

सीनेट की नब्बेवीं बैठक का कार्यवृत्त

**MINUTES OF THE 90th
MEETING OF THE SENATE**

16 मार्च 2022
16th MARCH 2022



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

भारतीय प्रौद्योगिकी संस्थान रुड़की
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 रुड़की 247 667
ROORKEE – 247 667



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अन्य मद के अन्तर्गत / Under any other items		
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INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
MEETING SECTION



Minutes of the 90th Meeting of the Senate held on 16.03.2022 at 04.00 P.M. in the Senate Hall.

The list of participants who attended the meeting is appended at **Annexure-I.**

At the outset, the Chairman welcomed the members to the 90th meeting of the Senate.

The Chairman thanked and placed on record the valuable contributions of the following:

1. Prof. Ganesh Kumbhar, Associate Dean, Infra. (Electrical & A/C)

The Chairman also welcomed the following new members of the Senate and wished for their active participation in the proceedings of the Senate:

1. Prof. Mukesh Kumar Singhal, Head, Deptt. of Hydro & Renewable Energy.
2. Prof. Chayya Sharma, Professor, Saharanpur Campus
3. Prof. Maheshanand, Mathematics Department
4. Prof. Anubrata Dey, Associate Dean of Infra. (Electrical & AC).

The following members conveyed their inability to join the meeting:

1. Prof. Amalendu Patnaik, Deptt. of E & C.E.
2. Prof. Satyendra Mittal, Deptt. of Civil Engg.
3. Prof. Kaushik Pal, Deptt. of Mech. & Ind. Engg.
4. Prof. B.K. Maheshwari, Deptt. of Earthquake Engineering
5. Prof. Millie Pant, Applied Science & Engineering
6. Prof. Rajat Rastogi, Deptt. of Civil Engg.
7. Prof. Anuj Sharma, Deptt. of Chemistry
8. Prof. Sumit Sen, Head, CoEDMM
9. Prof. Anil Kumar Gourishetty, ADOSW (SA)

A handwritten signature in blue ink, appearing to be 'A. H.' or similar, is written over a horizontal line.

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10. Prof. Ranjana Pathania, Deptt. of Biosciences and Bioengineering
11. Prof. Gaurav Raheja, Department of Architecture & Planning
12. Prof. Prof. Andallib Tariq, Department of Mech. & Ind. Engg.

The agenda was then taken up.

Item No. 90.1: To confirm the minutes of the 89th meeting of the Senate held on 09.12.2021.

Since no comments were received, the Senate confirmed the minutes as circulated on 27.12.2021.

Item No. 90.2: To report on the actions taken to implement the decisions of the Senate taken in its 89th meeting held on 09.12.2021.

The Senate noted the actions taken on the minutes.

Item No. 90.3: To consider the proposal of curriculum revision of B.Tech./B.Arch./ BS-MS/IMT programs.

The Senate considered the proposal and appreciated the work done by the committee. The Senate advised that more work be carried out on the structure of the curriculum considering the following:

- (a) Placement trends, social needs, need for entrepreneurs, project-based education, NEP etc.
- (b) Structure of the curriculum in a few sister/global Institutions.

The Senate suggested the following two-phase roadmap so that the new curriculum can be implemented w.e.f. the 2023-24 academic session.

1. In the first phase, a proposal on only the structure of the new UG curriculum (major course baskets, along with their proposed credit ranges) be designed on the basis of the above considerations and placed before the Senate for its consideration and approval. The baskets may include:
(a) Institute Core (b) Department Core (c) Department Electives (c) Open Electives (d) HSS (e) Non-graded components, if any, etc. It may be helpful to include the details of the Institute Core courses in this phase itself.
2. In the second phase, the department-wise detailed curriculum be prepared by the respective departments/

centres/ school so that it fits into the overall structure approved by the Senate in the first phase.

The department-wise detailed UG curriculum be placed before the IAPC and Senate for its consideration and approval.

Item No. 90.4: To consider the report of the committee constituted to create a proposal for a comprehensive “Exit Policy” of the academic programs.

The Senate considered the proposal on Exit Policy and decided that:

1. For UG programs, a certificate can be issued to a student provided she/he has spent at least two years in the program and has earned a minimum of 48 credits.
2. For PG programs, a certificate can be issued to a student provided she/he has spent at least one year in the program and has earned a minimum of 28 credits.
3. The Exit option in a Ph.D. program will be available to a student only after she/he completes a minimum period of one of year in the program after candidacy. Such a candidate shall be eligible for an MS by Research degree, provided she/he successfully defends her/his MS-Thesis in a presentation before the SRC. If a candidate is unsuccessful in the viva-voce, yet wishes to leave the programme, she/he may be awarded an Exit Certificate on the recommendation of the SRC.

Item No. 90.5: To consider the proposal to implement 75% attendance requirement w.e.f. from Spring 2021-22 for all students (excluding I year of UG-Spring).

The Senate considered the proposal and decided the following:

1. The 75% attendance requirement shall not be applicable in the current semester (excluding UG I Year).
2. The online mode of teaching be stopped w.e.f. 04th April, 2022.
3. The notification related to the PhD Program by Dean, Academic Affairs, dated April 8, 2020 stands withdrawn.

4. Henceforth, all academic presentations related to PhD programs be in the physical mode. However, the oral defense can be online, if the examiner is abroad.

Item No. 90.6: To consider the revised structure of M.Sc. Chemistry proposed by the Department of Chemistry.

The Senate considered and approved the revised structure as given in **Appendix-A**.

Item No. 90.7: To consider the following proposals of the Department of Electrical Engineering:

- (i) **To introduce a M.Tech. programme on 'Electric Vehicle Technology'**
- (ii) **To revise the structure of M.Tech. (Systems and Control)**

The Senate considered and approved the proposals.

Item No. 90.8: To consider request of Ms. Somya Jain (En.No. 19121032), B.Tech. (Polymer Science & Engg.) to remove the (*) marked for re-examination on the grade sheets of Spring Semester (2019-20).

The Senate considered and decided that the symbol # be used along with the grades which were earned through the special improvement provisions provided for in the Spring 2019-20 and Spring 2020-21 semesters owing to COVID-19 pandemic.

Item No. 90.9: To consider a proposal to revise the discipline eligibility for admission into the M.Tech. Polymer Science and Engineering program of the Department of Polymer and Process Engineering and to increase the intake w.e.f. the Academic Session 2022-23.

The Senate considered and approved the recommendations of the IAPC.

Item No. 90.10: To consider the following proposals of the Department of Civil Engineering:

- 1. **To rename the existing M.Tech. program on 'Geomatics Engineering' as "Geospatial Engineering" w.e.f. the Academic Session 2022-23.**

2. **To include Geomatics Engineering (GE) as eligibility for M.Tech. Geomatics Engg. under the Main GATE Discipline.**

The Senate considered and approved the recommendations of the IAPC (a) to rename the existing M.Tech. program as Geospatial Engineering, and (b) to include the Geomatics Engineering (GE) under the Main GATE Discipline.

Item No. 90.11: To consider the following proposals of Department of Water Resources Development and Management for M.Tech. Drinking water and Sanitation programme from Academic Session 2022-23:

1. **Structure**
2. **Seat matrix and Minimum Eligibility Qualifications (MEQ)**

The Senate considered and approved the recommendations of IAPC on the structure, seat matrix and the MEQ as given in **Appendices -B & C.**

Item No. 90.12: To consider the proposed seat matrices for the following programmes for admissions in the Academic Year 2022-2023:

1. **M.Tech./M.Arch./MURP programmes**
2. **M.Sc. programme through JAM 2022**
3. **Ph.D. Seat Matrix**

The Senate considered the seat matrices for the academic session 2022-23, and approved as given in **Appendices -D, E &F.**

Item No. 90.13: To consider the proposal to start a new fellowship in Ph. D. programme – “IITR@175 Fellowship”.

The Senate considered and accepted the proposal for IITR@175 Fellowship. The Fellowship amount shall be at par with that of the QIP scheme.

Item No. 90.14: To consider revision in Minimum Educational Qualification (MEQ) for admission into the Ph.D. programme in Water Resources Development & Management Department.

The Senate considered and approved the recommendations of the IAPC.

Item No. 90.15: To consider a proposal to allow Ph.D. students to submit Ph.D. thesis on the basis of Technology Commercialisation/ Patent granted/ Founding of Start-up in absence of required publications. (Item No.: 54.2.2, 54th IRC dt: 02.03.2022)

The Senate considered and approved the proposal.

Further, the Senate decided the following:

1. In case the patent is granted to a group of students, the student who is the first author shall be entitled to claim the credit.
2. In case two or more students, OR a student with a faculty jointly incubate a startup, only one student shall be entitled to claim credit.

Item No. 90.16: To consider the mercy appeal of the ex-Ph. D. Students for reinstatement of their academic registration.

The Senate considered and accepted the appeals, except the appeal of Rubi Sharma (18925039).

Item No. 90.17: To consider the provisional academic registrations of the following Ph. D. students, due to non-submission of mandatory documents:

- (a) Mr. Suman Sourav Mohanty (En.No.: 21916073), Ph. D. student, Deptt. of Humanities and Social Sciences.
- (b) Mr. Laxman Singh Khangarot (En.No.: 21911018), Ph. D. student, Deptt. of Electronics and Communication Engg.

The Senate considered the item and allowed the provisional academic registrations of Mr. Suman Sourav Mohanty and Mr. Laxman Singh Khangarot.

Item No. 90.18 To report the progress and status of online M.Tech. (Microelectronics and VLSI) program for working industry professionals.

The Senate took note of the report and appreciated the progress made.

Item No. 90.19: To report the approvals accorded by the Chairman, Senate.

The senate noted the items.

ANY OTHER ITEM

Item No. 90.20: To consider the proposal received from Dean, International Relation w.r.t. removing the upper limit on the seats i.e. 60 (40 PG + 20 Ph.D.) of International students under the "Study in India" scheme of the Ministry of Education.

The Senate considered and accepted the proposal.

Item No. 90.21: To report approvals accorded by the Chairman Senate on new awards/ scholarship/prizes etc.

The senate noted the items.

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



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Annexure-I

Following were present:

1.	Prof. Ajit K. Chaturvedi	Director & Chairman
2.	Prof. M. Parida	Deputy Director
3.	Prof. Prabhjot Singh Chani	Architecture & Planning
4.	Prof. Mahua Mukherjee	Architecture & Planning
5.	Prof. Sanjay Ghosh	Biosciences & Bioengineering
6.	Prof. Pravindra Kumar	Biosciences & Bioengineering
7.	Prof. Naveen Kumar Nawani	Biosciences & Bioengineering
8.	Prof. Gopinath Packirisamy	Biosciences & Bioengineering
9.	Prof. Ramasare Prasad	Biosciences & Bioengineering
10.	Prof. Partha Roy	Biosciences & Bioengineering
11.	Prof. Ashwani Kumar Sharma	Biosciences & Bioengineering
12.	Prof. Amit Kumar Dhiman	Chemical Engineering
13.	Prof. P.P. Kundu	Chemical Engineering
14.	Prof. Prasenjit Mondal	Chemical Engineering
15.	Prof. R.K. Dutta	Chemistry
16.	Prof. Kaushik Ghosh	Chemistry
17.	Prof. M.R. Maurya	Chemistry
18.	Prof. Paritosh Mohanty	Chemistr
19.	Prof. Jeevanandam P.	Chemistry
20.	Prof. R.K. Peddinti	Chemistr
21.	Prof. Muniappan Sankar	Chemistry
22.	Prof. Anuj Sharma	Chemistry
23.	Prof. U.P. Singh	Chemistry
24.	Prof. K.R. Justin Thomas	Chemistry
25.	Prof. Rahul Dev Garg	Civil Engineering
26.	Prof. S.K. Ghosh	Civil Engineering
27.	Prof. Bhola Ram Gurjar	Civil Engineering
28.	Prof. M.A. Iqbal	Civil Engineering
29.	Prof. Kamal Jain	Civil Engineering
30.	Prof. Absar Ahmad Kazmi	Civil Engineering
31.	Prof. Priti Maheshwari	Civil Engineering
32.	Prof. C.S.P. Ojha	Civil Engineering
33.	Prof. K.S. Hari Prasad	Civil Engineering
34.	Prof. G.D. Ransinchung R.N.	Civil Engineering
35.	Prof. N.K. Samadhiya	Civil Engineering
36.	Prof. Vishwas Sawant	Civil Engineering
37.	Prof. Umesh Kumar Sharma	Civil Engineering
38.	Prof. Mahendra Singh	Civil Engineering
39.	Prof. Akhil Upadhyay	Civil Engineering
40.	Prof. R. Balasubramanian	Computer Science & Engineering
41.	Prof. Sugata Gangopadhyay	Computer Science & Engineering
42.	Prof. Rajdeep Niyogi	Computer Science & Engineering
43.	Prof. Durga Toshniwal	Computer Science & Engineering
44.	Prof. Manish Shrikhande	Earthquake Engineering
45.	Prof. Anand Joshi	Earth Sciences

46.	Prof. R. Krishnamurthi	Earth Sciences
47.	Prof. B.R. Bhalja	Electrical Engineering
48.	Prof. Mukesh Kumar Pathak	Electrical Engineering
49.	Prof. G.N. Pillai	Electrical Engineering
50.	Prof. P. Sumathi	Electrical Engineering
51.	Prof. Barjeev Tyagi	Electrical Engineering
52.	Prof. Anand Bulusu	Electronics & Communication Engg.
53.	Prof. Sudeb Dasgupta	Electronics & Communication Engg.
54.	Prof. Sanjeev Manhas	Electronics & Communication Engg.
55.	Prof. N.P. Pathak	Electronics & Communication Engg.
56.	Prof. Dharmendra Singh	Electronics & Communication Engg.
57.	Prof. Rashmi Gaur	Humanities & Social Sciences
58.	Prof. Nagendra Kumar	Humanities & Social Sciences
59.	Prof. Binod Mishra	Humanities & Social Sciences
60.	Prof. Anindya Jayanta Mishra	Humanities & Social Sciences
61.	Prof. Sanjit Kumar Mishra	Humanities & Social Sciences
62.	Prof. D.S. Arya	Hydrology
63.	Prof. N.K. Goel	Hydrology
64.	Prof. Brijesh Kumar Yadav	Hydrology
65.	Prof. Arun Kumar	Hydro & Renewable Energy
66.	Prof. R.P. Saini	Hydro & Renewable Energy
67.	Prof. Sunil Kumar Singhal	Hydro & Renewable Energy
68.	Prof. Ramesh Chandra	Institute Instrumentation Centre
69.	Prof. Rajat Agarwal	Management Studies
70.	Prof. M.K. Barua	Management Studies
71.	Prof. Vinay Sharma	Management Studies
72.	Prof. Sandip Banerjee	Mathematics
73.	Prof. Premananda Bera	Mathematics
74.	Prof. Kusum Deep	Mathematics
75.	Prof. Maheshanand	Mathematics
76.	Prof. Tanuja Srivastava	Mathematics
77.	Prof. A. Swaminathan	Mathematics
78.	Prof. Dheerendra Kumar Dwivedi	Mechanical & Industrial Engg.
79.	Prof. B.K. Gandhi	Mechanical & Industrial Engg.
80.	Prof. P.K. Jha	Mechanical & Industrial Engg.
81.	Prof. Ravi Kumar	Mechanical & Industrial Engg.
82.	Prof. Bhanu Kumar Mishra	Mechanical & Industrial Engg.
83.	Prof. Manish Mishra	Mechanical & Industrial Engg.
84.	Prof. P.M. Pathak	Mechanical & Industrial Engg.
85.	Prof. Apurbba Kumar Sharma	Mechanical & Industrial Engg.
86.	Prof. Inderdeep Singh	Mechanical & Industrial Engg.
87.	Prof. K.M. Singh	Mechanical & Industrial Engg.
88.	Prof. Indra Vir Singh	Mechanical & Industrial Engg.
89.	Prof. S.H. Upadhyay	Mechanical & Industrial Engg.
90.	Prof. B.S.S. Daniel	Metallurgical & Materials Engg.
91.	Prof. B.V.M. Kumar	Metallurgical & Materials Engg.
92.	Prof. Vivek Pancholi	Metallurgical & Materials Engg.
93.	Prof. Anjan Sil	Metallurgical & Materials Engg.
94.	Prof. Ajay	Physics

- | | | |
|------|---|-------------------------------|
| 95. | Prof. P. Arumugam | Physics |
| 96. | Prof. Rajdeep Chatterjee | Physics |
| 97. | Prof. Aalok Misra | Physics |
| 98. | Prof. Vipul Rastogi | Physics |
| 99. | Prof. Ghanshyam Das Varma | Physics |
| 100. | Prof. Ajay Wasan | Physics |
| 101. | Prof. Sujay Chattopadhyay | Polymer & Process Engineering |
| 102. | Prof. M.L. Kansal | WRD&M |
| 103. | Prof. Deepak Khare | WRD&M |
| 104. | Prof. S.K. Mishra | WRD&M |
| 105. | Prof. Ashish Pandey | WRD&M |
| 106. | Prof. C.N. Ramchandran, Associate Dean of Academic Affairs (Curriculum) | |
| 107. | Prof. Sanjeev Kumar, Head, Institute Computer Centre | |
| 108. | Prof. Mukesh Kumar Singhal, Head, Hydro & Renewable Energy | |
| 109. | Dr. C. Jayakumar, Librarian | |
| 110. | Chairman, SCSP | |

Students' representatives:

111. Ms. S. Divyasri Lakshami Malavika, General Secretary Academic Affairs (UG)
112. Mr. Naveen Kumar Shrama, General Secretary Academic Affairs (PG)
113. Mr. Prashant Garg, Registrar & Secretary, Senate


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DEPARTMENT OF CHEMISTRY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XX M.Sc. (Chemistry)**
Department: **CY Chemistry**
Year: **I**

Teaching Scheme					Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Semester-I (Autumn)														
1.	CY-501	Quantum Chemistry, Symmetry and Group Theory	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
2.	CY-503	Thermodynamics, Interfaces and Solids	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
3.	CY-521	Advanced Analytical Methods	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	CY-507	Structure and Reactivity of Organic Molecules	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
5.	CY-509	Advanced Coordination Chemistry	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
6.	CY-511	Organic Chemistry Laboratory	PCC	4	0	0	8	0	8	0	25-35	20-30	0	40-50
7.	HSN-501	Technical Communication	PCC	2	2	0	0	2	0	20-35	0	20-30	40-50	0
Total				22										
Semester-II (Spring)														
1.	CY-502	Advanced Organometallic Chemistry	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
2.	CY-504	Kinetics and Photochemistry	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
3.	CY-506	Organic Reaction Mechanisms	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	CY-508	Molecular Spectroscopy	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
5.	CY-510	Inorganic Chemistry Laboratory	PCC	4	0	0	8	0	8	0	25-35	20-30	0	40-50
6.	CY-534	Physical Chemistry Laboratory	PCC	4	0	0	8	0	8	0	25-35	20-30	0	40-50
7.		Program Elective-I	PEC	3	-	-	-	-	-	-	-	-	-	-
Total				23										

Appendix 'A'
Item No. Senate / 90.6

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DEPARTMENT OF CHEMISTRY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **XX M.Sc. (Chemistry)**
Department: **CY Chemistry**
Year: **II**

Teaching Scheme					Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Semester-I (Autumn)														
1.	CY-601	Project - I	PCC	4	0	0	8	0	0	0	0	0	100	0
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.		Program Elective-VI	PEC	3	-	-	-	-	-	-	-	-	-	-
Total				19										
Semester-II (Spring)														
1.	CY-602	Project - II	PCC	8	0	0	16	0	0	0	0	0	100	0
2.	CY-604	Seminar	SEM	2	0	0	0	0	0	0	0	0	100	0
3.		Program Elective-VII	PEC	3	-	-	-	-	-	-	-	-	-	-
Total				13										

Summary				
Semester	1	2	3	4
Semester-wise Total credits	22	23	19	13
Total Credits	77			

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List of Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
1.	CY-512	Nuclear and Radiochemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
2.	CY-514	Heterocyclic Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
3.	CY-518	Structure, Bonding and Properties of Solids	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	CY-520	Inorganic Rings and Polymers	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
5.	CY-606	Total Synthesis	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
6.	CY-607	Electroanalytical Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
7.	CY-608	Chemical Biology	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
8.	CY-609	Inorganic Biochemistry and Reaction Mechanism	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
9.	CY-610	Molecular Modeling and Simulations	PEC	3	2	0	2/2	2	0	15-30	20	15-25	30-40	0
10.	CY-612	Carbon Nanomaterials and their Applications	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
11.	CY-613	Frontiers in Inorganic Biochemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
12.	CY-614	Asymmetric Synthesis	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
13.	CY-615	Crystal and Molecular Structure	PEC	3	2	0	2/2	2	0	15-30	20	15-25	30-40	0
14.	CY-617	Supramolecular Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
15.	CY-619	Modern Organic Synthetic Methods	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
16.	CY-621	Organic Structure Determination	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
17.	CY-623	Organic Semiconductors	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
18.	CY-625	Proteins and Polypeptides	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
19.	CY-627	Advanced Surface and Colloidal Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
20.	CY-629	Advanced Physical Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
21.	CY-633	Nanoscale Materials: Properties and Applications	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0

22.	CY-635	Advanced Magnetic Resonance Spectroscopy	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
23.	CY-638	Reactivity, Structure Determination, Devices and Electronic Structure of Solids	PEC	3	2	0	2/2	2	0	15-30	20	15-25	30-40	0
24.	CY-703	Advanced Material Characterization Techniques	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
25.	CY-902	Advanced Inorganic Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
26.	CY-903	Advanced Organic Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
27.	CY-904	Advanced Physical Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
28.	CY-905	Spectroscopic Methods of Structural Elucidation	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0

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**DEPARTMENT OF WATER RESOURCES DEVELOPMENT AND MANAGEMENT
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code: **XXX M.Tech. (Drinking Water and Sanitation)**
Department: **WR Department of Water Resources Development and Management**
Year: **I**

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weight (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Semester- I (Autumn)														
1.	WRN-503	Water Resources Planning and Management	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	WRN-507	Drinking-Water and Sanitation Sustainability	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	WRN-509	Water Sanitation, Hygiene and Infrastructural Management	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	WRN-516	Rural and Urban Water Supply	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.		Program Elective-I	PEC	4	-	-	-	-	-	-	-	-	-	-
		Total		20										
Semester-II (Spring)														
1.	WRN-506	Mini Project on Drinking Water and Sanitation	PCC	2	-	-	4	-	3	-	50	-	-	50
2.	WRN-700	Seminar	SEM	2	-	-	-	-	-	-	-	-	100	-
3.		Program Elective-II	PEC	4	-	-	-	-	-	-	-	-	-	-
4.		Program Elective-III	PEC	4	-	-	-	-	-	-	-	-	-	-
5.		Program Elective-IV	PEC	4	-	-	-	-	-	-	-	-	-	-
6.		Program Elective-V	PEC	4										
		Total		20										

**DEPARTMENT OF WATER RESOURCES DEVELOPMENT AND MANAGEMENT
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code: **XXX M.Tech. (Drinking Water and Sanitation)**
Department: **WR Department of Water Resources Development and Management**
Year: **II**

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weight (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Semester- I (Autumn)														
1.	WRN-701A	Thesis Stage-I (to be continued next semester)	DIS	12	-	-	-	-	-	-	-	-	100	-
		Total		12										
Note: Students can take 1 or 2 audit courses as advised by the supervisor, if required.														
Semester-II (Spring)														
1.	WRN-701B	Thesis Stage-II (continued from III semester)	DIS	18	-	-	-	-	-	-	-	-	100	-
		Total		18										

Summary				
Semester	1	2	3	4
Semester-wise Total Credits	20	20	12	18
Total Credits	70			

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Program Elective Courses for M.Tech. (Drinking Water and Sanitation)

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weight (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
1.	WRN-501	System Design Techniques	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	WRN-580	Renewable Energy System Technology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	WRN-581	Water Quality Monitoring and Modeling	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	WRN-586	Groundwater Development and Management	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	WRN-587	Watershed Development and Management	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	WRN-588	Remote Sensing and GIS Applications in Water Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7.	WRN-589	Drinking-Water for Low-Income Societies	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
8.	WRN-590	Wastewater and Fecal Sludge Management	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
9.	WRN-591	Resilience, Shocks and Emergencies	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
10.	WRN-592	Management and Operation of Water Utilities	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
11.	WRN-593	Water Works Engineering	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
12.	WRN-594	Flow Hydraulics and Urban Drainage	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
13.	WRN-595	Circular Water Economy	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14.	WRN-596	Sustainable Water Resources	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

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Appendix 'C'

Item No. Senate / 90.11

M.Tech. Drinking Water and Sanitation (DWS) Programme Seat Matrix, MEQ and Admission Process

Seat Matrix:

Academic Department/ Centre & (Code)	Academic Programmes		Main Gate Discipline(s)	Categories				Other GATE Disciplines	Categories				EWS 10%	PD 5%	Spl. Wise Intake
				UR	OBC	SC	ST		UR	OBC	SC	ST			
Water Resources Development and Management (WRD)	M.Tech. Drinking Water and Sanitation	45	CE/AG/ES/AR/CH/ME(10)	4	3	1	1	-	-	-	-	-	1	-	10

Minimum Eligibility Criteria:

Candidates belonging to General, GEN-EWS and OBC category must have secured at least 60% marks or CGPA of 6.00 on a 10-point scale at the qualifying degree level; Candidates belonging to SC/ST/PD category, must have secured 55% or 5.50 CGPA on a 10-point scale. The marks awarded for the qualifying degree will be considered for eligibility.

Minimum Educational Qualification: Bachelor's degree in Engineering in any one of the following - Civil / Environmental/ Mechanical/ Agricultural/Chemical/ B.Arch. and Planning or equivalent.

Eligible GATE Disciplines: Civil Engineering (CE); Agricultural Engineering (AG); Environmental Science and Engineering (ES); Architecture and Planning (AR); Chemical Engineering (CH); Mechanical Engineering (ME).

Note:

- A few candidates can be admitted under QIP.

International Candidates: The international students can apply through ITEC/ICCSR/ASEAN or other MEA portals through Indian Embassies in respective countries. Such students can apply through the International Relations Portal of IIT Roorkee <https://ir.iitr.ac.in/HowToApply>

Sponsored candidates (Full-time & Part-Time): In line with other M.Tech. programmes of the Institute.

Note: The candidates working in Institute /University awarding a PG degree itself are not eligible for admission as Part-Time or Full-Time candidates if facilities are not available except QIP Candidates.


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Proposed Seat Matrix for M.Tech./M.Arch./MURP Admission 2022-23

S.No	Academic Department/ Centre & (Code)	Academic Programmes	Main Gate Discipline(s)	Other GATE Disciplines										PD 5% horizontal	Spl. Wise intake	Total seats in Dept/Centre
				GATE Discipline Code	UR	OC	SC	ST	GATE Discipline Code	UR	OC	SC	ST			
1	Architecture and Planning (ARD)	M.Arch.	AR(12)	5	4	2	1	-	-	-	-	-	-	1	13	26
		M.U.R.P.	AR(10)	4	3	2	1	-	CE(2)	1	1	0	0	1	13	
2	Hydro and Renewable Energy (HRE)	M.Tech. Renewable and Hydro Energy	CE(2)	1	1	0	0	-	AG/CH/EE/EC/ME/PI/XE/IN (12)	6	3	2	1	2	16	27
		M.Tech. Environmental Management of Rivers and Lakes	CE(3)	1	1	1	0	-	AG/CH/EE/ME/PI/ XE/AR/CY/BI/PH/MA/XL/EY/ES(7)	3	2	1	1	1	11	
3	Chemical Engineering (CHD)	M.Tech. Chemical Engineering	CH(19)	8	6	3	2	-	-	-	-	-	-	2	21	21
4	Civil Engineering (CED)	M.Tech. Environmental Engg.	CE(10)	4	3	2	1	-	CH(2)	1	1	0	0	1	13	91
		M.Tech. Geospatial Engg.	CE/GE(9)	4	3	1	1	-	AR/CS/EC/EE/AG/MN(4)	2	1	1	0	1	14	
		M.Tech. Geotechnical Engg.	CE(12)	6	3	2	1	-	MN (2)	1	1	-	-	2	16	
		M.Tech. Hydraulic Engg.	CE(11)	5	3	2	1	-	-	-	-	-	-	1	12	
		M.Tech. Structural Engg.	CE(21)	9	6	4	2	-	-	-	-	-	-	2	23	
		M.Tech. Transportation Engg.	CE(12)	6	3	2	1	-	-	-	-	-	-	1	13	
		M.Tech. Soil Dynamics	CE(11)	5	3	2	1	-	-	-	-	-	-	1	12	
5	Earthquake Engineering (EED)	M.Tech. Structural Dynamics	CE(17)	8	5	3	1	-	-	-	-	-	-	2	19	41
		M.Tech. Seismic Vulnerability and Risk Assessment	CE(9)	4	3	1	1	-	-	-	-	-	-	1	10	
		M.Tech. Electric Drives & Power Electronics	EE(13)	6	4	2	1	-	-	-	-	-	-	2	15	
6	Electrical Engineering (EED)	M.Tech. Instrumentation and Signal Processing	EE(9)	4	3	1	1	-	EC/IN(4)	2	1	1	0	2	15	75
		M.Tech. Power System Engg.	EE(13)	6	4	2	1	-	-	-	-	-	-	2	15	
		M.Tech. Systems and Control	EE(10)	4	3	2	1	-	EC/IN(3)	1	1	1	0	2	15	
		M.Tech. Electric Vehicle Technology	EE(15)	6	4	2	1	-	-	-	-	-	-	2	15	
		M.Tech. Communication Systems	EC(11)	5	3	2	1	-	-	-	-	-	-	1	12	
7	Electronics and Communication Engineering (ECD)	M.Tech. R.F. & Microwave Engg.	EC(10)	5	3	1	1	-	-	-	-	-	-	1	11	34
		M.Tech. Microelectronics and VLSI	EC/PH(10)	4	3	2	1	-	-	-	-	-	-	1	11	
		M.Tech. Computer Science & Engg.	CS(29)	13	9	5	2	-	-	-	-	-	-	3	32	
8	Computer Science and Engineering (CSD)	M.Tech. Computer Science & Engg.	CS(29)	13	9	5	2	-	-	-	-	-	-	3	32	32
9	Hydrology (HYD)	M.Tech. Hydrology	CE/AG(17)	8	5	3	1	-	GG/XE/PH/ EY(3)	1	1	0	1	2	22	22
10	Mechanical and Industrial Engineering (MED)	M.Tech. CAD, CAM & Robotics	ME/PI(13)	5	4	2	1	-	-	-	-	-	-	1	13	70
		M.Tech. Machine Design Engg.	ME/PI(14)	6	4	2	1	-	-	-	-	-	-	1	14	
		M.Tech. Production & Industrial Systems Engg.	ME/PI(15)	6	4	2	1	-	-	-	-	-	-	2	15	
		M.Tech. Thermal Engg.	ME/PI(15)	6	4	2	1	-	-	-	-	-	-	2	15	
		M.Tech. Additive & Joining Technologies	ME/PI(13)	5	4	2	1	-	-	-	-	-	-	1	13	
		M.Tech. Industrial Metallurgy	MT(3)	2	1	0	0	-	ME/PI/XE (7)	3	2	1	1	1	11	
11	Metallurgical and Materials Engineering (MTD)	M.Tech. Materials Engg.	MT(4)	2	1	1	0	-	PH/ME/PI/CY/XE (7)	3	2	1	1	1	12	23
		M.Tech. Pulp & Paper	CH(7)	3	2	1	1	-	ME/BI/TF/EY (5)	2	2	1	0	1	13	
12	Paper Technology Saharanpur Campus (PPD)	M.Tech. Packaging Technology	CH(6)	2	2	1	1	-	BI/CY/ME/TF (6)	3	2	1	0	1	13	26
13	Water Resources Development and Management (WRD)	M.Tech. Irrigation Water Management	CE/AG(7)	3	2	1	1	-	-	-	-	-	-	1	8	31
		M.Tech. Water Resources Development	CE/EE/ME (12)	5	4	2	1	-	-	-	-	-	-	1	13	
		M.Tech. Drinking Water and Sanitation	CE/AG/ES/AR/CH/ME(10)	4	3	1	1	-	-	-	-	-	-	1	10	
14	Physics (PHD)	M.Tech. Solid State Electronic Materials	PH(7)	3	2	1	1	-	EE/EC/MT (3)	1	1	1	0	1	11	22
		M.Tech. Photonics	PH(7)	3	2	1	1	-	EE/EC/MT/IN (3)	1	1	1	0	1	11	
15	Nanotechnology (NTC)	M.Tech. Nanotechnology	MT/ME/EC/CH/BI/ CE (4)	2	1	1	0	-	CY/PH/XL (6)	2	2	1	1	1	11	11
16	Disaster Mitigation and Management (DMC)	M.Tech. Disaster Mitigation and Management	CE(5)	2	1	1	1	-	ME/PI/CS/CH/AR/AG/PH/MA/XL/XE/EY/ BT (5)	2	2	1	0	1	11	11
17	Transportation Systems (TSC)	M.Tech. Infrastructure Systems	CE(3)	1	1	1	0	-	ME/PI/CH/EE/EC/CS/ AR (7)	3	2	1	1	1	11	11
18	Biosciences and Bioengineering (BBD)	M.Tech. Bioprocess Engineering	CH (4)	2	1	1	0	-	BI/AG/XE/TF (6)	2	2	1	1	1	11	11
19	Polymer and Process Engg.	M.Tech. Polymer Science and Engg.	CH/XE(12)	5	4	2	1	-	CY/ME/PE/PI/TF (8)	4	2	1	1	2	22	22
20	Mehta Family School of Data Science and Artificial Intelligence (MFS)	M.Tech. Artificial Intelligence	CS/EC/EE (13)	6	4	2	1	-	AE/AG/AR/BM/BI/CE/CH/CY/ES/EY/GG/ IN/MA/ME/MN/MT/PE/PH/PI/ST/TF/XE/ XH/XL (5)	2	1	1	1	2	20	40
		M.Tech. Data Science	AE/AG/AR/BM/BI/CE/CH/CY/EC/EE/ ES/EY/GG/IN/MA/ME/MN/MT/PE/PH/PI/ ST/TF/XE/XH/XL(20)	6	5	3	2	-	-	-	-	-	-	2	20	
21	International Centre of Dams (ICD)	M.Tech. Dam Safety and Rehabilitation	CE (8)	3	2	1	1	-	-	-	-	-	-	1	8	8
Total				215	146	80	43	-	46	33	18	10	64	36	655	655

* Subject to approval of
the Senate

Proposed Seat Matrix for M.Sc. Admission through JAM 2022

S.No	Deptt	Programme	Code	Paper code	Gen (Non-PwD)	Gen (PwD)	EWS(Non-PwD)	EWS (PwD)	OBC (Non-PwD)	OBC (PwD)	SC (Non-PwD)	SC (PwD)	ST (Non-PwD)	ST (PwD)	Total
1	Earth Sciences	M.Sc. Applied Geology	1801	GG	8	0	1	1	5	0	3	0	1	0	19
2	Chemistry	M.Sc. Chemistry	1802	CY	18	0	3	1	12	0	6	1	3	0	44
3	Humanities and Social Sciences	M.Sc. Economics	1803	EN	12	1	3	0	8	1	5	0	3	0	33
4	Mathematics	M.Sc. Mathematics	1804	MA	14	1	4	0	9	1	6	0	3	0	38
5	Physics	M.Sc. Physics	1805	PH	12	0	2	1	9	0	3	1	2	0	30

Note: If PwD candidate is not available then the seat will be allotted to the candidate of respective category. Seats of PwD category are not over and above the sanctioned intake. The above seat distribution is done in order to maintain the total intake (164)

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Appendix-1

Category wise vacancy for admission to Ph.D program for Autumn Semester of the session 2022-23 under Institute Assistantshi

Deptt/ centre	Faculty position as on March 01, 2022	Total Seats = 5 x core faculty & 2 x Joint faculty	Total Intake						Seats Filled						Vacancy					
			Unreserved	Gen-EWS	OBC	SC	ST	Total Intake	Unreserved	Gen-EWS	OBC	SC	ST	Total filled	Unreserved	GEN-EWS	OBC	SC	ST	Total Vacancy
(Roorkee Campus)																				
Architecture and Planning	16	80	32	8	22	12	6	80	22	2	13	9	2	48	10	6	9	3	4	32
Biosciences and Bioengineering	25+2*	129	52	13	35	19	10	129	22	1	13	4	2	42	30	12	22	15	8	87
Civil Engineering	53	265	107	26	72	40	20	265	83	14	48	25	10	180	24	12	24	15	10	85
Chemical Engineering	24	120	49	12	32	18	9	120	22	8	20	12	3	65	27	4	12	6	6	55
Chemistry	27	135	55	14	36	20	10	135	24	2	12	10		48	31	12	24	10	10	87
Computer Science and Engineering	16	80	32	8	22	12	6	80	20		7	3		30	12	8	15	9	6	50
Management Studies	22	110	45	11	30	16	8	110	29	1	8	6		44	16	10	22	10	8	66
Electronics and Communication Engineering	35	175	71	18	47	26	13	175	35	4	21	6		66	36	14	26	20	13	109
Earth Sciences	27	135	55	14	36	20	10	135	32	6	12	3		53	23	8	24	17	10	82
Electrical Engineering	36	180	73	18	49	27	13	180	40	15	22	13	5	95	33	3	27	14	8	85
Earthquake Engineering	16	80	32	8	22	12	6	80	17	3	15	4	3	42	15	5	7	8	3	38
Hydro and Renewable Energy	11	55	22	6	15	8	4	55	9		8	3		20	13	6	7	5	4	35
Humanities and Social Sciences	27	135	55	14	36	20	10	135	23	8	20	8	6	65	32	6	16	12	4	70
Hydrology	9	45	18	5	12	7	3	45	15		5	2		22	3	5	7	5	3	23
Mathematics	26	130	53	13	35	19	10	130	16	4	8	9		37	37	9	27	10	10	93

Appendix 'F'
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Mechanical and Industrial Engineering	46	230	93	23	62	35	17	230	48	11	37	18	7	121	45	12	25	17	10	109
Metallurgical and Materials Engineering	24	120	49	12	32	18	9	120	18		17	10		45	31	12	15	8	9	75
Physics	35	175	71	18	47	26	13	175	41	12	23	6	2	84	30	6	24	20	11	91
Water Resources Development and	9+1*	47	19	5	13	7	3	47	12	4	9	5		30	7	1	4	2	3	17
Dept of Design	14*	28	11	3	8	4	2	28	2	1	2			5	9	2	6	4	2	23
Centres		2454	994	249	663	366	182	2454	530	96	320	156	40	1142	464	153	343	210	142	1312
C-Trans	10*	20	8	2	5	3	2	20	7		5			12	1	2	0	3	2	8
Dis. Mit. & Magnt	14*+2	38	15	4	10	6	3	38	8	1	0	3	1	13	7	3	10	3	2	25
Nanotechnology	22*+1	49	20	5	13	7	4	49	11	3	4	2		20	9	2	9	5	4	29
MFSAIDS	23*	46	19	5	12	7	3	46						0	19	5	12	7	3	46
Institute Instrumentation Centre	1	5	2	1	1	1	0	5	1		1			2	1	1	0	1	0	3
Total		158	64	17	41	24	12	158	27	4	10	5	1	47	37	13	31	19	11	111
(Saharanpur Campus)	Total Seat @ 8 x no. of faculty																			
Applied Sc. & Engg.	3	24	10	2	6	4	2	24	6	1	4		1	12	4	1	2	4	1	12
Pulp & Paper Tech.	6	48	19	5	13	7	4	48	6		2	1		9	13	5	11	6	4	39
Polymer & Process Engg.	10	80	32	8	22	12	6	80	23	1	8	2		34	9	7	14	10	6	46
Total		152	61	15	41	23	12	152	35	2	14	3	1	55	26	13	27	20	11	97
Grand total		2764	1119	281	745	413	206	2764	592	102	344	164	42	1244	527	179	401	249	164	1520

* Joint Faculty

Note: PwD seats are 5% horizontal

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