- Air-conditioning of mess
- Construction of single seater hostel for UG-First year

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Future Plans (Student Activity)

- Construction of Rock-Climbing Wall
- New Badminton Hall (Minimum 5 Courts)
- Extension of SAC Building and creation of co-working space
- Extension/creation of Gymnasium
- Inter-Bhawan General Championship for cultural and Sports
- Development and promotion for para, sports and cultural, activities
- Increased engagement of students in MoE activities

Future Plans (Student Wellness)

- Creation of new Wellness-Centre with provision of group therapy rooms
- Creation of permanent counsellor positions to meet MoE guidelines
- To increase Bio-Feedback capacity

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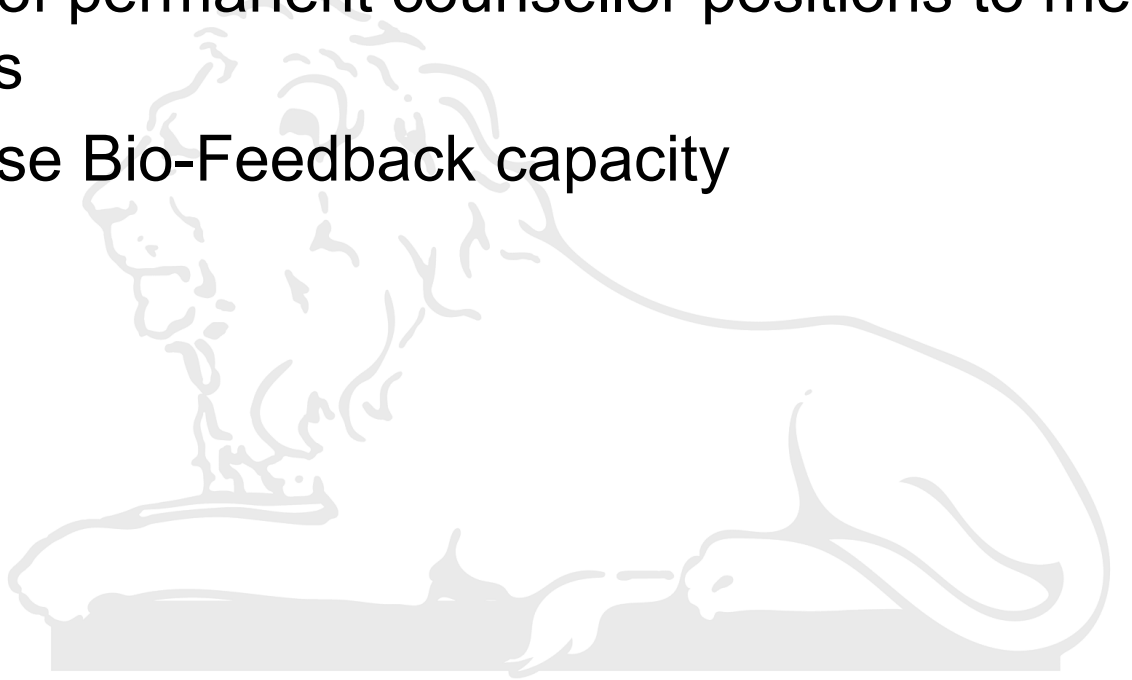


संस्थापन सेवाएँ
ESTABLISHMENT SERVICES

Vision of Administration

by

Dean Administration

VISION

Automation and Technology Integration

- To stream line HR processes, all activities of the Establishment Services will be automated in phased manner in the institute.
- The development work on the automation System (ESAS) is under progress to automate routine tasks, manage employee data effectively, and provide self-service options for employees.
- Subsequently, it will be integrated with all Departments, Centres, School, concerned offices/sections such as F&A , SRIC, IR, Hospital etc.
- The office will focus on data-driven decision making leveraging analytics and insights to inform strategic decision-making.

VISION

Recruitment, Talent Acquisition and Retention Policy

- Recruitment Rules are under development to implement innovative recruitment strategies to attract and retain top talent in the non-teaching groups of employees.
- Policies to be framed for professional development opportunities, and a positive work culture.
- A recruitment calendar to be framed for direct recruitment and VBPS for smooth conduct of processes
- Conduct of recruitment examinations by central agencies like NTA.
- To review the existing strength of the regular non teaching employees in accordance with increased students' strength.

VISION

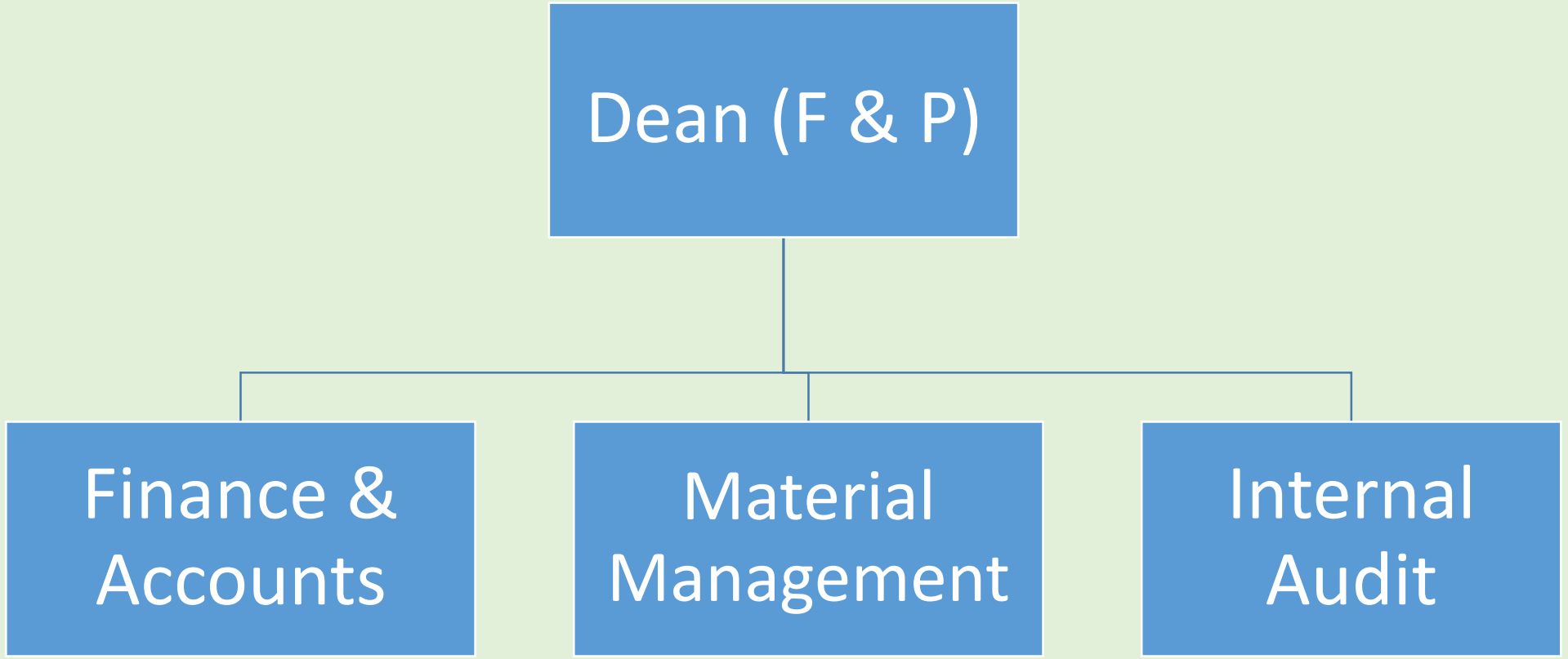
Positive Work Culture Development

- Foster a culture of diversity, equity, and inclusion within the organization.
- Implement training programs to raise awareness, promote inclusivity, and address unconscious biases.
- Implement training programs for office etiqquetes and code of conduct, rules on service matters.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Framework and Vision: Finance Section

Framework - Dean (Finance and Planning)



Finance and Accounts Office

Payroll section	Bill section	Fund section
Budget and Balance sheet section	Endowment section	Planning Section

Major highlights in recent past

- **Financial literacy** - Development of FAQ for all major functional and operational activities of the Institute like Student tour, Leave Travel Concession (LTC), TA, Chair contingency and other expenditure, Telephone reimbursement, CEA etc.
- **Easy documentation** - Improvement in the forms used by the IIT fraternity by reducing unwanted information columns and making the formats more user friendly and convenient.
- **Reducing Turn-around-Time (TAT)** – The processing of expenditure bills and other personal claims is made fast by adopting latest technological methods and reducing the document processing time by effective monitoring and efficient control.

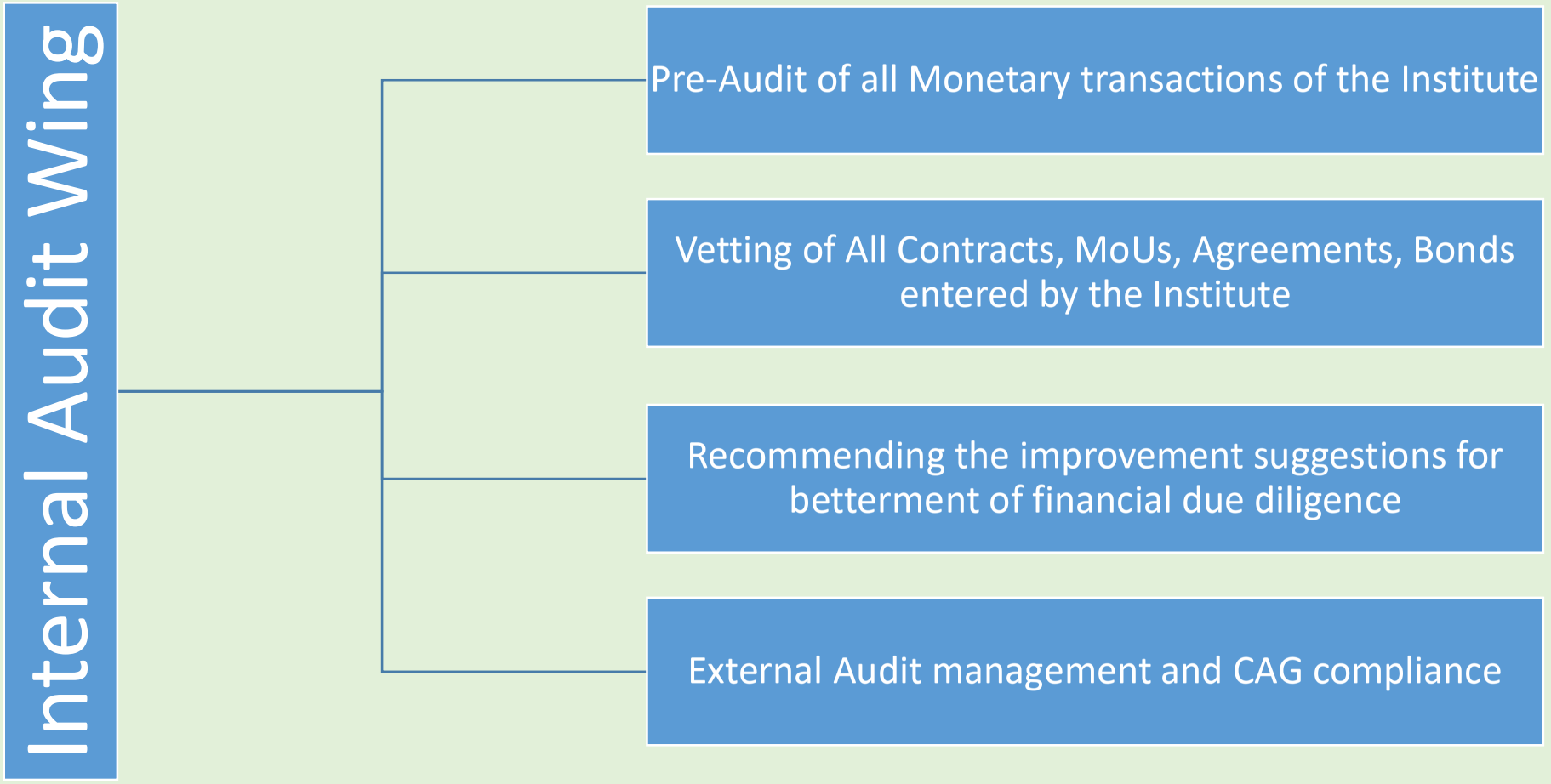
Major highlights in recent past

- **Jeevan Praman** – Implemented Jeevan Praman (GoI Utility for pensioners) for the Institute pensioners in order to save them from the hassle of visiting the IIT office in person to submit Live certificate.
- **Development of Department dashboard** to prevent any errors or mistakes in bills and claims processing and imparting knowledge to departments on betterment of due diligence processes
- **Constant maneuver to better the banking relationships** and smoothening of processes to make transactions fast and speedy like in case of foreign exchange transactions
- **Reducing the manual intervention in bill processing** and use of more technology friendly inputs

Vision of Finance and Accounts section

- **Improvement in Regulatory compliance** and due diligence framework by consistent scrutiny and timely reporting of operational deficiencies
- **Better compliance management** by reducing the number of outstanding observations of Comptroller and General of Audit (CAG)
- **Establishing cent percent following of Government rules and regulation** by spreading financial awareness and improving financial knowledge among IIT Fraternity
- **Development of FAQ and revisiting Forms** for all transactions to make them more user friendly and convenient
- **Making live tracking of expenditure and personal claims** possible by designing a mechanism through use of Information technology
- **Efforts to increase budget : Plan/Non-Plan**

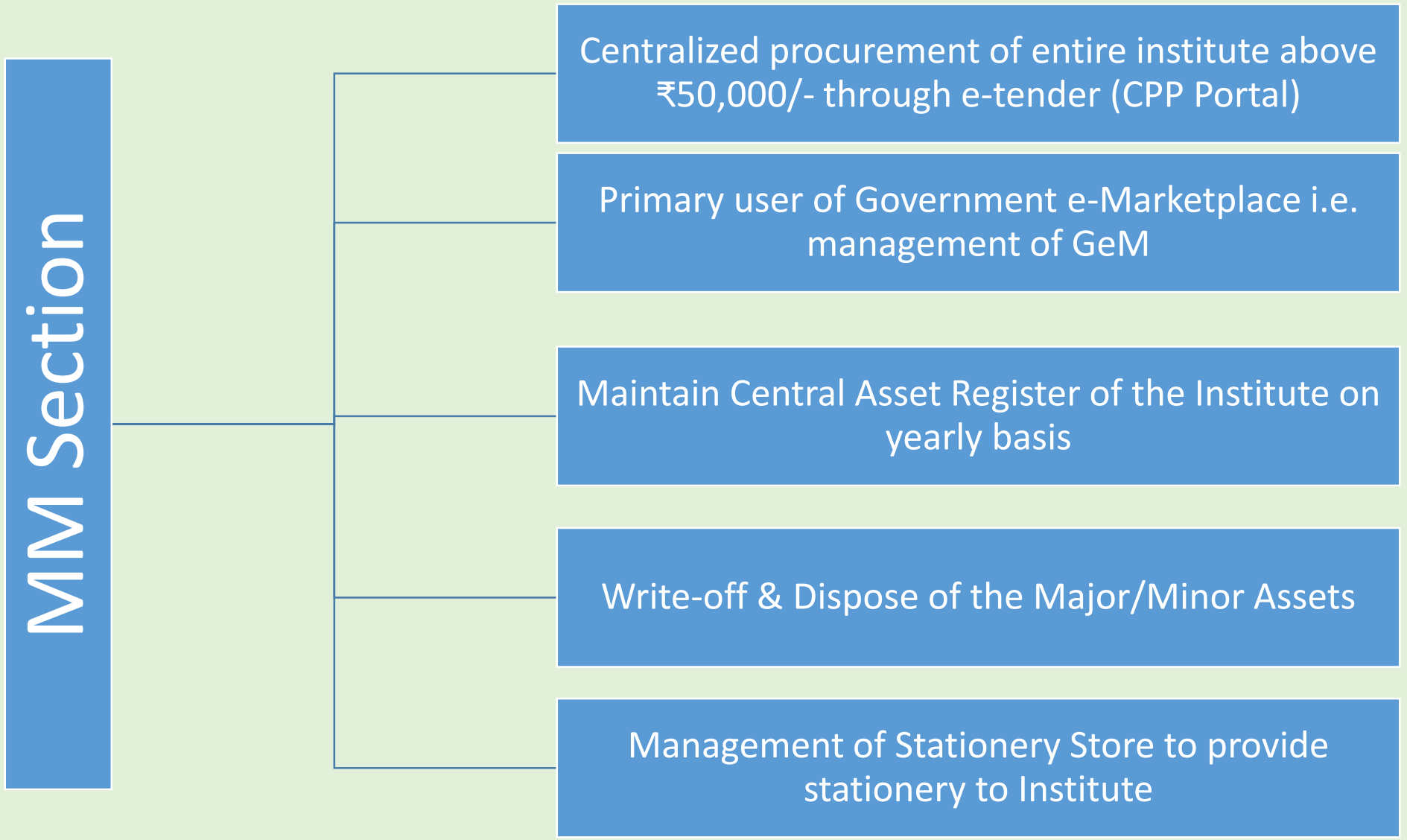
Major activities of Internal Audit



Vision of Internal Audit section

- **Achieving the optimum and efficient audit objectives** by applying the best knowledge and due diligence thus enabling the Institute to function smoothly without any compliance issues
- **Improvement in speed and quality of Internal Audit functions** by maximum and effective utilization of resources
- **Developing the right methodologies and practices** in order to make the audit functions user friendly and easily accessible
- **Imparting knowledge to the users about Government rules** framework to achieve high degree of vigilant functioning

Major activities of MM Section



Vision of MM Section

- **Better compliance with rules amended from time to time in GFR-2017** to avoid significant audit observations.
- **Developing an in-house software/mechanism to track the status of the invoices**. Also, the software is to be designed for obtaining online approvals in terms of indent, purchase proposal & note sheets of various types.
- **Developing a more efficient mechanism to make MM section more user-friendly** & to track the status of procurement in a click. This may be done by mapping it with iconnect also.
- **Adopting best available practices of E-tendering & GeM** from time to time.
- **Notifications/Flowcharts to impart knowledge** to the end-user for procurement.
- **Streamlining the advance process and timely adjustment of the same**.

Vision for Infrastructure Requirements Next Two Years

by

Dean Infrastructure

New Infrastructure Projects

I. Requirement of a new Administrative Building.

II. Repair & Restoration of existing JT Building (Our Heritage and Symbol of IITR).

III. A new Research park

IV. A suitable housing (residential Building) for Group B&C (Non-teaching Staff).

V. We urgently need to repair, facelift and upgrade our old infrastructure i.e. both academic buildings and Hostels.

VI. We also would need additional hostels for students and residences for faculty.

Upgradation of the Storm water Management System

- Flooding and water stagnation has gradually increased over the years due **to increase in ground coverage in campus** and **encroachment** of storm water drains **outside IITR campus**

- A **comprehensive storm water management plan** will be developed and implemented. This will include
  - Performing **landcover and flood analysis** of IITR campus and surroundings ***(initiated)***
  - Enhancing the capacity of **storm water retention facilities** & development of new retention facilities (including demarcating temporary retention facilities)
  - Introduction of **new storm water drainage channels**
  - Preparation of a **land cover development plan** considering storm water run-off and flooding

Upgradation of Complaint Management System

- The Complaint Management System (CMS) for IWD was implemented in 2021. It significantly enhanced the reporting & redressal of civil & electrical complaints and reduced paper-based transactions

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Based on the learnings from the last three years and feedback from IITR community, the CMS will be upgraded with the following features

- Complaint tracking and query system
- Time scheduling system for repair work
- Mobile-based CMS application

Comprehensive Maintenance Contracting for high-rise buildings

- IITR has gradually shifted from a low-rise development to mid-rise high-density development
- New buildings have **higher number services and need special maintenance and repair** which is different from the conventional procedures
- CPWD has initiated the process of **comprehensive maintenance contracting** on a pilot basis
- This will facilitate
  - A **nodal team/service contractor** being responsible for the services and maintenance
  - Effective **quality control and regulation of specifications**
  - Address **inter-dependency issues** which is common in mid-rise and high-rise buildings

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E/M Works

- As the institute (main campus) peak load already touched at 9.7 MVA, we need an additional transformer of 10MA and associated infrastructure at the present sub-station location. According sanction load has to be enhanced to 15MVA instead of present 10MVA.

- The present Swage Treatment Plant (STP) needs to be upgraded from 3 MLD to at least 6 MLD to commensurate with the ever increasing population in the main campus

- To increase Solar power capacity possibility by another 0.8MW (approx.) which is feasible. With the help of SECI, a new tender can be floated under RESCO model.

- Installing dual purpose solar panel structures at residential open parking slots which will provide shedding to parked cars during the hot summers

- Current capacity of HTDG of 6MVA is insufficient during power cut off from UPCL for supply of bulk campus loads and this causes intermittent zone wise load shedding. Therefore, augmentation of this capacity is needed by integrating existing LTDGs smartly to the HTDG line and also by increasing the HTDG capacity itself to 9MVA

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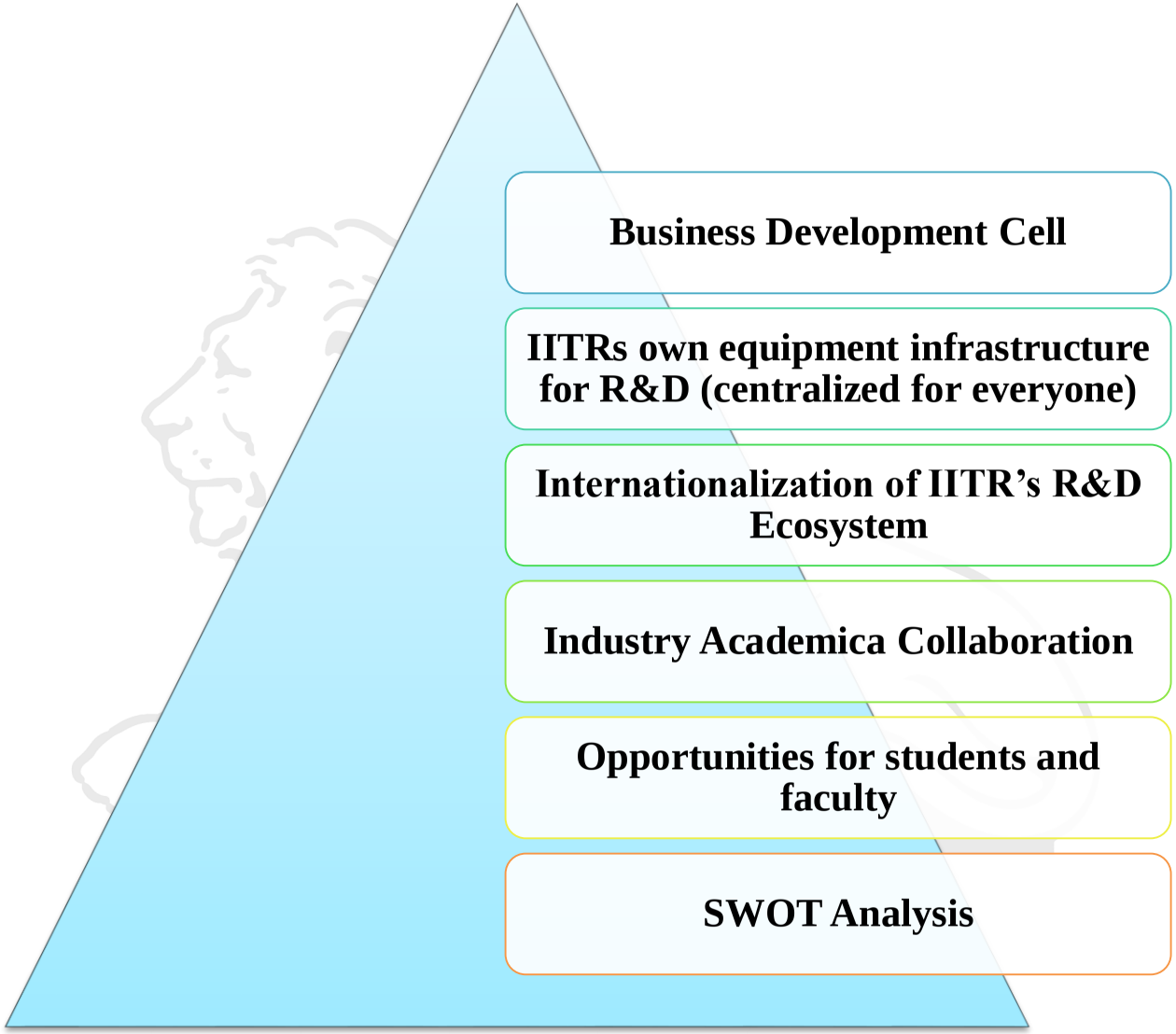
Vision@2047

IIT Roorkee's R&D Infrastructure

Future Vision



Robust internal R&D ecosystem

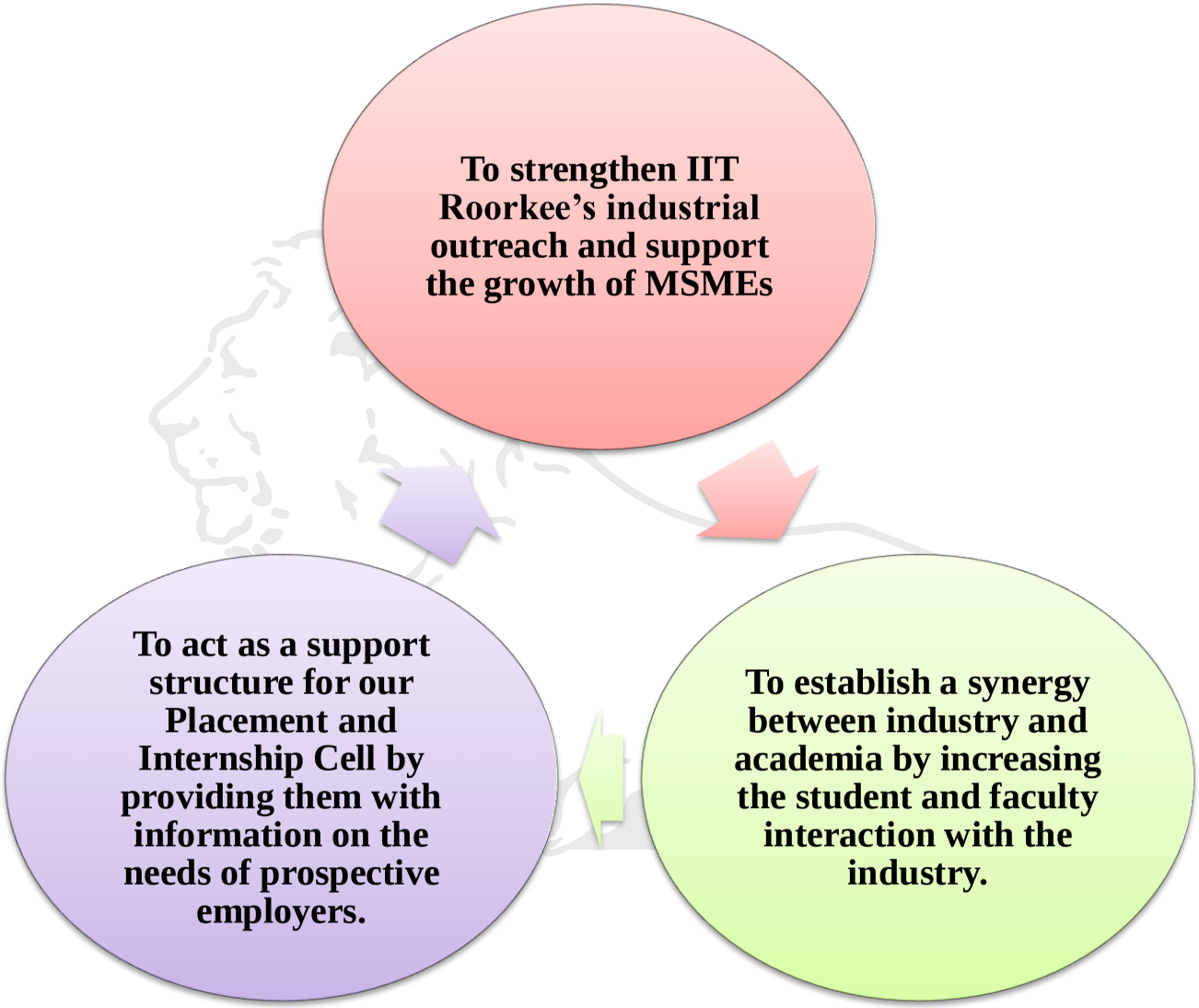
Creating an in-house comprehensive facility to meet all the research and development needs within the institute.

Performing a SWOT analysis of the institute's R&D facilities and fostering international partnerships to develop a robust R&D ecosystem aimed at advancing Sustainable Development Goals (SDGs).

Examine the upcoming institutes to evaluate their Key Performance Indicators (KPIs), and integrate relevant ones into the research and development ecosystem of IITR

Research and development focused on integrating AI into hardware systems to enhance their functionality.

Industry-Academia Collaboration



Business Development Cell

Liaise with the media cell for inputs on media intelligence for SWOT analysis, and for identifying the opportunities, both for the structure of the IITR and the growth of its online presence.

Liaise with Industry partners/Ministries for funding and create opportunities for faculty.

Build a positive perception of IIT Roorkee in local and global academia and industry ecosystem to.

Disseminate information on funding opportunities and to ensure a timely follow –up. Assist with industry proposals and develop agreements to identify potential opportunities.

Liaise with Dean IR to develop an international presence of IIT Roorkee. Develop proposals and get funding for International Research Parks, International CoEs and Industry Accelerators, International R&D Centres.

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Areas to focus on

Defence	Semiconductor	Agriculture
Drone	Automotive	Technology for Society
Rural Technology	Urban Development	MSMEs

Advancements in Sustainability and Innovation at Saharanpur Campus

Exploring Key Initiatives and Startups

Introduction

Exploration of innovative initiatives and startups focused on sustainability across various sectors , including hydrogen energy, sustainable materials, thermal energy storage, and packaging.

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Innovative Ideas:

- Hydrogen Valley
- Sustainable Polymer/Paper Products Startups
- Thermal Energy Storage Materials Startups
- Sustainable Packaging Materials Development
- Center of Excellence of ECE

Brief about the Innovative ideas

➢ Hydrogen Valley

Hydrogen Valley refers to a regional ecosystem that integrates hydrogen production, storage, distribution, and utilization across various sectors.

Key Components:

- **Production**: Utilizing renewable energy sources for hydrogen production.
- **Storage and Distribution**: Infrastructure for safe and efficient hydrogen storage and transport.
- **Utilization**: Applications in transportation, industry, and residential energy.

Benefits:

Reduces carbon emissions, promotes renewable energy integration, and enhances energy security.

➢ Startup for Sustainable Polymer and Paper Products

Startups focusing on the development of eco-friendly polymer and paper products to reduce plastic waste.

Innovations:

- **Biodegradable Polymers**: Materials that decompose naturally, reducing environmental impact.
- **Recyclable Paper Products**: Enhanced recycling processes and sustainable paper manufacturing.

Market Potential:

Growing demand for sustainable packaging and materials in various industries.

Brief about the Innovative Ideas

➢ Startup for Thermal Energy Storage Materials

Objective:

Designing and developing advanced materials for efficient thermal energy storage.

Key Technologies:

- **Phase Change Materials (PCMs)**: Store and release thermal energy during phase transitions.
- **Thermal Batteries**: High-capacity storage solutions for renewable energy integration.

Impact:

Enhances energy efficiency, supports renewable energy usage, and reduces peak energy demands.

➢ Development of Sustainable Packaging Materials

Importance:

Addressing the environmental impact of packaging waste.

Innovative Approaches:

- **Biodegradable Packaging**: Using materials that decompose naturally.
- **Edible Packaging**: Creating packaging that can be safely consumed.
- **Recyclable and Reusable Materials**: Designing for multiple uses and easy recycling.

Environmental Benefits:

Reduces landfill waste, lowers carbon footprint, and conserves resources.

Brief about the Innovative Ideas

➢ Center of Excellence of ECE

Purpose:

Establishing a Center of Excellence in Electrical and Computer Engineering (ECE) to drive innovation and research.

Core Areas:

- **Advanced Research**: Cutting-edge studies in electronics, communication systems, and computational technologies.
- **Industry Collaboration**: Partnerships with tech companies and startups for practical applications.
- **Education and Training**: Providing top-tier education and hands-on training for students.

Impact:

Fosters technological advancements, supports startups, and enhances educational outcomes.

Vision of DORA Office

Strengthening Alumni-Alma Mater Connection

VISION OF DORA OFFICE

- To be Alumni/ Donor oriented.
- To improve the bond with Our Alumni community that actively contributes to the growth and success of our Institution.
- To be a leader in Alumni-Institute connection.
- Increase the number of MoUs.
- Virtual Events and Networking.

Ways to Improve Alumni/ Donor Connect

Enhance Communication Channels	Alumni Induction Program:	More involvement of IARC
•Monthly Snippets, social media updates, and targeted emails to keep Alumni informed •To reach and communicate with every senior Alumnus and connect them with their classmates •Helping the young Alumni to find job opportunities that benefit their fields of specialization •Thank you Notes with pictures from Awardees •Feedback Mechanisms	•Induction of fresh graduate to Alumni Network •Ambassador - Male/ female	•Student Mentorship Program •Involvement in Jubilee Reunion

Ways to Improve Alumni/ Donor Connect

Alumni Giving and Fundraising	• Develop innovative campaigns and strategies to encourage Alumni to contribute financially to their alma mater, supporting scholarships, research initiatives, and campus improvements
Global Alumni Engagement	• Efforts to engage global alumni communities • Establish regional alumni chapters, organizing international events, Jubilee reunions and leveraging technology to overcome geographical barriers
Virtual Events and Networking	• Host more virtual events and networking opportunities • To foster a sense of community and facilitating professional connections
Career Services and Mentorship	• Connect with expert Alumni • Job seek assistance for students • Interview preparation

Future Goals for Alumni Jubilee Reunions:

Connection and camaraderie	• To foster a strong sense of connection and camaraderie among Alumni • Platform for Alumni to reconnect and strengthen their bonds
Alumni Giving and Support	• Encourage alumni to give and support for the institution's initiatives • Set a goal to increase alumni participation in fundraising efforts • Donor recognition programs
Celebration of Diversity	• Embraces the diversity among the Jubilee participants • Provide opportunities for alumni to celebrate each other's unique experiences and achievements
Engaging Programs	• Engaging and memorable Reunions • Keynote speakers, panel discussions, department visits, sports activities, cultural performances, and social events
Legacy and Tradition:	• Continue the tradition and legacy of Reunions • Find ways to innovate and evolve the event to meet the changing needs and expectations of Alumni.

Others:

MoUs	• Aiming to double our corpuses from 400 to 800 in the next two years by building a strong connection with our existing Donors/ Alumni • Enhance the connection with other Alumni who intend to donate in the future.
Financial Goals	• Update the donors about their donations and the Utilization on time which creates a transparency between us and motivate others to donate to IIT Roorkee. • Reach out to the Alumni to encourage them to giving back to alma Mater.
Measuring Impact and Success	• Regularly evaluate the impact and success of alumni engagement initiatives through metrics such as event attendance, participation rates, • Alumni feedback, and qualitative assessments of Alumni satisfaction and sense of connection with the alma mater.

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Thank You

Item No.101.15: To report the following approval accorded by the Chairman, Senate on behalf of the Senate.

A. Recommendations of 139th and 140th meetings of IAPC.

1. Requests of following students under various categories: (Item No.: 139.2.1, 139th IAPC dt: 10.04.2024)

Category-A: Name restoration and continuation of programme

a) Mr. Navdeep (Enr. No. 21113098), B.Tech. (CE), III Yr (Approved)
b) Mr. Manish Gothwal (Enr. No. 21115082), B.Tech. (EE), III Yr (Not Approved)
c) Ms. Suchi Bramhe (Enr. No. 23561034), M.Tech. (CH), I Yr (Approved in her second appeal)
d) Mr. Rupesh Kumar (Enr. No. 23529008), M.Tech. (EE), I Yr (Approved)
e) Mr. Deepak Kumar (Enr. No. 23558002), M.Tech. (HY), I Yr (Approved)
f) Mr. Ismail Sadi Mohamud (Enr. No. 23569011), M.Tech. (CE), I Yr (Approved)
g) Mr. Ravi Meena (Enr. No. 23615025), M.Sc. Physics, I Yr (Approved in his second appeal)

Category-B: Semester Withdrawal

a) Mr. Avinash Badanikai (Enr. No. 21567004), M.Tech. EC, II Yr (Not approved)

Category-C: NOC for internship

a) Ms. Jasmine (Enr. No. 23610009), M.Sc. Biotechnology, I Yr (Approved)

Category-D: Waiver of attendance to attend ETE:

a) Mr. Shashank Kumar (Enr. No. 22117131), B.Tech. ME, II Yr (Approved)

2. Request of Mr. Akhil Dhiman (Enr. No. 23523002), M.Tech. Structural Engineering (CE), I Yr regarding

permission to attend ETE scheduled during April-May, 2024 after joining of job. (Item No.: 140.2.6, 140th IAPC dt: 17.04.2024) (Approved)

B. Recommendations of 69th meeting of IRC dt: 24.04.2024.

1. To consider the following Proposed Agreements and Memorandum of Understandings (MoUs). (Item No.: 69.2.1)

   (a) Agreement between Queen's University at Kingston, Canada and Indian Institute of Technology, Roorkee (IITR) for Dual Doctoral Degree Program (DDDP).
   (b) Memorandum of Understanding (MoU) between SatSure Analytics India Private Ltd., Bengaluru, Karnataka and Indian Institute of Technology, Roorkee (IITR).
   (c) Memorandum of Understanding (MoU) between Planet Aerospace, Bengaluru, Karnataka and Indian Institute of Technology, Roorkee (IITR).

2. Requests of the following ex-Ph.D. students for reinstatement of their academic registration: (Item No.: 69.2.2)

   (a) Mr. Dharmendra Kumar, (En. 19916027), Ph.D. student, Deptt. Humanities & Social Sciences.
   (b) Mr. Supriya Halder, (En. 21912017), Ph.D. student, Deptt. Earth Sciences.
   (c) Mr. Rana Pratap Singh, (En. No. 14910022), ex-Ph.D. student, Deptt. of Civil Engineering.

C. Scholarships/awards/prizes.

The details of awardees for various awards and cash prizes to other than graduating students (**Appendix-A)**.

The details of fifteen (15) MCM scholarships established by a group of Alumni of batch 1998 and 1999 batch of B.Arch. **(Appendix-B)**.

D. Institution of new awards/prizes/scholarships.

1. **Mrs. Chander Mohini Kapoor and Jeewan Kapoor Merit Prize:** Mr. Jeewan Lal Kapoor, has revised his corpus to support one (01) cash prize of Rs. 20,000/- every year to the graduating student of M.Tech. Artificial Intelligence for securing the highest CGPA.

2. Major Gautam Sanyal, an alumnus of 1968 batch of B.E. (Civil Engineering) and representative of the 1968 batch, has established a corpus to support six (06) MCM scholarships of Rs. 20,000/- each per year to deserving and financially constrained UG students with the following details.

   a. **1968 Batch Civil Engineering MCM Scholarship:** This scholarship will be given to three (03) financially constrained UG students from the Department of Civil Engineering.

   b. **1968 Batch Mechanical and Industrial Engineering MCM Scholarship:** This scholarship will be given to two (02) financially constrained UG students from the Department of Mechanical and Industrial Engineering.

   c. **1968 Batch Electrical Engineering MCM Scholarship:** This scholarship will be given to one (01) financially constrained UG student from the Department of Electrical Engineering.

3. **Smt. Satya Mohan MCM Scholarship:** Dr. Rakesh Mohan, New Delhi, has established a corpus to create one (01) MCM scholarship of Rs. 20,000/- per year. This scholarship will be given to support a female UG student from the Department of Civil Engineering.

The awardees of MCM scholarships will be selected as per the prevailing procedure adopted by SCSP to award MCM scholarships of the Institute.

E. Modification in the name of G.M. Singhvi Department Gold Medal to G M Singhvi Memorial Gold Medal: Dr. Ajit Singhvi has established a corpus to create one (01) Gold medal per year with the name of G M Singhvi

Memorial Gold Medal to the departmental topper in the course MBA of Department of Management Studies (DoMS). This gold medal is awarded as G.M. Singhvi Department Gold Medal. But donor raised an objection with the word of Department in the award name. After discussion in SCSP Committee Meeting dated 23.04.2024, it is resolved that the award should be given as per the name mentioned in the MOU as **"G M Singhvi Memorial Gold Medal"**. Further, looking after this issue, SCSP committee suggested that the name of the award is to be given as per MOU. In case, any minor change, is needed in the name of the award, it is to be discussed with the donor and also the award certificate is needed to be modified accordingly. Also this will be applicable in all donor based Department Gold Medal.

The above are reported to the Senate.

Details of various awards/prizes to other than graduating students, Academic Year 2023-24

A. Awards/prizes to UG/PG students on the basis of their CGPA:

S. No.	Award/Prize	Criteria	Amount of Award/Prize	Details of Recipient					
				Enroll. No.	Name	CGPA	Gender	Programme	Year
1	Viney K. and Sunita Jain Award for Excellence in Information and Communication Technologies	For obtaining the highest CGPA amongst II-year students of B.Tech. (Computer Science and Engineering). Two awards will be given, One award will be given to a student getting highest CGPA upto II year in the CSE and the second award will be given to a student of CSE who gets the highest CGPA amongst the woman students of the batch. In case, highest CGPA in the entire CSE class is obtained by a woman student, the second prize will go to a student who scores second highest CGPA in the class irrespective of gender.	Rs. 10,000/-	21114015	ANVADYA KHARE	9.816	Male	B.Tech. (Computer Science and Engineering)	3
			Rs. 10,000/-	21114064	NAQIYAH KAGZI	9.011	Female	B.Tech. (Computer Science and Engineering)	3
2	B.K. Agrawal Award for Academic Excellence	For obtaining the highest CGPA amongst III-year students of B.Tech. (Chemical Engineering).	Rs. 40,000/-	20118072	SAANA TANDON	9.286	Female	B.Tech. (Chemical Engineering)	4
3	Prem Prakash Gupta Scholarship	For obtaining the highest CGPA amongst III-year students of B.Tech. (Chemical Engineering).	Rs. 10,000/-						
4	Shri Reghuraj Behari Mathur Cash Prize	For obtaining the highest CGPA amongst I-year students of B.Tech. (Civil Engineering). Two awards are to be given to two deserving students (one male & one female).	Rs. 20,000/-	22113140	SHIVANSHU DHIMAN	9.533	Male	B.Tech. (Civil Engineering)	2
			Rs. 20,000/-	22324010	ISHIKA ARYA	8.511	Female	B.Tech. (Civil Engineering)	2
5	Tara Chand Kanti Devi Cash Prize	For obtaining the highest CGPA amongst I-year students of B.Tech. (Civil Engineering).	Rs. 15,000/-	22113140	SHIVANSHU DHIMAN	9.533	Male	B.Tech. (Civil Engineering)	2
6	Rai Bahadur Khushi Ram Sud and Smt. Durga Devi Sud Memorial Cash Prize	For obtaining the highest CGPA amongst II-year students of B.Tech. (Civil Engineering).	Rs. 10,000/-	21113122	RAHUL BAJIYA	9.67	Male	B.Tech. (Civil Engineering)	3
7	Dr. H.P. Sinha Merit Scholarship	For obtaining the highest CGPA amongst III-year students of B.Tech. (Civil Engineering).	Rs. 10,000/-	20113088	MANIK GOYAL	9.444	Male	B.Tech. (Civil Engineering)	4
8	Gauri Shanker-Malti Prize	For obtaining the highest CGPA amongst III-year students of B.Tech. (Civil Engineering).	Rs. 10,000/-						
9	Lt. Gen. Ram Adhar Loomba Cash Prize	For obtaining the highest CGPA amongst III-year students of B.Tech. (Civil Engineering). Two awards are to be given to two deserving	Rs. 10,000/-	20113088	MANIK GOYAL	9.444	Male	B.Tech. (Civil Engineering)	4
			Rs. 10,000/-	20113074	KASHVI SINGH	9.326	Female	B.Tech. (Civil	4

S. No.	Award/Prize	Criteria	Amount of Award/Prize	Details of Recipient					
				Enroll. No.	Name	CGPA	Gender	Programme	Year
		students (one male & one female).						Engineering)	
10	Om Prakash Gupta and Sushila Devi Memorial Scholarship	For obtaining the highest CGPA amongst I-year girl students of B.Tech. programmes.	Rs. 10,000/-	22115158	VANJALE PRANJAL JEETENDRA	9.644	Female	B.Tech. (Electrical Engineering)	2
11	Air Cmde S.C. Mehra Scholarship	For obtaining the highest CGPA amongst I-year girl students of B.Tech. (Electrical Engineering).	Rs. 10,000/-	22115158	VANJALE PRANJAL JEETENDRA	9.644	Female	B.Tech. (Electrical Engineering)	2
		For obtaining the highest CGPA amongst II-year girl student of B.Tech. (Electrical Engineering).	Rs. 10,000/-	21117086	OJASWI CHOPRA	9.156	Female	B.Tech. (Electrical Engineering)	3
		For obtaining the highest CGPA amongst III-year girl student of B.Tech. (Electrical Engineering).	Rs. 15,000/-	20115008	AKRITI JAIN	9.402	Female	B.Tech. (Electrical Engineering)	4
12	Kailash Chand Goyal Merit Scholarship	For obtaining the highest CGPA amongst III-year students of B.Tech. (Electronics & Communication Engineering).	Rs. 25,000/-	20116073	PRIYANSH RATHI	9.511	Male	B.Tech. (Electonics and Communication Engineering)	4
13	MECH 76 Alumni Award	For obtaining the highest CGPA amongst II-year students of B.Tech. (Mechanical Engineering). The student should not receive any similar award.	Rs. 10,000/-	21117144	YALMARTHY NV RONNIT GUPTA	9.636	Male	B.Tech. (Mechanical Engineering)	3
	MECH 76 Alumni Award	For obtaining the highest CGPA amongst III-year students of B.Tech. (Mechanical Engineering). The student should not receive any similar award.	Rs. 10,000/-	20113029	ANSH SAINI	9.319	Male	B.Tech. (Mechanical Engineering)	4
14	Kaustubh Roy Memorial Cash Prize	For obtaining the highest CGPA amongst III-year students of B.Tech. (Mechanical Engineering).	Rs. 10,000/-	20117143	VISHESH GOSWAMI	9.168	Male	B.Tech. (Mechanical Engineering)	4
15	Shyam S Biyani Cash Award	For securing the highest CGPA amongst I-year students of M.Tech. (Polymer Science and Engineering).	Rs. 10,000/-	22562009	PRAGYA TIWARI	9.421	Female	M.Tech. (Polymer Science and Engineering)	2
		For securing the highest CGPA amongst I-year students of M.Tech. (Packaging Technology).	Rs. 10,000/-	22555008	MD SALMAN RASHID	9.921	Male	M.Tech. (Packaging Technology)	2
16	BSHPC Cash Prize	For securing the highest CGPA amongst I-year students of M.Tech. (Renewable and Hydro Energy).	Rs. 10,000/-	22568016	VARTIKA DUBEY	9.158	Female	M.Tech. (Renewable and Hydro Energy)	2
17	Ashwani Kumar Goel, ALEO Manali Hydropower Award	For securing the second highest CGPA amongst I-year students of M.Tech. (Renewable and Hydro Energy).	Rs. 10,000/-	22568015	URVI SINGH	9.0	Female	M.Tech. (Renewable and Hydro Energy)	2
18	Dwarka Dass Balwant	For securing the second highest CGPA	Rs. 5,000/-	22568012	YADAV SACHIN	8.263	Male	M.Tech. (Renewable	2

S. No.	Award/Prize	Criteria	Amount of Award/Prize	Details of Recipient					
				Enroll. No.	Name	CGPA	Gender	Programme	Year
	Kaur Thapar Cash Prize	amongst I-year students of M.Tech. (Renewable and Hydro Energy). The student should not receive any award of similar or higher amount.			GIRIJASHANKAR			and Hydro Energy)	
19	Chhattisgarh State Power Generation Corporation Hydro Award	For securing the highest CGPA amongst I-year students of M.Tech. (Renewable and Hydro Energy). The student should not receive any award of similar or higher amount.	Rs. 10,000/-	22568013	SIDDHANT MISHRA	8.895	Male	M.Tech. (Renewable and Hydro Energy)	2
		For securing the highest CGPA amongst I-year students of M.Tech. (Environment Management of Rivers and Lakes). The student should not receive any award of similar or higher amount.	Rs. 10,000/-	22513008	TEJASH SINGH	9.889	Male	M.Tech. (Environmental Management of Rivers and Lakes)	2
20	Maneesha Gupta Award of Excellence	For obtaining the highest CGPA amongst I-year students of MBA.	Rs. 10,000/-	22810062	SABYASACHI SINGH	9.258	Male	MBA	2
21	B K Chaturvedi Award	For obtaining the highest CGPA amongst I-year students of MBA.	Rs. 10,000/-						

B. Awards/prizes to UG/PG students on the basis of recommendation from the concerned departments:

S. No.	Award/Prize	Criteria	Amount of Award/Prize	Details of Recipient				
				Enroll. No.	Name	Gender	Programme	Year
1	Ar. Rishi Tiwari Memorial Scholarship	For obtaining the highest SGPA in the Professional Training Semester amongst the students of B.Arch. programme. In case of a tie, the student with the highest CGPA will get this award.	Rs. 10,000/-	18110023	SHIVAM KUMAR JAYASWAL	Male	B.Arch.	5
2	Excellence Award by 1972 Batch of Chemical Engineering	For excellent overall performance (Innovative Mind, Highest Total Marks, Business IQ & Sports) amongst III-year students of B.Tech. (Chemical Engineering). Two awards are to be given. The students should not receive any merit scholarship.	Rs. 15,000/-	20118072	SAANA TANDON	Female	B.Tech. (Chemical Engineering)	4
			Rs. 15,000/-	20112070	NAVYA MAMORIA	Female	B.Tech. (Chemical Engineering)	4
3	Shri Ishwar Dayal Singhal Cash Award	For securing the highest marks in the subject CEN-106: Geomatics Engineering-I or equivalent amongst I-year students of B.Tech. (Civil Engineering).	Rs. 20,000/-	22113075	KESHAV NAND GOYAL	Male	B.Tech. (Civil Engineering)	2
4	1940 Batch Alumni Scholarship	For having the highest rank in JEE (Advanced)	Rs. 10,000/-	23113076	JATIN GARG	Male	B.Tech. (Civil	1

S. No.	Award/Prize	Criteria	Amount of Award/Prize	Details of Recipient				
				Enroll. No.	Name	Gender	Programme	Year
		amongst I-year students of B.Tech. (Civil Engineering) admitted at the Institute.					Engineering)	
5	Smt. Santosh Rani Tandon Memorial Award	For obtaining the highest CGPA in the compulsory courses of Structural Engineering (up to III-year) amongst III-year girl students of B.Tech. (Civil Engineering).	Rs. 50,000/-	20113165	SUGANDHA GUPTA	Female	B.Tech. (Civil Engineering)	4
6	Chhattisgarh State Power Generation Corporation Hydro Award	For securing the highest marks in the subject "Small Hydro Power Development" amongst the UG students.	Rs. 10,000/-	20113035	ASTUTI SHARMA	Female	B.Tech. (Civil Engineering)	4
				20113073	KARANDE CHETAN BAPU	Male	B.Tech. (Civil Engineering)	4
		For securing the highest marks in the seminar amongst I-year students of M.Tech. (Renewable and Hydro Energy).	Rs. 10,000/-	22568016	VARTIKA DUBEY	Female	M.Tech. (Renewable and Hydro Energy)	2
		For securing the highest marks in the seminar amongst I-year students of M.Tech. (Environment Management of Rivers and Lakes).	Rs. 10,000/-	22513001	ANISH KUMAR VERMA	Male	M.Tech. (Environmental Management of Rivers and Lakes)	2
7	Usha Annual Award	For securing the highest marks in the subject "Small Hydro Power Planning and Management" amongst I-year students of M.Tech. (Renewable and Hydro Energy).	Rs. 10,000/-	22568001	ABHIMANYU PATHANIA	Male	M.Tech. (Renewable and Hydro Energy)	2
8.	Prof. V.K. Gupta Memorial Impactful Young Researcher Award	For getting a published/accepted research paper in an international journal of the highest impact factor amongst the research scholars from Department of Chemistry. The period of consideration will be from 1st April to 31st March every year. In case of more than one eligible candidate, the award will be given to the younger candidate. If the age of candidates is same, then the award will be shared.	Rs. 20,000/-	17909006	IKRAR AHMAD	Male	Ph.D. Chemistry	5

Note: The earlier criteria for S. No. A (16, ,17, 18, 19) and B (6, 7) listed awards mentions for the programme “Alternate Hydro Energy Systems”. Since the name of said program has been changed now to “Renewable and Hydro Energy”, henceforth the programme name “Alternate Hydro Energy Systems” is being replaced by “Renewable and Hydro Energy”.

C. Awards/prizes to UG/PG students on the basis of their performance in sports related activities:

S. No.	Award/Prize	Criteria	Amount of Award/Prize	Details of Recipient				
				Enroll. No.	Name	Gender	Programme	Year
1.	KCPL Award for Best Player in Football in the year	To the best players of football	Rs. 10,000/-	20111004	AJAY PATEL	Male	B.Tech. (Biosciences and Bioengineering)	4
2.	KCPL Award for Best Player in Cricket in the year	To the best players of cricket	Rs. 10,000/-	19411036	VIKASH	Male	Integrated M.Tech. (Geophysical Technology)	5
3.	Anoop Singh Khurana Squash Championship Prize	to the winner of the squash tournament for boys	Rs. 30,000/-	19411011	DHANVIN JAIN	Male	Integrated M.Tech. (Geophysical Technology)	5
		To the runner of the squash tournament for boys	Rs. 20,000/-	21411014	DIGVIJAY SINGH	Male	B.Tech. (Mechanical Engineering)	3
4.	Jaikamal Award for Best Athlete of the Year	To the best two athletes, one each in male and female category.	Rs. 10,000/-	19410003	ANKIT	Male	Integrated M.Tech. (Geological Technology)	5
			Rs. 10,000/-	20112114	VANDNA	Female	B.Tech. (Chemical Engineering)	4
5.	1968 Batch Donation Best Female Athlete	To the best female athlete.	Rs. 10,000/-	20112114	VANDNA	Female	B.Tech. (Chemical Engineering)	4
6.	Dr. K.V. Mital Memorial Award	To the best male player of Lawn Tennis	Rs. 5,000/-	22540009	SHAILESH RAVINDRA BANKAR	Male	M.Tech. (Production and Industrial Systems Engineering)	2
7.	Mrs. Sushila Mital Memorial Award	To the best female player of Lawn Tennis.	Rs. 5,000/-	22113017	ANJALI CHOUDHARY	Female	B.Tech. (Civil Engineering)	2
8.	Sesquicentennial (1997) Batch Silver Jubilee Award for Excellence in Sports	Two awards of Rs. 25,000/- each per year to the students of B.Tech./B.Arch., one each male and female, for exceptional achievement in sports.	Rs. 25,000/-	20112114	VANDNA	Female	B.Tech. (Chemical Engineering)	4
			Rs. 25,000/-	20122001	AASHWIN SHARMA	Male	B.Tech. (Electrical Engineering)	4
9.	1959 Batch Award for Excellence in Badminton	For the excellence in badminton under male category.	Running Trophy	21112124	YASH KUMAR	Male	B.Tech. (Chemical Engineering)	3
		For the runner up in the badminton singles event under male category.	Cup	22810006	MUNDRE ADITYA PRABHAKAR	Male	MBA	2
		For the excellence in badminton under female category.	Running Trophy	22323008	ARCHI	Female	BS-MS (Mathematics and Computing)	2
		For the runner up in the badminton singles event under female category.	Cup	19915016	INAPURAPU SURYARAJITHA	Female	Ph.D. (Electronics and Communication Engineering)	5

The details of fifteen (15) MCM scholarships established by a group of Alumni of batch 1998 and 1999 batch of B.Arch.

S. No.	Name of MCM Scholarship	Criteria
1.	Class of 1998 MCM Scholarship	To a financially constrained 2nd year M.Sc. student from the Department of Mathematics
2.	Dr. Chand Bala, Ph.D. 1981 Memorial MCM Scholarship	To a financially constrained 2nd year UG student from the Department of Chemistry
3.	B.Arch. 1999 Manish Shangari Memorial MCM Scholarship	To one male & one female 4th year UG students who will be part of a professional training program from the Department of Architecture
4.	Class of 1998 MCM Scholarship for Girl Student	To a 3rd year UG female student from the Department of Civil Engineering
5.	Class of 1998 MCM Scholarship	To a 4th year UG student from the Department of Civil Engineering
6.	Class of 1998 Sachin Gaur Memorial MCM Scholarship	To a financially constrained student of any year from the Department of Computer Science and Engineering
7.	Class of 1998 Punjab Singh Memorial MCM Scholarship	To a financially constrained student of any year from the Department of Computer Science and Engineering
8.	Class of 1998 Kartikaye Chandrayana MCM Scholarship	To a 3rd year UG student from the Department of Mehta Family School of Data Science and Artificial Intelligence
9. & 10.	Class of 1998 MCM Scholarship	To a financially constrained 3rd and 4th year UG students from the Department of Metallurgy and Materials Engineering
11.	Class of 1998 MCM Scholarship	To a financially constrained UG student of any year from the Department of Electronics and Communication Engineering
12.	Class of 1998 MCM Scholarship	To a financially constrained UG student of any year from the Department of Electrical Engineering
13.	Class of 1998 Rahul Shukla Memorial MCM Scholarship	To a financially constrained student of any year from the Department of Mechanical and Industrial Engineering
14.	Class of 1998 Vikas Chandra Memorial MCM Scholarship	To a financially constrained student of any year from the Department of Chemical Engineering
15.	Class of 1998 Shyam Singh Memorial MCM Scholarship	To a financially constrained student of any year from the Department of Production and Industrial Engineering

Under Any other items

Item No.101.16: To consider award of 237 Ph.D. Degrees for the students after the 97th Senate for the students who have completed the requirements for award of degrees w.e.f. 13.09.2023.

Provisional Ph.D. degrees have been issued to 237 students who have completed the requirements for the award of the Ph.D. degree in various disciplines w.e.f. 13.09.2023 (**Appendix-A**).

The Senate may consider recommending to the Board of Governors for award of these Degrees. The degrees to these candidates will be awarded at the Convocation of the Institute. (Date to be announced).

The above is submitted for the consideration of the Senate.

PDC List for the consideration of Senate

Appendix 'A'

Sl.No.	Name	Deptt.	Topic	Supervisor	Examiner (For./Ind.)	PDC Date
1.	Mr. Mahinder Bawaria	AR	PLANNING FOR OPTIMUM LAND USE FOR THE SAFE CITY ENVIRONMENT	Prof. Ram Sateesh Pasupuleti	Prof. Abraham George, IIT Kharagpur Prof. Subhajyoti Samaddar, Kyoto Univ., Japan Prof. Agatino Rizzo, Lulea Univ. of Tech., Sweden	13.09.23
2.	Mr. Manohare Manish Purushottam	AR	PSYCHOPHYSIOLOGY RESPONSE-BASED MODEL FOR HETEROGENEOUS TRAFFIC NOISE EXPOSURE	Prof. E. Rajasekar Prof. M. Parida	Prof. Sumana Gupta, IIT Kharagpur Prof. Brind Kumar, IIT (BHU) Varanasi	27.09.23
3.	Ms. Smita	AR	SUSTAINABLE WATER RESOURCE MANAGEMENT IN TIKAMGARH DISTRICT, MADHYA PRADESH	Prof. V. Devadas	Prof. P. B. S. Bhadoria, IIT Kharagpur Prof. Abdul Razak Mohamed, SPA Vijayawada	14.12.23
4.	Ms. Arshi Parashar	AR	INVESTIGATING FACTORS INFLUENCING WOMEN'S ENGAGEMENT WITH PUBLIC SPACES IN URBAN CONTEXT OF BHOPAL	Prof. Harshit Sosan Lakra	Prof. Ajay Khare, SPA, Bhopal Prof. Alpana Sivam, University of South Australia	12.02.24
5.	Mr. Atul Kumar	AR	GREEN INFRASTRUCTURE CHARACTERIZATION TO IMPROVE AIR QUALITY AND THERMAL ENVIRONMENT'	Prof. Mahua Mukherjee Prof. E. Rajasekar	Prof. Rajib SHAW, Keio University, Japan Prof. Claire Walsh, Newcastle University, UK	16.04.24
6.	Mr. Krishan Upadhyay	AR	DEVELOPMENT OF A THERMAL COMFORT INDEX FOR SEDENTARY WORK ENVIRONMENT	Prof. E. Rajasekar Prof. S. Subudhi	Prof. Himanshu Tyagi, IIT Ropar Prof. Srikonda Ramesh, SPA, Vijayawada	15.05.24
7.	Mr. Rakesh Kumar	B&B	STRUCTURAL AND FUNCTIONAL CHARACTERISATION OF THE JUVENILE HORMONE BIOSYNTHESIS PATHWAY ENZYME-FARNESOL DEHYDROGENASE FROM COTTON BOLLWORM HELICOVERPA ARMIGERA (HÜBNER)	Prof. A. K. Sharma	Prof. Amit Kumar Das, IIT Kharagpur Prof. Sanjib Senapati, IIT Madras Prof. Christian Betzel, Univ. of Hamburg, Germany	25.09.23
8.	Mr. Joy Das	B&B	MOLECULAR CHARACTERISATION AND FUNCTIONAL STUDIES ON CRUCIAL CHITIN BIOSYNTHESIS PATHWAY GENES FROM COTTON BOLLWORM HELICOVERPA ARMIGERA (HÜBNER)	Prof. A. K. Sharma	Prof. G. T. Behere, ICAR-Central Inst. for Cotton Res., Nagpur Prof. Keshav R. Kranthi, International Cotton Advsory Committee, Washington	25.09.23
9.	Mr. Niteesh Kumar Pandey	B&B	CHARACTERIZING DRUG RESISTANT BETA-LACTAMASES PRODUCED BY ISOLATEDBACTERIA FROM FIELD SAMPLES, TOWARDS THE UNDERSTANDING OF AMR AND DEVELOPMENT OF NOVEL DIAGNOSTICS	Prof. Saugata Hazra	Prof. Amit Kumar Das, IIT Kharagpur Prof. Samudrala Gourinath, JNU, New Delhi	03.11.23

10.	Mr. Vivek Vijay Junghare	B&B	UNDERSTANDING PEPTIDE STRUCTURE-FUNCTION USING MODELLING, MD SIMULATION & AI	Prof. Saugata Hazra	Prof. Nitish R. Mahapatra, IIT Madras Prof. Amit Kumar Das, IIT Kharagpur	07.11.23
11.	Mr. Sourya Bhattacharya	B&B	UNDERSTANDING CLASS A BETA-LACTAMASE TOWARDS DRUG RESISTANCE	Prof. Saugata Hazra	Prof. Prasenjit Bhaumik, IIT Bombay Prof. Amit Kumar Das, IIT Kharagpur	08.11.23
12.	Mr. Ashwani Kumar	B&B	METABOLOMICS-BASED BIOACTIVITY ASSESSMENT OF PLUMBAGO ZEYLANICA	Prof. Debabrata Sircar	Prof. Mukesh Jain, JNU, New Delhi Prof. Shyam Kumar Masakapalli, IIT Mandi	10.11.23
13.	Mr. Sampath Kumar Banoth	B&B	TRANSCRIPTOMICS OF DEVELOPING MERISTEMS UNDER TERMINAL HEAT STRESS IN CONTRASTING CULTIVARS OF BARLEY (HORDEUM VULGARE L.	Prof. Harsh Chauhan	Prof. Bhupendra Chaudhary, JNU New Delhi Prof. Sotirios Fragkostefanakis, Goethe Univ. Frankfurt, Germany Prof. Chandan Sahi, IISER Bhopal	18.12.23
14.	Ms. Preeti Tomer	B&B	APPLICATIVE INSIGHTS TOWARDS PHAS DERIVED FROM WASTE RESOURCES	Prof. Saugata Hazra	Prof. Kaustubha Mohanty, IIT Guwahati Prof. Rintu Banerjee, IIT Kharagpur	27.12.23
15.	Mr. Shailendra Kumar	B&B	STUDIES ON THE INTERACTION OF FLAVONES WITH DIFFERENT DNA SEQUENCES AND THEIR STRUCTURAL ANALYSIS	Prof. Maya S. Nair	Prof. Ashutosh Kumar, IIT Bombay Prof. Heiko Ihmels, Univ. of Siegen, Germany	29.01.24
16.	Mr. Gireesh Kumar Shroti	B&B	PRODUCTION AND CHARACTERIZATION OF GREEN PLASTIC POLYMER POLYHYDROXYALKANOATES DERIVED FROM MICRO-ORGANISM USING WASTE RESOURCES	Prof. Saugata Hazra	Prof. Vikash Babu, CSIR-IIIM, Jammu Prof. Joydeep Mukherjee, Jadavpur Univ., Kolkata Prof. Nirupama Mallick, IIT Kharagpur	26.02.24
17.	Ms. Sapna Kewalrao Sunita Lonare	B&B	STUDIES ON IMPORTANT PROTEINS OF CANDIDATUS LIBERIBACTER ASIATICUS TOWARDS DEVELOPING POTENTIAL INHIBITOR MOLECULES	Prof. A. K. Sharma	Prof. Arvind M. Kayastha, BHU Varanasi Prof. J. Sivaraman, National University of Singapore	28.03.24
18.	Mr. PANKAJ CHANDLEY	B&B	ANALYSIS OF IMMUNE RESPONSES AGAINST CANDIDATE VIRULENCE ANTIGEN/S DURING MICROBIAL INFECTION	Prof. K. Mohan Poluri	Prof. Nadeem Khan, University of Florida USA Prof. Joshua Nosanchuk, Albert Einstein College of Medicine, US Prof. Manikandan Subramanian, University of London, UK	18.05.24
19.	Mr. Prateek Tripathi	CE	INTEGRATION OF NEAR-INFRARED, THERMAL, RAMAN SPECTROSCOPY AND HYPERSPECTRAL IMAGING FOR MINERAL CHARACTERIZATION : IMPLICATIONS FOR FUTURE LUNAR MISSIONS	Prof. R. D. Garg	Prof. Biswajeet Pradhan, University of Technology Sydney, Australia Prof. Alessandro Maturilli, Institute of Planetary Research, Berlin	21.07.23
20.	Ms. Neelam Gunjyal	CE	WASTEWATER RECEIVING PONDS IN RURAL INDIA AND THEIR IMPACT ON ANTIBIOTIC RESISTANCE AND GROUNDWATER QUALITY	Prof. Gargi Singh Prof. C. S. P. Ojha	Prof. Arvind Kumar Nema, IIT Delhi Prof. Thomas Boving, Univ. of Rhode Island, USA	03.08.23

21.	Mr. Nejib Hassen Abdullahi	CE	MORPHOLOGICAL PROCESS AND FLOW CHARACTERISTICS IN A ALLUVIAL CHANNEL UNDER SEDIMENT MINING	Prof. Z. Ahmad	Prof. Deo Raj Kaushal, IIT Delhi Prof. Elena Pummer, Norwegian Univ. of Science & Technology, Norway	03.08.23
22.	Ms. Eshta Ranyal	CE	COMPUTER VISION BASED AUTOMATED CRACK AND POTHOLE DETECTION IN PAVEMENTS USING DEEP LEARNING	Prof. Kamal Jain	Prof. Michael Chapman, Toronto Metropolitan University, Canada Prof. Ayman F. Habib, Purdue University, USA	03.08.23
23.	Ms. Pinakshi Biswas	CE	FATE OF TRACE CONTAMINANTS IN RIVERS	Prof. Bhanu Prakash Vellanki	Prof. Ligy Philip, IIT Madras Prof. Dietrich Volmer, Humboldt University Berlin, Germany	03.08.23
24.	Mr. Lalit Pal	CE	ASSESSING NONSTATIONARITY IN PRECIPITATION AND ITS IMPACTS	Prof. C. S. P. Ojha Prof. Ajay Gairola	Prof. D. Nagesh Kumar, IISc Bangalore Prof. Prof. Ronny Berndtsson, Lund University, Sweden	08.09.23
25.	Mr. Sanjay Kumar Dewali	CE	AVALANCHE HAZARD MAPPING & MODELLING USING GEOMATICS TECHNIQUES	Prof. Kamal Jain	Prof. Gulab Singh, IIT Bombay Prof. Biswajeet Pradhan, University of Technology Sydney, Australia	20.09.23
26.	Mr. Abhijit Chakraborty	CE	NUMERICAL STUDY ON EMBANKMENTS RESTING ON LIQUEFIABLE SOIL WITH MITIGATION MEASURES	Prof. V. A. Sawant	Prof. G. R. Dodagoudar, IIT Madras Prof. Krishna R. Reddy, University of Illinois, USA	27.09.23
27.	Mr. Supriya Marik	CE	EVALUATION OF PAVEMENT PERFORMANCE RELATED PARAMETERS EMPLOYING SILICA BASED ADDITIVE COUPLING WITH ORDINARY PORTLAND CEMENT	Prof. G. D. Ransinchung R. N.	Prof. Arun Kumar, RMIT University, Australia Prof. Brind Kumar, IIT (BHU) Varanasi	06.10.23
28.	Mr. Ali Mubarack C. K.	CE	TRACK-BRIDGE INTERACTION IN PRESENCE OF CWR: STABILITY AS WELL AS STRENGTH ASPECTS	Prof. Akhil Upadhyay	Prof. Sriman K. Bhattacharyya, IIT Kharagpur Prof. Konjengbam Darunkumar Singh, IIT Guwahati	12.10.23
29.	Mr. Mayank Sharma	CE	MACHINE LEARNING BASED INFORMATION RETRIEVAL FROM LIDAR AND UAV DATASETS	Prof. R. D. Garg	Prof. Venkataraman Lakshmi, Univ. of Virginia, US Prof. Martin Kappas, Georg-August Unive. Goettingen, Germany	27.10.23
30.	Ms. Anita Bhatt	CE	PERFORMANCE BASED DESIGN OF RC MEMBERS SUBJECTED TO BLAST LOADING	Prof. Pradeep Bhargava Prof. Priti Maheshwari	Prof. Konjengbam Darunkumar Singh, IIT Guwahati Prof. Shobha K. Bhatia, Syracuse Univ., New York	01.11.23
31.	Ms. Kirtika Samanta	CE	ANALYSIS OF MACHINE FOUNDATIONS UNDER BLAST LOADING	Prof. Priti Maheshwari	Prof. Shobha K. Bhatia, Syracuse Univ., New York Prof. Subhadeep Banerjee, IIT Madras	03.11.23
32.	Mr. Mudragada Ravi Kumar	CE	DAMAGE ASSESSMENT OF RC FRAMES SUBJECTED TO BLAST AND POST-BLAST FIRE SCENARIOS	Prof. Pradeep Bhargava	Prof. Konjengbam Darunkumar Singh, IIT Guwahati Prof. Sasankasekhar Mandal, IIT (BHU) Varanasi	08.11.23
33.	Mr. Dinesh Kumar Samal	CE	STUDIES ON ITZ AND DAMAGE CHARACTERISTICS IN CONCRETE OF VARYING STRENGTHS: AN ANALYTICAL AND EXPERIMENTAL APPROACH	Prof. Sonalisa Ray Prof. H. Thiyagarajan	Prof. Ananth Ramaswamy, IISc Bangalore Prof. Jacqueline-Saliba, Universite de Bordeaux, France	13.11.23

34.	Mr. Kamran	CE	STUDY OF HIGH RATE OF DEFORMATION OF PRESTRESSED CONCRETE SLABS	Prof. Mohd A. Iqbal	Prof. P. Venkitanarayanan, IIT Kanpur Prof. Chengging Wu, Univ. of Tech. Sydney-NSW, Australia	18.12.23
35.	Mr. Himanshu Bana	CE	DROUGHT ASSESSMENT USING EDI AND RAINFALL VARIABILITY WITH GIS TOOLS	Prof. R. D. Garg	Prof. Martin Kappas, Georg-August Unive. Goettingen, Germany Prof. Venkataraman Lakshmi, Univ. of Virginia, US	19.12.23
36.	Mr. Arshdeep Singh	CE	VALORISATION OF RICE HUSK ASH AS A SUPPLEMENTARY CEMENTITIOUS MATERIAL	Prof. Bhupinder Singh	Prof. Sudip Talukdar, IIT Guwahati Prof. Arezki Tagnit Hamou, Universite de Sherbrooke, Canada	27.12.23
37.	Mr. Bineet Kumar	CE	STUDIES ON FRACTURE PROCESSES IN CEMENTITIOUS COMPOSITE UNDER FATIGUE LOADING	Prof. Sonalisa Ray	Prof. J. M. Chandra Kishen, IISc Bangalore Prof. Konjengbam Darunkumar Singh, IIT Guwahati	05.01.24
38.	Mr. Rishi Singh Chhabra	CE	PERFORMANCE EVALUATION OF SUSTAINABLE RECYCLED BASE USING RAP MATERIAL	Prof. G. D. Ransinchung	Prof. Brind Kumar, IIT (BHU) Varanasi Prof. Arun Kumar, RMIT University, Australia Prof. Dharamveer Singh, IIT Bombay	05.01.24
39.	Mr. Tasgaonkar Pankaj Prakash	CE	VEHICLE TRACKING SYSTEM AND LOCATION BASED SERVICES USING REMOTE SENSING AND GIS	Prof. R. D. Garg Prof. P. K. Garg	Prof. A. K. Gosain, IIT Delhi Prof. Onkar Dikshit, IIT Kanpur	09.01.24
40.	Mr. Gurmesh	CE	DEVELOPMENT OF INERTACTIVE TRAVELLER INFORMATION SYSTEM	Prof. Praveen Kumar Prof. M. Parida	Prof. Arun Kumar, RMIT University, Australia Prof. Akhilesh Kumar Maurya, IIT Guwahati	11.01.24
41.	Mr. Ebissa Gadissa Kedir	CE	MODELLING FLOW IN PRISMATIC AND NON-PRISMATIC COMPOUND CHANNELS	Prof. K. S. Hari Prasad Prof. C. S. P. Ojha	Prof. Prashanth Reddy Hanmaiahgari, IIT Kharagpur Prof. J. H. Pu, University of Bradford, UK	19.01.24
42.	Ms. Manaswinee Kar	CE	PLANNING OF PARK-AND-RIDE FACILITIES AS FIRSTMILE CONNECTIVITY TO METRO STATIONS	Prof. M. Parida Prof. S. Sadhukhan Prof. Sanhita Das	Prof. Ashish Verma, IISc Bengaluru Prof. Manoj M., IIT Delhi	01.02.24
43.	Mr. Waibhaw Kumar	CE	FIRE PERFORMANCE OF STRUCTURAL STEEL TUBULAR COLUMNS WITH AND WITHOUT INFILLS	Prof. Umesh Kumar Sharma	Prof. Yogesh M. Desai, IIT Bombay Prof. Venkatesh Kodur, Michigan State University, USA	06.02.24
44.	Mr. Ananya Bijaya	CE	EXPLORATION OF FRACTURE ANISOTROPY, MULTISCALE MECHANICS AND DYNAMIC FRACTURE THROUGH PHASE-FIELD METHOD	Prof. Rajib Chowdhury Prof. Shubhankar Roy Chowdhury	Prof. Julien Yvonnet, Gustave Eiffel Univ., France Prof. Amirtham Rajagopal, IIT Hydrabad	28.02.24
45.	Mr. Chhaya Zalakkumar Rasendu	CE	ASEISMIC DESIGN SOLUTIONS FOR LIQUID STORAGE TANKS	Prof. Vipul Prakash	Prof. Hemant B. Kaushik, IIT Guwahati Prof. K. K. Pathak, IIT (BHU) Varanasi	20.03.24
46.	Mr. Saurabh Upadhyay	CE	MODELLING OF TRAFFIC NOISE FOR MID-BLOCK LOCATIONS IN URBAN AREAS	Prof. Praveen Kumar Prof. M. Parida Prof. Brind Kumar	Prof. Suresh Merugu, Univ. of Southampton Malaysia Prof. Arun Kumar, Queensland University of Tech., Australia	29.03.24
47.	Mr. Mohd Mohsin Khan	CE	DYNAMIC MATERIAL CHARACTERIZATION OF CONCRETE	Prof. Mohd. Ashraf Iqbal	Prof. P. Venkitanarayanan, IIT Kanpur Prof. N. K. Gupta, IIT Delhi	01.04.24

48.	Mr. Ashish Walia	CE	DEVELOPMENT OF TEMPERATURE PREDICTION MODEL FOR FLEXIBLE PAVEMENTS	Prof. Rajat Rastogi Prof. Praveen Kumar Prof. S. S. Jain	Prof. Aravind Krishna Swamy, IIT Delhi Prof. Amit Bhasin, University of Texas, Austin	02.04.24
49.	Mr. B. Gowtham Balasundaram	CE	THERMAL HYDROLYSIS PRETREATMENT OF SEWAGE SLUDGE	Prof. A. A. Kazmi Dr. Vinay Kumar Tyagi	Prof. Makarand M. Ghangrekar, IIT Kharagpur Prof. Zhou Yan, Nanyang Tech. Univ., Singapore	12.04.24
50.	Mr. Sunni Kanta Prasad Kushwaha	CE	GEOSPATIAL ANALYSIS USING LIDAR IN FORESTRY AND UAV PHOTOGRAMMETRY IN URBAN REGIONS	Prof. Kamal Jain	Prof. Onkar Dikshit, IIT Kanpur Prof. Ram Avatar, Hokkaido University, Japan	17.04.24
51.	Mr. Adarsh Yadav	CE	TRAFFIC NOISE MODELLING AT URBAN INTERSECTON	Prof. M. Parida Prof. Pushpa Choudhary Prof. Brind Kumar	Prof. Khaled Shaaban, 800 W University Pkwy, MS 102 Prof. L. A. Kumaraswamidhas, IIT (ISM) Dhanbad	25.04.24
52.	Mr. Kavach Mishra	CE	CHARACTERIZATION OF IMPERVIOUS SURFACES USING HYPERSPECTRAL DATA AND MACHINE LEARNING TECHNIQUES	Prof. R. D. Garg	Prof. Andrea Garzelli, Univ. of Siena, Italy Prof. Kevin Tansey, University of Leicester, Leicester, UK	08.05.24
53.	Mr. Sandeep Kumar Dubey	CE	STUDIES ON CONCRETE FRACTURE BEHAVIOUR UNDER MONOTONIC AND FATIGUE LOADING: EFFECT OF HETEROGENEITY	Prof. Sonalisa Ray	Prof. J.M. Chandra Kishen, IISc Bangalore Prof. Prabir K. Kolay, Southern Illinois University, USA Prof. Sarat Kumar Panda, IIT Bhubaneswar	20.05.24
54.	Mr. Mukesh Kumar Meena	CH	ANALYTICAL PYROLYSIS FOR STRUCTURAL MODIFICATION AND THERMOCHEMICAL TRANSFORMATION OF LIGNOCELLULOSIC BIOMASS	Prof. Deepak Kumar Ojha	Prof. Ajay K. Dalai, Univ. of Saskatchewan, Canada Prof. Raman Singh, Monash University, Australia	13.11.23
55.	Ms. Priyanka	CH	IN SITU CATALYTIC (FE/CU/ZN) HYDROTHERMAL LIQUEFACTION OF WATER HYACINTH	Prof. N. S. M. Reddy	Prof. R. Vinu, IIT Madras Prof. Giridhar Madras, IIT Hyderabad Prof. Ajay K. Dalai, Univ. of Saskatchewan, Canada	21..11.23
56.	Mr. Saqib Jamshed	CH	HYDRODYNAMICS OF POROUS AND NON-POROUS CYLINDERS	Prof. Amit K. Dhiman	Prof. Arul Prakash K., IIT Madras Prof. Laszlo Baranyi, Univ. of Miskolc, Hungary	07.12.23
57.	Mr. Ravi Prakash	CH	EXPERIMENTAL AND NUMERICAL STUDY OF WALL WETTABILITY ON HYDRODYNAMICS OF LIQUID-LIQUID TWO-PHASE FLOW IN MINIATURE GEOMETRIES	Prof. Sumana Ghosh	Prof. Kirti Chandra Sahu, IIT Hyderabad Prof. Gautam Biswas, IIT Kanpur	12.12.23
58.	Mr. Naushad Khan	CH	EXTRACTIVE DESULFURIZATION OF LIQUID FUELS USING QUATERNARY AMMONIUM SALTS BASED DEEP EUTECTIC SOLVENTS	Prof. V. C. Srivastava	Prof. Jitendra Sangwai, IIT Madras Prof. Nishith Verma, IIT Kanpur	27.12.23
59.	Mr. Devendra Rai	CH	SYNTHESIS OF THIN-FILM ELECTRODES: APPLICATIONS IN WASTEWATER TREATMENT	Prof. Shishir Sinha	Prof. Ashutosh Tiwari, University of Utah, US Prof. Ravindra Gudi, IIT Bombay	28.03.24

60.	Ms. Sneha Chauhan	CSE	ON CYBER SECURITY MODELS USING LAD	Prof. S. Gangopadhyay	Prof. M. V. Panduranga Rao, IIT Hyderabad Prof. Pantelimon Stanica, Naval Postgraduate School, USA	27.09.23
61.	Mr. Debraj Kundu	CSE	DESIGN AUTOMATION ISSUES AND THEIR SOLUTIONS FOR IMPLEMENTATION OF BIOPROTOCOLS USING ADVANCED MICROFLUIDIC BIOCHIPS	Prof. Sudip Roy	Prof. Rishad Shafik, Newcastle University, UK Prof. Indranil Sen Gupta, IIT Kharagpur	10.11.23
62.	Mr. Samarth Godara	CSE	A.I. APPROACHES FOR DECISION MAKING IN AGRICULTURAL APPLICATIONS	Prof. Durga Toshniwal	Prof. Robert Stahlbock, University of Hamburg, Germany Prof. Imre J. Rudas, Obuda University, Hungary	10.11.23
63.	Mr. Awaneesh Kumar Yadav	CSE	SECURE AND EFFICIENT AUTHENTICATION PROTOCOLS FOR NEXT GENERATION IoT AND MOBILE NETWORKS	Prof. Manoj Misra Prof. P. K. Pandey Prof. Madhusanka Liyanage	Prof. Pradeep Atrey, State University, New York Prof. Mohammad Shojafar, University of Surrey Prof. Michael Sheng, Macquarie Univ., Sydney	17.04.24
64.	Mr. Suyash Shukla	CSE	SIZE AND PRODUCTIVITY METRICS BASED EFFORT ESTIMATION FOR SOFTWARE DEVELOPMENT	Prof. Sandeep K. Garg	Prof. Pradeep Atrey, State University, New York Prof. Sanjay K. Singh, IIT (BHU) Varanasi	15.05.24
65.	Ms. Shaurya Mall	CT	ELECTRIC VEHICLE ADOPTION CHALLENGES AND CHARGING INFRASTRUCTURE PLANNING IN THE INDIAN URBAN ENVIRONMENT	Prof. A. Ramesh	Prof. S. G. Deshmukh, IIT Delhi Prof. Mark Goh, National University of Singapore	08.01.24
66.	Mr. Abdul Basit Khan	CT	EFFECTS OF DRIVING CHARACTERISTICS ON TRAFFIC SAFETY AND MANAGEMENT	Prof. Rajat Agarwal Prof. S. S. Jain	Prof. Akhilesh Kumar Maurya, IIT Guwahati Prof. Arun Kumar, Royal Institute of Tech., Australia	01.02.24
67.	Mr. T. Aromal	CT	A LEVEL OF SERVICE FRAMEWORK FOR AIRPORT PASSENGER TERMINAL BUILDINGS	Prof. E. Rajasekar Prof. B. R. Gurjar	Prof. Sharad Gokhale, IIT Guwahati Dr. Mukti Advani, CSIR-CRRI Delhi	05.04.24
68.	Ms. Jasasmita Das	CY	FABRICATION OF MIXED MATRIX MEMBRANE USING HETEROATOM-ENRICHED NANOPOROUS MATERIALS UTILIZED FOR ADSORPTIVE REMOVAL OF HG(II), PB(II), AND U(VI) IONS	Prof. Paritosh Mohanty	Prof. Sagar Pal, IIT (ISM) Dhanbad Prof. Kai Landskron, Lehigh University, USA	20.09.23
69.	Ms. Preeti Gahtori	CY	PROBING THE INFLUENCE OF SURFACE PROPERTIES OF NANOPARTICLES ON INTERFACIAL WATER AND LIPID MEMBRANES USING VSFG SPECTROSCOPY	Prof. Ravindra Pandey	Prof. Puspendu Kumar Das, IISc Bangalore Prof. Carlos R Baiz, Univ. of Texas at Austin, USA Prof. Manabendra Chandra, IIT Kanpur	27.09.23
70.	Mr. Sain Singh	CY	STUDIES ON DESIGNED RUTHENIUM COMPLEXES AND THEIR REACTIVITIES	Prof. Kaushik Ghosh	Prof. Anil J. Elias, IIT Delhi Prof. Pradip Mascharak, Univ. of California, US	09.10.23
71.	Ms. Atika	CY	POROUS ACTIVATED CARBON AND NICKEL HYDROXIDE AS ELECTRODES FOR SYMMETRIC AND HYBRID SUPERCAPACITOR DEVICES	Prof. R. K. Dutta	Prof. Bhabani K. Satapathy, IIT Delhi Prof. Raghunath Acharya, BARC Mumbai	20.11.23

72.	Mr. Anuj Rawat	CY	ADSORPTIVE DESULPHURIZATION OF FUELS BY POLYCYCLIC AROMATIC HYDROCARBONS DERIVED NANOPOROUS POLYMERS	Prof. Paritosh Mohanty	Prof. Bishnupada Mandal, IIT Guwahati Prof. Ajay Mandal, IIT (ISM) Dhanbad	21.11.23
73.	Mr. Vikrant Chaudhary	CY	PRESSURE EFFECT ON SPIN, ELECTRONIC, AND THERMAL TRANSPORT IN TERNARY INTERMETALLICS	Prof. Hem C. Kandpal	Prof. Abhishek Kumar Singh, IISc Bangalore Prof. Arghya Taraphder, IIT Kharagpur	13.12.23
74.	Mr. Anupam Das	CY	PHOTOINDUCED ORGANIC TRANSFORMATIONS OF OLEFINS AND CARBONYL COMPOUNDS	Prof. K. R. Justin Thomas	Prof. K. R. Prabhu, IISc Bangalore Prof. G. Gekar, IIT Madress	05.03.24
75.	Mr. Ikrar Ahmad	CY	IN SITU SYNTHESIS OF HETEROATOM(S) (N/S/P) CODOPED POROUS REDUCED GRAPHENE OXIDE AS ELECTRODE MATERIAL(S) FOR DESIGNING OF BINDERFREE AND HIGH-MASS LOADED SUSTAINABLE HIGH PERFORMANCE AQUEOUS SYMMETRIC SUPERCAPACITOR AND ELECTROCHEMICAL SENSOR	Prof. Anil Kumar	Prof. Detlef Bahnemann, Saint-Petersburg State University, Russia Prof. Prem Chandra Pandey, IIT (BHU), Varanasi	15.03.24
76.	Mr. Motahar SK	CY	NON-PRECIOUS METAL-CATALYZED (DE)HYDROGENATION OF ALCOHOLS: SYNTHESIS OF OLEFINS, N-HETEROARENES AND 1,5-DIKETONES	Prof. Debasis Banerjee	Prof. N. G. Ramesh, IIT Delhi Prof. Louis FENSTERBANK, Sorbonne Université, France	15.03.24
77.	Ms. Shivani Chauhan	DMM	PARTICIPATORY RISK RESILIENT PLANNING FRAMEWORK FOR SUSTAINABLE HILL HABITAT	Prof. Mahua Mukherjee	Prof. Rajib SHAW, Keio University, Japan Prof. Chandan Ghosh, Ministry of Home Affairs, Delhi	20.02.24
78.	Mr. Sandeep Gairola	DMM	DEVELOPMENT AND FLAMMABILITY BEHAVIOR OF FOREST/CROP RESIDUE-BASED POLYMERIC COMPOSITES	Prof. Inderdeep Singh Prof. Shishir Sinha	Prof. Debabrata Chakraborty, IIT Guwahati Prof. Naresh Bhatnagar, IIT Delhi	12.03.24
79.	Mr. Saragada Prasanna Kumar	ECE	DESIGN AND ANALYSIS OF ENERGY-EFFICIENT SRAMBASED ON-CHIP IN-MEMORY COMPUTATION FOR MACHINE LEARNING APPLICATIONS	Prof. Bishnu Prasad Das	Prof. Gaurab Banerjee, IISc Bangalore Prof. Tony Kim Tae Hyoung, NTU, Singapore	07.11.23
80.	Mr. Bivalkar Mandar Kisan	ECE	DEVELOPMENT OF SIGNAL ENHANCEMENT TECHNIQUES FOR TARGET DETECTION WITH MICROWAVE/ MILLIMETER WAVE IMAGING SYSTEMS	Prof. Dharmendra Singh	Prof. S. N. Merchant, IIT Bombay Prof. Yoshio Yamaguchi, Niigata University, Japan	10.11.23
81.	Ms. Namiita	ECE	NTIFERROMAGNETIC SKYRMION BASED ENERGY-EFFICIENT NEURON DEVICES	Prof. B. K. Kaushik	Prof. Supriyo Bandyopadhyay, Virginia Commonwealth Univ., USA Prof. M. M. De Souza, Univ. of Sheffield, UK	30.11.23

82.	Ms. Surbhi Adya	ECE	INVESTIGATIONS ON SECOND HARMONIC GYROTRONS	Prof. Meenakshi Rawat Prof. M. V. Kartikeyan	Prof. Alan David Reginald Phelps, University of Strathclyde, UK Prof. Francisco Falcone, Univ. of Johannesburg, South Africa Prof. M. Jaleel Akhtar, IIT Kanpur	30.11.23
83.	Mr. Vivek Kumar	ECE	MODELING AND ANALYSIS OF SELF-HEATING EFFECT IN ADVANCED MULTI-GATE MOSFETS	Prof. Arnab Dutta Prof. Sudeb Dasgupta	Prof. Vihar Georgiev, University of Glasgow, UK Prof. Abhisek Dixit, IIT Delhi	19.12.23
84.	Mr. Jaydeep Singh	ECE	DEVELOPMENT OF EM BASED TECHNIQUES WITH MACHINE LEARNING FOR DESIGNING THE MICROWAVE STRUCTURES	Prof. Dharmendra Singh	Prof. A. R. Harish, IIT Kanpur Prof. K. P. Singh, IIT (BHU) Varanasi	19.12.23
85.	Mr. Debashish Mondal	ECE	INVESTIGATIONS ON HIGH-POWER SUB-TERAHERTZ GYROTRONS	Prof. Meenakshi Rawat Prof. M. V. Kartikeyan	Prof. Claudio Paoloni, Lancaster University, UK Prof. Gun-sik Park, Seoul National Univ. Republic of Korea	29.01.24
86.	Ms. Priya Gupta	ECE	THROUGHPUT ENHANCEMENT USING RESOURCE ALLOCATION AND MASSIVE MIMO TECHNOLOGY IN CELLULAR SYSTEM	Prof. Debashis Ghosh	Prof. Eduard Jorswieck, Institute for Comm. Tech., Technische Univ. Braunschweig, Germany Prof. Srikrishna Bhashyam, IIT Madras	06.02.24
87.	Ms. Aradhya Saini	ECE	DEVELOPMENT OF COMPUTER VISION APPROACH FOR RAILROAD TRACK HEALTH/ASSETS MONITORING WITH DRONE DATA	Prof. Dharmendra Singh	Prof. H. Yahia, INRIA Bordeaux Sud-Ouest, France Prof. Sanjay K. Singh, IIT (BHU) Varanasi	30.04.24
88.	Mr. Khoirom Johnson Singh	ECE	NEGATIVE CAPACITANCE EFFECTS IN MULTIDOMAIN FERROELECTRIC DEVICES FOR LOW VOLTAGE APPLICATIONS	Prof. Sudeb Dasgupta Prof. Anand Bulusu	Prof. Pierpaolo Palestri, University of Modena and Reggio-Emilia Prof. Fabrizio Bonani, Politecnico di Torino, Italy	06.05.24
89.	Mr. Diress Tilahun Antalem	EE	INVESTIGATION ON DC/AC MICROGRID STABILITY FOR INPUT SOURCE DISTURBANCE	Prof. Avik Bhattacharya	Prof. Sukumar Mishra, IIT Delhi Prof. Dipti Srinivasan, National Univ. of Singapore	05.09.23
90.	Mr. Soju Joseph Alexander	EE	AN EMBEDDED PZT-BASED TRANSDUCER FOR MONITORING CURING OF CEMENTITIOUS MATERIALS IN STRUCTURES	Prof. P. Sumathi Prof. S. K. Panigrahi	Prof. Boby George, IIT Madras Prof. Bishwajit Bhattacharjee, IIT Delhi Prof. S. C. Mukhopadhyay, Macquarie Unive. NSW, Australia	20.09.23
91.	Ms. Satabdy Jena	EE	NETWORKED CONTROL AND OPERATION OF CYBER PHYSICAL DC / AC MICROGRIDS	Prof. N. P. Padhy	Prof. Suresh Chandra Srivastava, IIT Kanpur Prof. K. Shanti Swarup, IIT Madras	03.11.23
92.	Mr. Suresh Maganti	EE	DISTRIBUTED GENERATION FOR IMPROVING THE VOLTAGE PROFILE OF A WEAK GRID	Prof. N. P. Padhy	Prof. K. Shanti Swarup, IIT Madras Prof. Suresh Chandra Srivastava, IIT Kanpur	03.11.23
93.	Mr. P. Naveen	EE	OPTIMAL COORDINATION OF OVERCURRENT RELAYS FOR ENHANCED PROTECTION IN AC MICROGRIDS	Prof. Premalata Jena	Prof. A. K. Pradhan, IIT Kharagpur Prof. Trapti Jain, IIT Indore	11.01.24

94.	Mr. Kamal Raj Singh	EE	CARDIAC MRI SEGMENTATION USING DEEP LEARNING"	Prof. Ambalika Sharma Prof. G. K. Singh	Prof. Dinesh Kumar, RMIT University, Australia Prof. Vikram M. Gadre, IIT Bombay	12.02.24
95.	Mr. Nitesh Kumar	EE	INVESTIGATIONS OF SOLID STATE TRANSFORMERS FOR MICROGRID APPLICATIONS	Prof. Pramod Agarwal	Prof. Prasad Enjeti, Texas A&M Univ., USA Prof. Geza Joos, University. Street Montreal Quebec, Canada	12.02.24
96.	Mr. Chetan Srivastava	EE	NOVEL AND EFFICIENT PROTECTION SCHEMES FOR LOW VOLTAGE DC MICROGRID	Prof. Manoj Tripathy	Prof. Lie Xu, University of Strathclyde, UK Prof. A. K. Pradhan, IIT Kharagpur	22.04.24
97.	Mr. Gade Kesava Rao	EE	FAULT DETECTION AND LOCALIZATION SCHEMES FOR DC MICROGRID NETWORK	Prof. Premalata Jena	Prof. A. K. Pradhan, IIT Kharagpur Prof. Iqbal Husain, North Carolina State University, USA	26.02.24
98.	Mr. Narendra Babu Y.	EE	HARMONIC INSTABILITY ASSESSMENT AND RESONANCE INVESTIGATION OF GRID-TIED INVERTER SYSTEM	Prof. N. P. Padhy	Prof. Suryanarayana Doolla, IIT Bombay Prof. Subhransu Ranjan Samantaray, IIT Bhubaneswar	29.02.24
99.	Ms. Kartika Dubey	EE	PROTECTION AND SECURITY ENHANCEMENT OF ACTIVE AC DISTRIBUTION SYSTEM USING DIFFERENTIAL TECHNIQUES	Prof. Premalata Jena	Prof. Ashok Kumar Pradhan, IIT Kharagpur Prof. Vijay K. Sood, Ontario Tech. Univ., Canada	28.03.24
100.	Mr. Himesh Kumar	EE	LOSS ALLOCATION IN DISTRIBUTION NETWORK WITH DISTRIBUTED GENERATION	Prof. D. K. Khatod	Prof. Anil Pahwa, Kansas State Univ., US Prof. Debapriya Das, IIT Kharagpur	09.04.24
101.	Mr. Rudranarayan Pradhan	EE	DEVELOPMENT OF NOVEL FAULT DETECTION AND DIRECTION ESTIMATION SCHEMES FOR AC MICROGRID	Prof. Premalata Jena	Prof. Surendra Reddy Salkuti, Woosong University, Republic of Korea Prof Chandrashekhar N Bhende, Bhubaneswar	03.05.24
102.	Ms. Bhabani Kumari Choudhury	EE	DEVELOPMENT OF NOVEL PROTECTION SCHEMES FOR DC MICROGRIDS	Prof. Premalata Jena	Prof. A. K. Pradhan, IIT Kharagpur Prof. Bidyadhar Subudhi, IIT Goa	09.05.24
103.	Mr. Abhishek Kumar	EE	INTER-TURN FAULT LOCALIZATION IN TRANSFORMER WINDING BY ANALYZING FREQUENCY REGIONS OF SFRA	Prof. Bhavesh R. Bhalja Prof. Ganesh B. Kumbhar	Prof. S. V. Kulkarni, IIT Bombay Prof. C. C. Reddy, IIT Ropar	10.05.24
104.	Mr. Desai Aniket Sanjay	EQ	ROLE OF A-PRIORI INFORMATION IN MINIMIZING UNCERTAINTIES IN MASW TESTING AND SUBSEQUENT SITE RESPONSE ANALYSIS	Prof. Ravi S. Jakka	Prof. Deepankar Choudhury, IIT Bombay Prof. Adrian Rodriguez-Marek, Virginia Polytechnic Institute & State University, USA Prof. K. S. Rao, IIT Delhi	07.11.23
105.	Mr. Palyam Gautham Reddy	EQ	SEISMIC PERFORMANCE EVALUATION OF CONCRETE GRAVITY DAMS	Prof. Manish Shrikhande	Prof. Amlan Kumar Sengupta, IIT Madras Prof. Ahmed Ghobarah, McMaster University, Canada	23.11.23
106.	Mr. Patankar Digvijay Babasaheb	EQ	DESIGN CONSIDERATIONS OF FRICTION DAMPER FOR SEISMIC RESPONSE REDUCTION IN FRAMED BUILDINGS	Prof. Manish Shrikhande	Prof. Durgesh C. Rai, IIT Kanpur Prof. Arghya Deb, IIT Kharagpur	27.12.23

107.	Mr. Mayank Sharma	EQ	EFFECT OF URM INFILLS ON SEISMIC PERFORMANCE OF RC FRAME AND FRAME-SHEAR WALL BUILDINGS	Prof. Yogendra Singh Prof. Henry V. Burton	Prof. Solomon Tesfamariam, P. Univ. of Waterloo, Canada Prof. Vasant Matsagar, IIT Delhi Prof. Sajal K. Deb, IIT Guwahati	21.03.24
108.	Mr. C. Lallawmawma	EQ	SEISMIC HAZARD AND RISK ASSESSMENT OF NORTHEAST INDIAN REGION-A PROBABILISTIC APPROACH	Prof. M. L. Sharma Prof. J. Das	Prof. P. Anbazhagan, IISc Bangalore Prof. Sanjit Kumar Pal, IIT (ISM) Dhanbad	15.05.24
109.	Mr. Cyril Shaju	ES	A FRACTAL APPROACH TO TIME SERIES ANALYSIS WITH EMPHASIS ON INDIAN PLATE SEISMICITY	Prof. Kamal	Prof. Paresh Nath Singha Roy, IIT Kharagpur Prof. Ramesh P. Singh, Chapman University, USA	03.08.23
110.	Mr. Ravi Yadav	ES	MICROBIOTA FROM DECCAN INTERTRAPPEAN DEPOSITS OF THE WESTERN (KUTCH) AND CENTRAL (MADHYA PRADESH) PENINSULAR INDIA	Prof. A. S. Maurya Prof. Sunil Bajpai	Prof. Ajoy Kumar Bhaumik, IIT (ISM) Dhanbad Prof. Georgios Georgalis, Polish Acad. of Sci., Poland	21.10.23
111.	Mr. Mohd. Usman Khan	ES	SPATIAL DISTRIBUTION, GEOCHEMICAL BEHAVIOUR AND MOBILZATION MECHANISMS OF ARSENIC IN THE AQUIFERS OF UPPER AND MIDDLE GANGETIC PLAINS, INDIA	Prof. Nachiketa Rai	Prof. Dan Lapworth, British Geological Survey, UK Prof. Ashima Saikia, University of Delhi, Delhi	13.11.23
112.	Soumya Darshan Panda	ES	STABILITY ASSESSMENT OF KOTROPI LANDSLIDE USING NUMERICAL MODELING AND ESTABLISHMENT OF REGIONAL RAINFALL THRESHOLD, HIMACHAL PRADESH, INDIA	Prof. S. P. Pradhan	Prof. T. N. Singh, IIT Patna Prof. Kripamoy Sarkar, IIT (ISM) Dhanbad Prof. Vikram Vishal, IIT Bombay	14.12.23
113.	Mr. Dinesh Kumar	ES	RESERVOIR CHARACTERISATION AND SOURCE ROCK STUDIES OF MESOZOIC AND TERTIARY SEQUENCES, JAISALMER BASIN, RAJASTHAN	Prof. A. S. Maurya Prof. Ravi Sharma	Prof. Soumyajit Mukherjee, IIT Bombay Prof. Santanu Banerjee IIT Mumbai	07.02.24
114.	Ms. Nongmaithem Menaka Chanu	ES	3D TOMOGRAPHIC MODELLING FOR NE INDIA USING SURFACE WAVES	Prof. S. Mukhopadhyay Dr. Naresh Kumar	Prof. Surya Pachhai, University of UTAH, USA Prof. Luca De Siena, Johannes Gutenberg University, Germany	04.03.24
115.	Mr. Tanveer Ali Dar	ES	CHARACTERIZATION OF SURFACE WATER-GROUNDWATER INTERACTIONS IN THE UPPER JHELUM BASIN, HIMALAYAS, USING AN INTEGRATED GEOCHEMICAL, ISOTOPIC, AND MODELING APPROACH	Prof. Nachiketa Rai Dr. Sudhir Kumar	Prof. Alan E. Fryar, University of Kentucky, USA Prof. Syed Hilal Farooq, IIT Bhubaneswer	21.03.24

116.	Mr. Dhanesh Kumar Phaye	ES	UNCONVENTIONAL HYDROCARBON POTENTIAL OF CAMBAY SHALE, JAMBUSAR-BROACH AREA, CAMBAY BASIN, INDIA: IMPLICATION ON SEQUENCE STRATIGRAPHY	Prof. Biplab Bhattacharya	Prof. Raj Kumar Singh, IIT Bhubaneswer Prof. Atul Kumar Verma, IIT (ISM) Dhanbad	05.04.24
117.	Ms. Pipasa Layak	ES	ACCRETION AND THERMO-CHEMICAL EVOLUTION OF TERRESTRIAL PLANETARY BODIES	Prof. Nachiketa Rai	Prof. Debajyoti Paul, IIT Kanpur Prof. Jamie Gilmour, Univ. of Manchester, UK Prof. Mathieu Roskosz, MNSN, France	25.04.24
118.	Mr. Ankit Gupta	ES	TECTONIC GEOMORPHOLOGY AND SEDIMENTOLOGY IN PARTS OF THE GANGA-GHAGHARA INTERFLUVE	Prof. Pradeep Srivastava	Prof. Jayant K. Tripathi, JNU Delhi Prof. Javed N. Malik, IIT Kanpur	15.05.24
119.	Mr. Dixitkumar Prafulkumar Pathak	HRD	DEVELOPMENT OF INTEGRATED RENEWABLE ENERGY SYSTEM FOR AN UN-ELECTRIFIED REMOTE AREA	Prof. D. K. Khatod	Prof. Devender Singh, IIT (BHU) Varanasi Prof. Prabodh Bajpai, IIT Kanpur	29.11.23
120.	Mr. Sandeep Kumar	HRD	STUDIES ON PRODUCTION AND UTILISATION OF BIODIESEL FROM MIXED OILS	Prof. M. K. Singhal Prof. M. P. Sharma	Prof. Hifjur Raheman, IIT Kharagpur Prof. Devendra Deshmukh, IIT Indore	06.12.23
121.	Mr. Ramjee Lal Meena	HRD	DEVELOPMENT OF CONTROL STRATEGIES FOR DC MICROGRID	Prof. Avik Bhattacharya Prof. D. K. Khatod	Prof. Dipti Srinivasan, National Univ. of Singapore Prof. Bharat Singh Rajpurohit, IIT Jodhpur	22.04.24
122.	Mr. Naman Arora	HRD	ASSESSMENT OF SEDIMENT ABRASIVE POTENTIAL IN HIMALAYAN RIVERS	Prof. Arun Kumar Prof. Sunil K. Singal	Prof. Mohammad Saud Afzal, IIT Kharagpur Prof. Jaan Pu, University of Bradford, UK	26.04.24
123.	Mr. Surya Prakash Verma	HSS	EXPLORATION OF CHARLIE CHAPLIN'S THE LITTLE TRAMP SCREENPERSONA IN SELECT FILMS: A POSTSCRIPT TO THE MYTH OF SISYPHUS	Prof. Binod Mishra	Prof. Aysha Iqbal, IIT Madras Prof. Maya Shanker Pandey, BHU, Varanasi	03.08.23
124.	Ms. Simegn Birhan Tessema	HSS	ECONOMIC VALUATION OF FOREST ECOSYSTEM SERVICES UNDER PARTICIPATORY MANAGEMENT IN ETHIOPIA	Prof. Diptimayee Nayak	Prof. Vrajaindra Upadhyay, IIT Delhi Prof. K. Narayanan, IIT Bombay	25.09.23
125.	Mr. Riyaz Alam	HSS	ASSESSMENT OF ECOTOURISM IN PROTECTED AREAS: A STUDY OF JIM CORBETT TIGER RESERVE, INDIA	Prof. Diptimayee Nayak	Prof. Benjamin Burkhard, Leibniz University Hannover, Germany Prof. Narayan C. Nayak, IIT Kharagpur	06.10.23
126.	Mr. Manzoor Ahmad Malik	HSS	ESSAYS ON DEMOGRAPHIC DYNAMICS, AGEING, AND ECONOMIC GROWTH	Prof. S. P. Singh Prof. Falguni Pattanaik	Prof. Shivalingappa Sangappa Halli, Univer. of Manitoba, Canada Prof. Udaya Shankar Mishra, International Institute for Population Sci., Mumbai	06.10.23
127.	Mr. Athaley Vaibhao Govindrao	HSS	A STUDY OF INCLUSIVE PRACTICES AND EDUCATION TECHNOLOGY FOR DEAF STUDENTS OF ART AND DESIGN HIGHER EDUCATION IN INDIA	Prof. A. J. Mishra	Prof. Deepak Joshi, IIT Delhi Prof. Prof. Olga V. Galustyan, Southern Federal University, Russia	27.12.23

128.	Ms. Richa	HSS	CLIMATE-CHANGE INDUCED MIGRATION: AN EVIDENCE-BASED STUDY IN THE SELECTED DISTRICTS OF NORTH BIHAR	Prof. Subir Sen	Prof. Jack Dewaard, Population Council, Washington, USA Prof. Tuhin Ghosh, Jadavpur Unive., Kolkata	02.01.24
129.	Ms. Purba Chakraborty	HSS	RECLAIMING SPACE IN AREAS OF CONFLICT: A SELECT READING OF JOE SACCO AND SARAH GLIDDEN	Prof. Rashmi Gaur	Prof. Rajni Singh, IIT (ISM) Dhanbad Prof. Alessandro Vescovi, Universita, Culture E Mediazioni, Italy	01.02.24
130.	Ms. Nobonita Rakshit	HSS	ENVIRONMENTAL CRISIS AND POSTCOLONIAL SOUTH ASIA: AN ECO-AESTHETIC READING OF CONTEMPORARY SOUTH ASIAN NOVELS	Prof. Rashmi Gaur	Prof. Rajesh Kumar, IIT Madras Prof. Rajni Singh, IIT (ISM) Dhanbad	26.02.24
131.	Mr. Divyanshu Kumar Dixit	HSS	PERI-URBANISATION, LAND-USE DYNAMICS AN LIVELIHOOD DIVERSIFICATION IN URBAN FRINGE OF AGARA AND VARANASI CITIES	Prof. S.P. Singh	Prof. Ram Sakal Yadav, BHU, Varanasi Prof. Nalib Bharti, IIT Patna	28.02.24
132.	Ms. Priya	HSS	ASSESSMENT OF AGRICULTURAL SUSTAINABILITY IN PUNJAB: FACTORS AND FARMERS' PERSPECTIVE	Prof. Sukhpal Singh	Prof. Dukhbandhu Sahoo, IIT Bhubaneswar Prof. Pritee Sharma, IIT Indore Dr. Shiv Kumar, ICAR-NIAEPRP, New Delhi	06.05.24
133.	Mr. Guntu Ravikumar	HY	INVESTIGATION OF CHARACTERISTICS, DRIVERS, AND PREDICTABILITY OF COMPOUND DRY AND HOT EXTREMES	Prof. Ankit Agarwal	Prof. R. Krishnan, IITM, Pune Prof. Nicola Fohrer, Univ. of Kiel, Germany	30.11.23
134.	Mr. Tegegn Kassa Beyene	HY	HYDROLOGICAL DROUGHT PROPAGATION AND VULNERABILITY IN ETHIOPIA	Prof. Manoj K. Jain Prof. B. K. Yadav Prof. Ankit Agarwal	Prof. Bellie Sivakumar, IIT Bombay Prof. Srinivasulu Ale, Texas A&M AgriLife Research, USA	01.12.23
135.	Ms. Sana Dhamija	HY	GEOSTATISTICAL MODELLING, PLANT UPTAKE AND HUMAN HEALTH RISK ASSESSMENT OF ARSENIC IN GANGA BASIN, INDIA	Prof. Himanshu Joshi	Prof. Abhijit Mukherjee, IIT Kharagpur Prof. David Polya, The Univ. of Manchester, UK Prof. Stefan Krause, University of Birmingham, UK	15.05.24
136.	Mr. Rouchin Mahendra	IIC	SYNTHESIS & STUDY OF METAL DIELECTRIC THIN FILMS FOR OPTICAL COMPONENTS AND DEVICES	Prof. Ramesh Chandra	Prof. Mahesh Kumar, IIT Jodhpur Prof. Parinda Vasa, IIT Bombay	03.11.23
137.	Mr. K. Sunil Behal	MA	PROPAGATION OF COMPUTER VIRUS AND PATCH DISSEMINATION	Prof. Tanuja Srivastava Prof. Sunita Gakkhar	Prof. Nitu Kumari, IIT Mandi Prof. A. K. Misra, BHU Varanasi	08.09.23
138.	Mr. Mashkoor Ali	MA	MATHEMATICAL THEORY ON THE DISCRETE COLLISION-INDUCED BREAKAGE EQUATIONS AND THE SAFRONOV-DUBVOSKII COAGULATION EQUATIONS	Prof. Ankik Kumar Giri	Prof. Sunil Kumar, IIT (BHU) Varanasi Prof. Volker John, WIAAS Germany	06.10.23
139.	Ms. Preeti	MA	CLASSIFICATION AND CLUSTERING PROBLEMS IN MACHINE LEARNING ASSISTED BY METAHEURISTIC ALGORITHMS	Prof. Kusum Deep	Prof. Kapil Ahuja, IIT Indore Prof. Amitava Chatterjee, Jadavpur Univ., Kolkata	12.10.23

140.	Ms. Ashishi Puri	MA	COMPUTATIONAL ALGORITHMS FOR RECONSTRUCTION OF CROSSING WHITE MATTER FIBERS IN BRAIN	Prof. Sanjeev Kumar	Prof. Swaroop Nandan Bora, IIT Guwahati Prof. Sarvesh Kumar, IISST Trivandrum	17.10.23
141.	Mr. Sibasish Dhibar	MA	COST OPTIMIZATION AND JOINING STRATEGIES FOR MARKOVIAN QUEUES	Prof. Madhu Jain	Prof. U. C. Gupta, IIT Kharagpur Prof. Kuo-Hsiung Wang, Asis University, Taiwan	27.10.23
142.	Mr. Ashish Kumar	MA	EXISTENCE, UNIQUENESS AND CONTROLLABILITY RESULTS FOR SOME FRACTIONAL ORDER DIFFERENTIAL EQUATIONS	Prof. D. N. Pandey	Prof. Michal Feckan, Comenius University in Bratislaava, Slovaka Prof. Swaroop Nandan Bora, IIT Guwahati	01.11.23
143.	Ms. Anjali Sonkariya	MA	DEVELOPMENT OF SOME INTUITIONISTIC FUZZY DEA MODELS AND THEIR APPLICATIONS TO POLICE, BANKING AND EDUCATION SECTORS	Prof. S. P. Yadav	Prof. Pankaj Dutta, IIT Bombay Prof. S. P. Tiwari, IIT (ISM) Dhanbad	22.11.23
144.	Ms. Uganta Yadav	MA	MATHEMATICAL MODELS FOR HARVESTING OF NATURAL RESOURCES	Prof. Ameeya K. Nayak Prof. Sunita Gakkhar	Prof. Joydev Chattopadhyay, ISI Kolkata Prof. Nitu Kumari, IIT Mandi	30.11.23
145.	Mr. Kush Kinra	MA	RANDOM DYNAMICS OF CONVECTIVE BRINKMANFORCHHEIMER EQUATIONS	Prof. Manil T. Mohan	Prof. Peter Kloeden, Universitat Tubingen, Germany Prof. Zdzislaw Brzezniak, University of York, UK	01.12.23
146.	Ms. Lavina Sahijwani	MA	CONTROLLABILITY AND COMPUTATION OF CONTROL FOR INFINITE DIMENSIONAL FRACTIONAL DIFFERENTIAL SYSTEMS	Prof. N. Sukavanam	Prof. Dhirendra Bahuguna, IIT Kanpur Prof. Chee Peng Lim, Deakin University, Australia	01.12.23
147.	Ms. Sapna	MA	NUMERICAL SIMULATION OF FLUID FLOW, HEAT AND MASS TRANSFER OF POWER-LAW NANOFLUID USING HYBRID APPROACH	Prof. Pratibha Prof. Rama Bhargava	Prof. Ankur Jain, Univ. of Texas at Arlington, USA Prof. Arvind Kumar Gupta, IIT Ropar	14.12.23
148.	Ms. Arpita Mondal	MA	MODELLING THE DYNAMICS OF MARINE ECOSYSTEM USING MOMENT CLOSURE METHOD	Prof. Sandip Banerjee	Prof. Siddhartha Pratim Chakrabarty, IIT Guwahati Prof. R. K. Upadhyay, IIT (ISM) Dhanbad	19.12.23
149.	Mr. Prince	MA	DESIGN AND DEVELOPMENT OF NEW VARIANTS OF SALP SWARM ALGORITHM FOR ENERGY RELATED OPTIMIZATION PROBLEMS	Prof. Kusum Deep	Prof. Akshaya Kumar Ojha, IIT Bhubaneswar Prof. Atulya K. Nagar, Liverpool Hope Univ., UK	29.01.24
150.	Ms. Palak	MA	PERFORMANCE ANALYSIS OF STATE DEPENDENT MARKOVIAN QUEUEUS WITH RETRIAL ORBIT	Prof. Madhu Jain	Prof. Umesh Chandra Gupta, IIT Kharagpur Prof. Ajit K. Verma, Western Norway University	02.04.24
151.	Ms. Surbhi Rani	MA	COMPLEX DYNAMIC BEHAVIOR IN SOME NON-LINEAR CONTINUOUS SYSTEMS	Prof. Sunita Gakkhar Prof. A. K. Nayak	Prof. Arvind Kumar Gupta, IIT Ropar Prof. Nitu Kumari, IIT Mandi	30.04.24
152.	Mr. Mohan	MA	SOME GENERALIZATIONS OF SUMSETS AND THEIR ASSOCIATED DIRECT AND INVERSE PROBLEMS	Prof. R. K. Pandey	Prof. Georges Grekos, Institute Camille Jordan, France Prof. Rupam Burman, IIT Guwahati	30.04.24

153.	Mr. Vrinda Dhingra	MA	DEVELOPING AND ANALYZING STRATEGIES FOR OPTIMAL SPARSE PORTFOLIO SELECTION	Prof. Shiv Kumar Gupta	Prof. Pankaj Dutta, IIT Bombay Manuel Arana-Jimenez, University of Cadiz Prof. Suresh Chandra, IIT Delhi	09.05.24
154.	Ms. Surabhi Nishad	MA	HYBRID MESHFREE IMPLEMENTATION TO SOME PROBLEMS OF FLOW AND HEAT TRANSFER IN NANOFLUIDS	Prof. A. K. Nayak Prof. Rama Bhargava	Prof. André Revil, Université Savoie Mont-Blanc EDYTEM CNRS UMR 5204, France Prof. P V S N Murthy, IIT Kharagpur	09.05.24
155.	Mr. Mayank	MA	STOCHASTIC MODELING AND PERFORMANCE PREDICTION OF QUEUEING SYSTEMS WITH SERVICE INTERRUPTION	Prof. Madhu Jain	Prof. Phung-Duc Tuan, University of Tsukuba, Japan Prof. U. C. Gupta, IIT Kharagpur	15.05.24
156.	Mr. Pramod Kumar	MIE	MATHEMATICAL MODELLING AND EXPERIMENTAL CHARACTERISATION OF THE DYNAMIC RESPONSE OF DIELECTRIC ELASTOMER ACTUATORS	Prof. M. M. Joglekar	Prof. Rajeev Kumar, IIT Mandi Prof. Akhilendra Singh, IIT Patna	22.08.23
157.	Mr. Rupak Kumar	MIE	UNDERSTANDING INTERFACIAL ENTRAINMENT PROCESSES AT ADIABATIC THREE-PHASE DOMAIN AND LIQUID-LIQUID BOILING	Prof. Arup Kumar Das	Prof. Shripad T. Revankar, Purdue Univ., USA Prof. Prasad Patnaik B.S.V., IIT Madras	11.09.23
158.	Mr. Rohit Singh	MIE	EXPERIMENTAL INVESTIGATION AND MODELLING OF MACHINING OF DIFFICULT TO CUT MATERIAL USING INTERNALLY COOLED CUTTING INSERT	Prof. Varun Sharma	Prof. Santosh Kumar, IIT (BHU) Varanasi Prof. Anil Kumar Srivastava, Univ. of Texas Rio Grande Valley, US	21.09.23
159.	Mr. Saumitra Mishra	MIE	EXPERIMENTAL AND NUMERICAL INVESTIGATION OF EMISSION CHARACTERISTICS FROM 20-70 KW BURNER FLAMES	Prof. K. B. Mishra	Prof. V. Raghavan, IIT madras Prof. R. V. Ravikrishna, IISc Bangalore	29.09.23
160.	Mr. Vivek Verma	MIE	EXPERIMENTAL AND COMPUTATIONAL INVESTIGATIONS ON MAGNESIUM-BASED COMPOSITES FOR BIODEGRADABLE INTERNAL FRACTURE FIXATION	Prof. Kaushik Pal	Prof. Kantesh Balani, IIT Kanpur Prof. Manoj Gupta, National University Singapore, Singapore	12.10.23
161.	Mr. Dungavath Narayana Swamy Naik	MIE	EXPERIMENTAL INVESTIGATIONS OF PULSEASSISTED CRYO-MICRO LUBRICATION FOR MACHINING OF TI-3AL-2.5V	Prof. Varun Sharma	Prof. Pavan Kumar Kankar, IIT Indore Prof. Anil Kumar Srivastava, Univ. of Texas Rio Grande Valley, US	21.10.23
162.	Mr. Vinay Kumar Yadav	MIE	EFFECT OF THERMO-MECHANICAL TREATMENT ON MECHANICAL AND FATIGUE BEHAVIOR OF AA 2024	Prof. I. V. Singh Prof. Vidit Gaur	Prof. S. Aravindan, IIT Delhi Prof. M. Ramji, IIT Hyderabad Prof. Enrico Salvati, University of Udine, Italy	26.10.23
163.	Mr. Gunipe Prasanth Kumar	MIE	UNDERSTANDING MICROFLUIDIC APPROACHES FOR SLURRY DILATION AND SOLID PARTICLE SEPARATION TARGETING WATER FILTRATION	Prof. Arup Kumar Das	Prof. Suman Chakraborty, IIT Kharagpur Prof. Sushanta Mitra, Unv. of Waterloo, Canada	31.10.23

164.	Mr. Kamaliya Parth Keshavkumar	MIE	ANALYSING CREASE-WRINKLE BEHAVIOUR OF THIN-FILM INFLATABLE SPACE STRUCTURE	Prof. S. H. Upadhyay	Prof. Xiaowei Deng, Univ. of Hong Kong, Hong Kong Prof. Francisco Lopez Jimenez, Univ. of Colordo at Boulder, US	31.10.23
165.	Ms. Kalpana	MIE	STUDY OF HEAT AND MASS TRANSFER IN A SINGLE STORAGE SOLAR ASSISTED LIQUID DESICCANT AIR CONDITIONING SYSTEM	Prof. Sudhakar Subudhi	Prof. Kirti Chandra Sahu, IIT Hyderabad Prof. Shripad T. Revankar, Purdue Univ., USA Prof. Sandip Kumar Saha, IIT Bombay	
166.	Mr. Satish Kumar	MIE	STUDY OF THERMAL INTERACTION OF BOREHOLE HEAT EXCHANGERS WITH GROUND DURING GROUND SOURCE HEAT PUMP APPLICATIONS	Prof. Krishnan Murugesan	Prof. B. Premachandran, IIT Delhi Prof. Arul Prakash K., IIT Madras	10.11.23
167.	Mr. Avik Saha	MIE	STUDY OF GAS-LIQUID INTERFACES USING UNIFIED AND COUPLED MACRO-MICRO SIMULATIONS	Prof. Arup Kumar Das	Prof. Saptarshi Basu, IISc Bangalore Prof. Yanbao Ma, University of California, USA	13.11.23
168.	Ms. Astha Sharma	MIE	MODELLING AND ANALYSIS OF SUPPLY CHAIN RISK IN PHARMACEUTICAL INDUSTRIES	Prof. Dinesh Kumar Prof. Navneet Arora	Prof. S. Venkataramanaiah, IIM Lucknow Prof. Amol Singh, IIM Rohtak	23.11.23
169.	Mr. Saurabh Shambhu Dayal Sharma	MIE	ATOMISTIC SIMULATIONS TO STUDY EFFECT OF HE BUBBLE ON THERMAL AND MECHANICAL PROPERTIES OF NICKEL	Prof. Avinash Parashar	Prof. Hitendra Kumar Malik, IIT Delhi Prof. Rajeev Kapoor, BARC Mumbai	14.12.23
170.	Ms. Duhan Neha Rajkumar	MIE	NUMERICAL SIMULATIONS OF DISLOCATIONS IN SEMICONDUCTOR MATERIALS USING XFEM	Prof. B. K. Mishra Prof. Indra Vir Singh	Prof. Akhilendra Singh, IIT Patna Prof. Timon Rabczuk, Insti. of Structural Mech., Bauhaus University Weimar, Germany	11.01.24
171.	Ms. Priya Singh	MIE	STUDIES ON DISSIMILAR WELD METAL JOINTS FOR ADVANCED ULTRA SUPERCRITICAL POWER PLANT APPLICATIONS	Prof. Navneet Arora	Prof. Leijun Li, University of Alberta, Canada Prof. Ashish Kumar Nath, IIT Kharagpur	29.01.24
172.	Ms. Anjali Jha	MIE	NUMERICAL SIMULATIONS OF HYDRIDE EMBRITTLEMENT IN ZIRCONIUM ALLOY	Prof. Indra Vir Singh Prof. B. K. Mishra	Prof. Tinh Quoc Bui, Tokyo Institute of Tech., Japan Prof. Himanshu Pathak, IIT Mandi	19.01.24
173.	Mr. Palange Rupesh Kishor	MIE	METEHEMATICAL MODELLING OF HEAT AND SPECIES TRANSPORT IN UNDERGROUND COAL GASIFICATION	Prof. Krishnan Murugesan	Prof. V. Raghavan, IIT Madras Prof. Francesco Pepe, Università del Sannio, Italy	25.01.24
174.	Mr. Nishab Ali	MIE	VORTICES DEVELOPMENT AND INTERACTION STUDY ACROSS 180° SHARP BEND OF TWO-PASS RECTANGULAR DUCT WITH AND WITHOUT MATRIX-SUBCHANNELS	Prof. Andallib Tariq	Prof. Manabendra Pathak, IIT Patna Prof. Rakesh Kumar, IIT Kanpur	01.02.24
175.	Mr. Ajay Kumar	MIE	ELECTROMECHANICAL ANALYSIS OF PNEUMATICALLY COUPLED DIELECTRIC ELASTOMER ACTUATOR	Prof. M. M. Joglekar	Prof. Nilanjan Mallik, IIT (BHU) Varanasi Prof. Jacopo Ciambella, Sapienza Univ. of Rome, Italy	02.02.24

176.	Mr. Rajneesh Kumar	MIE	STUDY OF FLUID FLOW, SOLIDIFICATION AND INCLUSION BEHAVIOR IN CONTINUOUS CASTING MOLD USING EMS	Prof. P. K. Jha	Prof. Govind S. Gupta, IISc Bangalore Prof. Sukanta Kumar Dash, IIT Kharagpur	08.02.24
177.	Mr. Anil Singh	MIE	A STUDY OF PLAIN/CONICAL HYBRID POROUS JOURNAL BEARINGS SYSTEM	Prof. S. C. Sharma	Prof. Braham Prakash, Luleå Univ. of Technology, Sweden Prof. S. Yoshimoto, Tokyo Univ. of Sci., Japan	12.02.24
178.	Ms. Madhuri Bhadauria	MIE	CONVECTIVE HEAT TRANSFER FROM CHANNEL TO MODERATOR FOR IPHWR DURING LOCA	Prof. Ravi Kumar Prof. Arup Kumar Das	Prof. P. M. V. Subbarao, IIT Delhi Prof. Uwe Hampel, Technische Universität Dresden, Dresden	16.02.24
179.	Mr. Aswani Kumar Singh	MIE	EXPERIMENTAL INVESTIGATIONS INTO ULTRASONIC ASSISTED GRINDING OF DIFFICULT TO CUT MATERIALS WITH ULTRASONICALLY ATOMIZED GREEN SOLVENTS	Prof. Varun Sharma	Prof. Ajay Muljibhai Sidpara, IIT Kharagpur Prof. Faiz Iqbal, University of Lincoln, UK Prof. Harpreet Singh, IIT Ropar	01.03.24
180.	Mr. Godasu Ashwin Kumar	MME	THERMOMECHANICAL PROCESSING OF ALLOY 625 AND ITS MECHANICAL PROPERTIES UNDER STATIC AND DYNAMIC LOADING	Prof. Suhrit Mula Prof. Ujjwal Prakash	Prof. Nithyanand Prabhu, IIT Bombay Prof. Wolfgang Bleck, RWTH Aachen University, Germany	17.10.23
181.	Mr. Arpan Arora	MME	FE-42NI INVAR-BASED ODS STEELS DEVELOPED BY MECHANICAL ALLOYING + SPARK PLASMA SINTERING	Prof. Suhrit Mula	Prof. N. K. Mukhopadhyay, IIT (BHU) Varanasi Prof. Suryanarayana Challapalli, Univ. of Central Florida, USA	06.12.23
182.	Mr. Ankur	MME	CORROSION BEHAVIOR OF HEAT-TREATED 7068 ALUMINIUM ALLOY	Prof. G. P. Chaudhari	Prof. V. S. Raja, IIT Bombay Prof. Kallol Mondal, IIT Kanpur	28.02.24
183.	Mr. Vaibhav Jain	MME	MULTISCALE CARBON FILLER REINFORCED EPOXY COMPOSITE FOR STRUCTURAL APPLICATIONS	Prof. Debrupa Lahiri Dr. Kinshuk Dasgupta	Prof. Naresh Bhatnagar IIT Delhi Prof. Hom Nath Dhakal, University of Portsmouth, UK	12.04.24
184.	Mr. Himanshu	MS	IMPACT OF FAIR VALUE ACCOUNTING ON FINANCIAL REPORTING QUALITY: INDIAN EVIDENCE	Prof. J. P. Singh	Prof. Hafez Abdo, Nottingham Univ. Business, UK Prof. Prabina Rajib, IIT Kharagpur	03.08.23
185.	Ms. Prachi Thakur	MS	DIVERSITY TRAINING IN HOSPITALITY	Prof. R. L. Dhar	Prof. Saumya Singh, IIT (ISM) Dhanbad Prof. Rupashree Baral, IIT Madras	18.08.23
186.	Ms. Shumaila Chandni	MS	LINKING EMPLOYEE ENGAGEMENT AND CUSTOMER ENGAGEMENT TO DRIVE CUSTOMER LOYALTY: REORIENTING SERVICE PROFIT CHAIN	Prof. Z. Rahman	Prof. Varisha Rehman, IIT Madras Prof. Arti D. Kalro, IIT Bombay	12.09.23
187.	Ms. Ayushi Yadav	MS	EFFECT OF JOB CRAFTING ON JOB PERFORMANCE: THE INFLUENCING ROLE OF WORK ENGAGEMENT AND LMX	Prof. R. L. Dhar	Prof. Seema Sharma, IIT Delhi Prof. Saumya Singh, IIT (ISM) Dhanbad	25.09.23
188.	Ms. Pooja Kapoor	MS	AN ANALYSIS OF INFLATION EXPECTATIONS AND PERCEPTIONS IN THE INDIAN CONTEXT	Prof. Sujata Kar	Prof. Puja Padhi, IIT Mumbai Prof. Andrea Paltrinieri, Catholic Univ. of Sacre Heart, Italy	10.11.23

189.	Mr. Rahul Singh Rathore	MS	DEVELOPING A SCORECARD FOR TECHNOLOGY BUSINESS INCUBATION PROGRAM IN INDIAN HEIs	Prof. Rajat Agarwal	Prof. Kaushik V. Pandya, Sheffield Hallam University, UK Prof. Manoj Lal Shrestha, Konan University, Japan	16.11.23
190.	Ms. Ruchi Moolchandani	MS	FACTORS INFLUENCING CORPORATE CASH HOLDINGS: EVIDENCE FROM INDIA	Prof. Sujata Kar	Prof. M. Thenmozhi, IIT Madras Prof. Nicolas Aubert, Aix-Marseille Univ., France	10.11.23
191.	Mr. Gaurav Jyoti	MS	UNRAVELING THE IMPLICATIONS OF CORPORATE SUSTAINABILITY ON FIRMS FINANCIAL PERFORMANCE: AN EMPIRICAL EVIDENCE FROM NIFTY-500 FIRMS	Prof. Ashu Khanna	Prof. Shveta Singh, IIT Delhi Prof. Prabina Rajib, IIT Kharagpur	13.12.23
192.	Mr. Saurabh Ardra	MS	ANALYSIS AND DESIGN OF FRAMEWORK FOR CIRCULAR FOOD SUPPLY CHAIN IN INDIA	Prof. M. K. Barua	Prof. Sandeep Mondal, IIT (ISM) Dhanbad Prof. Bhaba Krishna Mohanty, IIM, Lucknow Prof. Ravi Shankar, IIT Delhi	29.01.24
193.	Ms. Sudeshna Rath	MS	MANUFACTURING COMPETITIVENESS THROUGH SIX SIGMA IN STEEL INDUSTRY	Prof. Rajat Agrawal	Prof. Athanasios Papadopoulos, University of Kent, UK Prof. Prabhas Bhardwaj, IIT (BHU) Varanasi	25.01.24
194.	Ms. Sakshi Srivastava	MS	A STUDY ON AI AND BIG DATA PRACTICES AND DATADRIVEN DECISION-MAKING	Prof. Gaurav Dixit	Prof. Sujeet K. Sharma, IIM Nagpur Prof. Patrick Mikalef, Norwegian Univ. of Sci. and Tech., Norway	13.02.24
195.	Ms. Rahila Aziz Chat	MS	CHRONIC BRAND HATE: CONCEPTUALIZATION, SCALE DEVELOPMENT AND VALIDATION	Prof. Z. Rahman	Prof. Regina Connolly, Dublin City University, Ireland Prof. Mahim Sagar, IIT Delhi	04.03.24
196.	Mr. Santosh Anand	MS	ACHIEVING SUSTAINABILITY AND FOOD SECURITY THROUGH POST-HARVEST LOSS AND WASTE REDUCTION IN THE AGRI-FRESH PRODUCE SUPPLY CHAIN	Prof. M. K. Barua	Prof. Rudra P. Pradhan, IIT Kharagpur Prof. Godwin Tennyson, IIM Trichy	14.03.24
197.	Mr. Aakash Khindri	MS	IMPACT OF WORKPLACE CURIOSITY AND FUTURE SELF CONTINUITY ON GRIT OF EMPLOYEES	Prof. S. Rangnekar	Prof. Kanika T. Bhal, IIT Delhi Prof. Susmita Mukhopadhyay, IIT Kharagpur	15.03.24
198.	Ms. Monika Sharma	MS	BRAND ANTHROPOMORPHISM STRENGTH: CONCEPTUALIZATION, CONSTRUCT DEVELOPMENT AND MEASUREMENT VALIDATION	Prof. Z. Rahman	Prof. Cleopatra Veloutsou, University of Glasgow, UK Prof. Mahim Sagar, IIT Delhi	28.03.24
199.	Ms. Nupur Sharma	MS	IMPACT OF WORKPLACE OSTRACISM ON WORKPLACE DEVIANCE AND SERVICE SABOTAGE: ROLE OF EMOTIONAL EXHAUSTION AND MORAL IDENTITY	Prof. R. L. Dhar	Prof. Pooja Purang, IIT Bombay Prof. Anita Sarkar, XLRI Xavier School of Management, Jamshedpur	15.05.24
200.	Ms. Swati Singh	NT	THERAPEUTIC USE OF CUO-BIOPOLYMER BASED NANOPARTICLES FOR TARGETED DRUG DELIVERY TOWARDS BREAST CANCER	Prof. Kaushik Pal	Prof. Rama Shanker Verma, IIT Madras Prof. Rohit Srivastava, IIT Bombay	08.08.23

201.	Mr. Siddharth Sharma	NT	FABRICATION OF TRANSITION METAL NITRIDE THIN FILM BASED BIOCOMPATIBLE AND FLEXIBLE SUPERCAPACITORS	Prof. Ramesh Chandra	Prof. R. Jayaganthan, IIT Madras Prof. Yogendra Kumar Mishra, University of Southern Denmark	21.10.23
202.	Mr. Atif Suhail	NT	INORGANIC HALIDE PEROVSKITE NANOCRYSTALS FOR OPTOELECTRONICS APPLICATION	Prof. Monojit Bag	Prof. Pabitra Kumar Nayak, Tata Institute of Fundamental Res., Hyderabad Prof. Dhandapani Venkataraman, Univer. of Massachusetta Amherst, US	31.01.24
203.	Mr. Abhinav Tandon	NT	DESIGN AND DEVELOPMENT OF NEXT-GENERATION BINDER-FREE LITHIUM-ION BATTERY	Prof. Yogesh Kumar Sharma	Prof. Amartya Mukhopadhyay, IIT Bombay Prof. Tseung-Yuen Tseng, National Yang Ming Chiao Tung University, Taiwan	08.02.24
204.	Ms. Akanksha Rajendra Urade	NT	GRAPHENE GROWTH ON ELECTRODEPOSITED NI/CU SUBSTRATE	Prof. Indranil Lahiri Prof. K. S. Suresh	Prof. V. Subramanya Sarma, IIT Madras Prof. N. P. Gurao, IIT Kanpur	21.02.24
205.	Mr. Mukesh Kumar Sharma	PH	DENSITY FUNCTIONAL THEORY AND MONTE CARLO STUDY OF CERTAIN MAGNETIC AND MULTIFERROIC MATERIALS	Prof. Tulika Maitra	Prof. Alok Shukla, IIT Bombay Prof. Tarun Kanti Ghosh, IIT Kanpur	27.09.23
206.	Ms. Pooja Yadav	PH	EXPERIMENTAL AND THEORETICAL INVESTIGATIONS OF QUANTUM TRANSPORT IN SHALLOW AND DEEP DONOR BASED SINGLE ELECTRON TRANSISTORS	Prof. Arup Samanta	Prof. Suddhasatta Mahapatra, IIT Bombay Prof. Enrico Prati, Università Statale di Milano, Lombardia, Italia	09.10.23
207.	Mr. Gopal Yadav	PH	ASPECTS OF THERMAL QCD PHENOMENOLOGY AT INTERMEDIATE GAUGE/T HOOFT COUPLING FROM STRING/M-THEORY, (HD) GRAVITY ISLANDS, AND MULTIVERSE	Prof. Aalok Misra	Prof. Sudhakar Panda, NISE&R, Jatni Padanpur Prof. Neils A. Obers, Neils Bohr Institute, Denmark	12.10.23
208.	Mr. Salman Ahamad Khan	PH	SOME ASPECTS OF A HOT QCD MEDIUM IN PRESENCE OF MAGNETIC FIELD	Prof. B. Krishna Patra	Prof. Nora Brambilla, Technical University of Munich, Germany Prof. Sourav Sarkar, Variable Energy Cyclotron Centre, Kolkata	16.10.23
209.	Ms. Anita Kumari	PH	TRANSPORT PROPERTIES OF HIGH TEMPERATURE SUPERCONDUCTORS	Prof. Tashi Nautiyal Prof. B. D. Indu Prof. G. D. Verma	Prof. Manish Kumar, JNU New Delhi Prof. Ctirad Uher, University of Michigan, USA Prof. Arti Kashyap, IIT Mandi	17.10.23
210.	Mr. Himanshu Chauhan	PH	GROWTH AND STUDY OF STRUCTURAL AND SUPERCONDUCTING PROPERTIES OF FE (TE, SE) THIN FILMS AND SINGLE CRYSTALS	Prof. G. D. Verma	Prof. Israel Felner, The Hebrew Univ., Israel Prof. V. P. S. Awana, CSIR-NPL, New Delhi Prof. Neeraj Khare, IIT Delhi	08.12.23

211.	Mr. Sagar Kumar Verma	PH	PLASMONIC METASURFACES FOR EXTRA-ORDINARY TRANSMISSION AND ABSORPTION OF LIGHT IN VISIBLE TO IR REGIME	Prof. Sachin Kumar Srivastava	Prof. Dibakar Roy Chowdhury, Mahindra University, Hyderabad Prof. Senthil Murugan Ganapathy, Optoelectronics Res. Centre, University of Southampton, UK	17.01.24
212.	Mr. Rishabh Kumar	PH	FACETS OF FUSION AND FISSION DYNAMICS INVESTIGATED VIA HEAVY-ION REACTIONS AROUND THE COULOMB BARRIER	Mr. Rishabh Kumar	Prof. B. K. Nandi, IIT Bombay Prof. Rolf-Dietmar Herzberg, University of Liverpool, UK	30.01.24
213.	Mr. Sachin Verma	PH	THEORETICAL STUDY OF THE SPECTRAL PROPERTIES AND THERMOELECTRIC TRANSPORT ACROSS SUPERCONDUCTOR/NORMAL METAL AND QUANTUM DOT HYBRID NANODEVICES	Prof. Ajay	Prof. Elena Bascones, Instituto de Ciencia de Mat. De Madrid, Sor Juana Lnes de la Cruz, Spain Prof. Alexander Melnikov, Russian Acad. of Sci.	15.02.24
214.	Mr. Manish Kumar Vishwakarma	PH	INVESTIGATION OF CHARGE CARRIER DYNAMICS AND DIELECTRIC RELAXATION BEHAVIOUR IN METAL OXIDES	Prof. Puneet Jain	Prof. Dipti Gupta, IIT Bombay Prof. D. Venkataraman, University of Massachusetts Amherst, US	26.02.24
215.	Mr. Hemant Rathi	PH	ADS2/CFT1 AT FINITE DENSITY AND HOLOGRAPHIC ASPECTS OF 2D BLACK HOLE	Prof. Dibakar Roychowdhury	Prof. Justin R. David, IISc Bangalore Prof. Alessandro Torrielli, University of Surrey, Guildford, United Kingdom	28.02.24
216.	Mr. Tanuj Chamoli	PH	TUNABLE JOSEPHSON TRANSPORT THROUGH SINGLE AND DOUBLE QUANTUM DOTS JUNCTION AT INFINITE-U LIMIT	Prof. Ajay	Prof. J. P. Singh, IIT Delhi Prof. Saurabh Basu, IIT Guwahati	15.02.24
217.	Mr. Debarshi Dey	PH	THERMOELECTRIC AND HEAVY QUARK TRANSPORT COEFFICIENTS OF HOT QCD MATTER IN THE PRESENCE OF MAGNETIC FIELD	Prof. B. K. Patra	Prof. Igor Shovkovy, Arizona State Univ., USA Prof. Joan Soto, University de Barcelona, Spain	05.03.24
218.	Mr. Virender Ranga	PH	PROTON AND ALPHA INDUCED REACTIONS ON LIGHT NUCLEI FOR NUCLEAR STRUCTURE AND ASTROPHYSICS	Prof. Anil Kumar Prof. Indranil Mazumdar	Prof. Basanta Kumar Nayak, HBNI, Mumbai Prof. Maria Kmiecik UL. Radzikowskiego, Poland	07.03.24
219.	Mr. Rahul Rathi	PH	AIRGLOW IMAGING OBSERVATIONS OF EARTH'S UPPER ATMOSPHERE	Prof. Sumanta Sarkhel	Prof. Yuichi Otsuka, Nagoya University, Japan Prof. Shikha Raizada, Univ. of Central Florida, USA	22.03.24
220.	Ms. Madhu	PH	NUCLEAR STRUCTURE INVESTIGATIONS IN TRANSITIONAL REGION AROUND DOUBLY-MAGIC 208Pb	Prof. Ajay Y. Deo	Prof. Alison Bruce, University of Brighton, Brighton, UK Prof. Maitreyee Saha Sarkar, SINP, Kolkata	22.03.24
221.	Ms. Chhavi Verma	PPE	IRIDESCENT STRUCTURAL COLORATION AND SELF ASSEMBLY OF CHIRAL NEMATIC CELLULOSE NANOCRYSTAL COMPOSITES	Prof. P. K. Maji	Prof. Santanu Chattopadhyay, IIT Kharagpur Prof. Kheng Lim Goh, Newcastle University, Singapore	21.09.23

222.	Ms. Vaishali Mittal	PPE	BIODIESEL PRODUCTION FROM MICROALGAE THROUGH NANOCATALYTIC TRANSESTERIFICATION PROCESS	Prof. U. K. Ghosh	Prof. Ki-Hyun Kim, Hanyang University, Korea Prof. Asheesh Kumar Yadav, CSIR Bhubaneswar Prof. Devendra P. Saroj, University of Surrey, UK	02.01.24
223.	Mr. Ajay Vishwakarma	PPE	FIRE RETARDANCY BEHAVIOUR OF COTTON FABRIC COATED WITH BIO AND SYNTHETIC MATERIALS	Prof. S. Chattopadhyay Prof. Aravind Dasari	Prof. Amit Kumar, IIT Madras Prof. Jimenez Maude, University of Lille, France	11.04.24
224.	Mr. Saureng Kumar	PT	WIRELESS SENSOR NETWORK-BASED REAL-TIME INTELLIGENT TRANSPORTATION SYSTEM FOR STORAGE CONDITIONS ASSESSMENT IN SUPPLY CHAIN MANAGEMENT	Prof. S. C. Sharma	Prof. Ravi Shankar Singh, IIT (BHU) Varanasi Prof. Xiao-Zhi Gao, University of Eastern Finland, Finland	06.10.23
225.	Mr. Kaushal Kumar	PT	DEVELOPMENT OF LATERAL N-TYPE CHARGED PLASMABASED HETERO-STRUCTURE JUNCTIONLESS TUNNEL FET	Prof. S. C. Sharma	Prof. Ravi Kumar Gangwar, IIT (ISM) Dhanbad Prof. Jemal Abawajy, Deakin Univ., Australia Prof. Sudheer Kumar, IIT Kanpur	09.10.23
226.	Ms. Preeti Yadav	PT	DEVELOPMENT OF AN EFFICIENT LOCALIZATION SCHEME IN WIRELESS SENSOR NETWORKS USING MACHINE LEARNING	Prof. S. C. Sharma	Prof. Ravi Shankar Singh, IIT (BHU) Varanasi Prof. Ajit K. Verma, Western Norway Univ. of Applied Sciences, Norway	09.10.23
227.	Mr. Satish Kumar Singh	PT	APPLICATION OF FORWARD OSMOSIS PROCESS FOR SECONDARY TREATED EFFLUENT OF PULP AND PAPER INDUSTRY	Prof. Chhaya Sharma Prof. Abhijit Maiti	Prof. Mihir Kumar Purkait, IIT Guwahati Prof. Oded Nir, Ben-Gurion University of the Negev, Israel	13.11.23
228.	Mr. Saurabh Kumar Kardam	PT	VAPOR-PHASE STUDY OF ANTIMICROBIAL PACKAGING SYSTEMS CONTAINING ESSENTIAL OILS	Prof. Dharm Dutt, Prof. Ashish A. Kadam	Prof. Ajay Kathuria, California Polytechnic State Univ., California Prof. Sampa Saha, IIT Delhi Prof. Mario Scetar, University of Zagreb, Croatia	29.01.24
229.	Mr. Nandkishor Joshi	PT	DEVELOPMENT OF ENERGY HARVESTING MODEL AND OPTIMIZATION OF IEEE 802.11 DCF MAC PROTOCOL FOR COGNITIVE RADIO NETWORK	Prof. S. C. Sharma	Prof. Preetam Kumar IIT Patna Prof. Ajit Kumar Verma, Western Norway University of Applied Sci., Norway	15.02.24
230.	Ms. Pooja Yadav	PT	DETECTION OF CHRONIC DISEASE AND ANALYSIS OF HYPERPARAMETERS USING DEEP LEARNING TECHNIQUES	Prof. S. C. Sharma	Prof. Ajit Kumar Verma, Western Norway Univ. of Applied Sci., Norway Prof. Preetam Kumar, IIT Patna	22.02.24
231.	Ms. Konala Akhila	PT	DESIGN AND DEVELOPMENT OF POLYPHENOLIC BASED FLEXIBLE pH INDICATORS FOR SMART FOOD PACKAGING	Prof. K. K. Gaikwad	Prof. Pramod V. Mahajan, Leibniz-Institut für Agrartechnik und Bioökonomie e.V., Germany Dr. Rajeshwar S. Matche, CSIR Mysuru	09.05.24
232.	Mr. Mohale Vijay Pandurang	WRDM	ANALYSIS OF SUB SYNCHRONOUS OSCILLATION IN HYDROPOWER SYSTEMS	Prof. Thanga Raj Chelliah	Prof. Suryanarayana Doolla, IIT Bombay Prof. Hamid Toliyat, Texas A&M University, USA	03.08.23

233.	Mr. Nand Kishore Sharma	WRDM	SOIL CONSERVATION SERVICE-CURVE NUMBER METHODOLOGY MODIFIED FOR IMPROVED DIRECT RUNOFF ESTIMATION	Prof. S. K. Mishra Prof. Ashish Pagndey	Prof. Yutaka Matsuno, Kindai University, Japan Prof. Richard H. McCuen, Univ. of Maryland, USA	13.12.23
234.	Mr. Ishan Sharma	WRDM	A CRITICAL INVESTIGATION OF SCS-CN METHODOLOGY FOR RAINFALL-RUNOFF MODELLING	Prof. S. K. Mishra Prof. Ashish Pandey	Prof. N. S. Raghuwanshi, IIT Kharagpur Prof. Ronny Berndtsson, Lund Univ., Sweden	12.02.24
235.	Mr. Wasu Manawko Tefera	WRDM	AN INTEGRATED MODELING APPROACH FOR HYDROPOWER POTENTIAL ASSESSMENT AND SUITABILITY ANALYSIS	Prof. K. S. Kasiviswanathan	Prof. RAAJ Ramsankaran, IIT Mumbai Prof. Jianxun He, Univ. of Calgary, Canada	20.03.24
236.	Mr. Melese Baye Hailu	WRDM	RAINFALL-RUNOFF AND SEDIMENT YIELD MODELLING UNDER CLIMATE CHANGE	Prof. S. K. Mishra Dr. Sanjay Kumar	Prof. Ronny Berndtsson, Lund Univ., Sweden Prof. Manish Kumar Goyal, IIT Indore	21.03.24
237.	Mr. Javed Ali	WRDM	INVESTIGATION OF ELECTROMAGNETICALLY INDUCED VIBRATIONS IN ASYNCHRONOUS HYDROGENERATOR	Prof. Thanga Raj Chelliah Prof. Pramod Agarwal	Prof. Sriram Srinivas, IIT Madras Prof. Joseph Olorunfemi Ojo, Tennessee Tech. University, USA	02.04.24

Item No.101.17: To report the following approval accorded by the Chairman, Senate on behalf of the Senate.

At any given time, not more than 5 Ph.D. students with Institute Assistantship can be supervised by a faculty member in his / her parent department / centre / school or associate department / centre / school**.**

Further, in case of the Co-supervision, 1 student shall be counted as 0.5 student.

New faculty members will be given priority. It shall be ensured that each new faculty member at least has one Ph.D. student with Institute Assistantship before allocating to other faculty members.

The above is reported to the Senate.