

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



सीनेट की छियान्वेवीं बैठक हेतु कार्यसूची
AGENDA FOR THE 96th MEETING
OF THE SENATE

बैठक सं०	:	छियान्वेवीं
MEETING NO.	:	96 th
स्थान	:	सीनेट हॉल, भा० प्रौ० सं० रुड़की
VENUE	:	Senate Hall, IIT Roorkee
दिनांक	:	07 जून 2023
DATE	:	07 th June 2023
समय	:	04.00 बजे अपरान्ह
TIME	:	04.00 P.M.

भारतीय प्रौद्योगिकी संस्थान रुड़की
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कार्यसूची / AGENDA

मुद्दा सं० / Item No.	विवरण / Particulars	पृष्ठ / Page(s)
96.1	सीनेट की दिनांक 22.02.2023 तथा 31.03.2023 को आयोजित हुई 94वीं तथा 95वीं बैठकों के कार्यवृत्त की पुष्टि करना। To confirm the minutes of the 94 th & 95 th meeting of the Senate held on 22.02.2023 & 31.03.2023.	1
96.2	सीनेट की दिनांक 22.02.2023 तथा 31.03.2023 को आयोजित हुई 94वीं तथा 95वीं बैठकों में लिए गए निर्णयों के क्रियान्वयन पर की गई कार्यवाही को रिपोर्ट करना। To report on the actions taken to implement the decisions of the Senate taken in its 94 th & 95 th meeting held on 22.02.2023 & 31.03.2023.	2-9
96.3	नए यूजी पाठ्यक्रम के अनुसार ईएससी, बीएससी और ओईसी पाठ्यक्रम और विभागवार कार्यक्रम संरचनाओं पर विचार करना। To consider the ESC, BSC and OEC Courses and Department wise Program Structures as per the new UG curriculum.	10-253
96.4	आईआईटी/सीएफटीआई में खेल कोटा के माध्यम से प्रवेश के प्रस्ताव पर विचार करना। To consider the proposal for consideration of admission through sports quota in IITs/CFTIs.	254-264

96.5	एक नया केन्द्र- “भारतीय ज्ञान प्रणाली में उत्कृष्टता केंद्र (सीओईआईकेएस)” स्थापित करने के लिए आईकेएस समिति के प्रस्ताव पर विचार करना। To consider the proposal of the IKS Committee to establish a new Centre – “Centre of Excellence in Indian Knowledge Systems (CoEIKS)”.	265-273
96.6	बायोसाइंसेस और बायोइंजीनियरिंग विभाग की पूर्णकालिक पीएचडी छात्रा सुश्री शालिनी कौशिक के चिकित्सा आधार पर उनकी स्थिति को पूर्णकालिक से अंशकालिक में बदलने के अनुरोध पर विचार करना। To consider the request of Ms. Shalini Kaushik, Full-time Ph.D. student, Department of Biosciences and Bioengineering, to change her status from Full-time to Part-time on medical grounds.	274-294
96.7	अध्यक्ष, सीनेट द्वारा दी गई मंजूरी को रिपोर्ट करना। To report the approvals accorded by the Chairman, Senate.	295-304
अन्य मुद्दे अध्यक्ष की अनुमति से/Under any other item with the permission of the Chair.		

Item No. 96.1: To confirm the minutes of the 94th & 95th Senate meeting held on 22.02.2023 & 31.03.2023.

The minutes of the 94th & 95th Senate meetings held on 22.02.2023 & 31.03.2023 were circulated to the members vide e-mail dated 07.03.2023 & 03.05.2023. No comments have been received.

The Senate may consider and confirm the said minutes.

Item No. 96.2: To report on the actions taken to implement the decisions of the Senate taken in its 94th & 95th meeting held on 22.02.2023 & 31.03.2023.

Item No.	Reference to the Senate minutes	Extracts of the Minutes	Status of action taken																
94.3	To consider the revised proposal of the UG Curriculum Revision Committee (UCRC).	The Senate considered and accepted the proposal. Further, the Senate suggested to send it to the academic departments and academic centres for designing the department wise programme specific structures, courses/course baskets according to the approved basic structure. The departments/centres/school are to submit the above to the Dean, Academic Affairs by the end of March 2023. The Senate placed on record its sincere appreciation to all who contributed in developing the curriculum structure, in particular, the resource persons of the Workshop on UG Academic Curriculum Development.	Notified																
94.4	To consider the proposal of the Department of Management Studies regarding reallocation of credits.	The Senate considered and approved the proposal of the Department of Management Studies regarding reallocation of credits as given below: <table border="1"> <thead> <tr> <th>Course Code</th><th>Course Title</th><th>Subject Area</th><th>Credits</th></tr> </thead> <tbody> <tr> <td>BMN:601</td><td>Business Simulation for Capstone</td><td>PCC</td><td>1.5</td></tr> <tr> <td>BMN:602</td><td>Summer Training</td><td>PCC</td><td>1.5</td></tr> <tr> <td>BMN:610</td><td>Major Project</td><td>RP</td><td>6</td></tr> </tbody> </table>	Course Code	Course Title	Subject Area	Credits	BMN:601	Business Simulation for Capstone	PCC	1.5	BMN:602	Summer Training	PCC	1.5	BMN:610	Major Project	RP	6	Notified
Course Code	Course Title	Subject Area	Credits																
BMN:601	Business Simulation for Capstone	PCC	1.5																
BMN:602	Summer Training	PCC	1.5																
BMN:610	Major Project	RP	6																

94.5	To consider the proposal for an earliest submission date for Masters' Thesis.	The Senate considered the proposal and approved 1 st May every year as the earliest date of submission of Masters' Thesis.	Notified																						
94.6	To consider a proposal – ‘Golden Girl’ for the FIRST Rank Holder (Gold Medallist) female candidates for admission in the Masters and Ph.D. Programmes of the Institute.	The Senate considered and accepted the proposal – ‘Golden Girl’ for the FIRST Rank Holder female candidate from the top 50 NIRF (in the OVERALL category in the most recent year) in all available disciplines for admission in the Masters and Ph.D. Programmes of the Institute. The intake for such candidates shall be supernumerary.	Notified																						
94.7	To consider the proposal for additional seats in the M.Tech. programme in Disaster Mitigation & Management programme.	The Senate considered and approved the following (with the changes in the GATE disciplines) for additional seats in M.Tech. programme in Disaster Mitigation & Management: <table><tr><th rowspan="2">Name of Programme</th><th colspan="2">Existing</th><th rowspan="2">E W S</th><th rowspan="2">Total</th><th colspan="2">New</th><th rowspan="2">E W S</th><th rowspan="2">Total</th></tr><tr><th>Main GATE Discipline</th><th>Other GATE Discipline</th><th>Main GATE Discipline</th><th>Other GATE Discipline</th></tr><tr><td>M.Tech. Disaster Mitigation & Management</td><td>CE (5)</td><td>ME/PI/CS/ CH/AR/GG/ PH/MA/XL/ XE/EY/BT (5)</td><td>1</td><td>11</td><td>CE (5)</td><td>ME/PI/CS/ CH/AR/ GG/ PH/MA/ XL/XE/EY /BT/GE (13)</td><td>2</td><td>20</td></tr></table>	Name of Programme	Existing		E W S	Total	New		E W S	Total	Main GATE Discipline	Other GATE Discipline	Main GATE Discipline	Other GATE Discipline	M.Tech. Disaster Mitigation & Management	CE (5)	ME/PI/CS/ CH/AR/GG/ PH/MA/XL/ XE/EY/BT (5)	1	11	CE (5)	ME/PI/CS/ CH/AR/ GG/ PH/MA/ XL/XE/EY /BT/GE (13)	2	20	Implemented
Name of Programme	Existing			E W S	Total			New				E W S	Total												
	Main GATE Discipline	Other GATE Discipline	Main GATE Discipline			Other GATE Discipline																			
M.Tech. Disaster Mitigation & Management	CE (5)	ME/PI/CS/ CH/AR/GG/ PH/MA/XL/ XE/EY/BT (5)	1	11	CE (5)	ME/PI/CS/ CH/AR/ GG/ PH/MA/ XL/XE/EY /BT/GE (13)	2	20																	
94.8	To consider the program structure, minimum educational qualification, eligible GATE disciplines and seat matrix for admission to Joint M.Tech. programmes in ‘Semiconductor Technology’ in collaboration with three universities from Taiwan.	The Senate considered and approved the proposal, along with the program structure. The Senate decided that the intake for the programme shall be 15. Further, the Senate decided that the candidates be allowed to register in the ECE department. This joint collaborative programme be offered in coordination with the Department of Physics.	Implemented																						

94.9	To consider the revision in eligibility criteria and GATE Disciplines for M.Tech. programmes as proposed below: 1. Change(s) in Minimum Educational Qualification (MEQ) for admission to M.Tech. programmes in the following Departments: (i) Department of Computer Science and Engineering (ii) Department of Metallurgical and Materials Engineering (iii) Department of Applied Mathematics and Scientific Computing 2. Change(s) in eligible GATE disciplines for admission to M.Tech. programmes in the following Department: (i) Department of Hydro and Renewable Energy (ii) Department of Metallurgical and Materials Engineering (iii) Centre for Excellence in Disaster Mitigation and Management (iv) Mehta Family School of Data Science and Artificial Intelligence	The Senate considered and approved the proposals. Further, the Senate suggested that in the Minimum Educational Qualification (MEQ), “or equivalent” be replaced by “or equivalent in the relevant discipline”.	Notified

94.10	Seat matrix for M.Tech./M.Arch./MURP programmes for the Academic Session 2023-2024.	The Senate approved the proposal.	Notified
94.11	To consider the intake/seat matrix for UG programs for the session 2023-24.	The Senate considered and approved the UG seat matrix for the academic year 2023-2024.	Notified
94.12	To consider the revision in the existing provision of the requirement of NOC while converting the status of a Masters student from Full-Time to Part-Time.	The Senate considered and approved the following revision on a provision for NOC from Master students converted to Part Time: <i>If a student wishes to join an organization, he/she can request for change of his/her status to part-time, provided that he/she completes all the course work requirements and submits the copy of the offer letter.</i> <i>The Dean of Academic Affairs can approve the request on the recommendation of DAPC/CAPC/ ScAPC.</i> <i>After conversion from full time to part time, the student has to work 9 (nine) months for each remaining stage of the thesis. However, such students have to complete the degree requirements within 4 years from the date of initial registration.</i>	Implemented
94.13	To consider the request from Mr. Rushit Premal Pancholi (Enrol. No. 22114081) for a grant of the James Thomason Scholarship (JTS) of 2022.	The Senate did not accept the request for change in the JEE rank cut-off criteria for James Thomason Scholarship (JTS) of 2022.	Informed

94.14	To consider the Mercy Appeals of the following ex-Ph.D. students, for reinstatement of their academic registration. (i) Mr. Akshay Kumar Yadav (En. No.: 1799016), Department of Mathematics. (ii) Mr. Saptarshi Kolay (En. No.: 14902011), Department of Arch. & Planning.	The Senate considered the mercy appeals of the following ex-Ph.D. students regarding re-instatement of their academic registration and decided the following: <table><tr><th>S. No.</th><th>Name, Enrollment No., Deptt.</th><th>Request Accepted/ Not Accepted</th></tr><tr><td>1.</td><td>Mr. Akshay Kumar Yadav (En. No.: 1799016), Deptt. of Mathematics</td><td>Not Accepted</td></tr><tr><td>2.</td><td>Mr. Saptarshi Kolay (En. No. 14902011), Deptt. of Arch. & Planning.</td><td>Accepted the request as a special case; a warning be issued to the student by the AAO stating that further leniency in registration be avoided.</td></tr></table>	S. No.	Name, Enrollment No., Deptt.	Request Accepted/ Not Accepted	1.	Mr. Akshay Kumar Yadav (En. No.: 1799016), Deptt. of Mathematics	Not Accepted	2.	Mr. Saptarshi Kolay (En. No. 14902011), Deptt. of Arch. & Planning.	Accepted the request as a special case; a warning be issued to the student by the AAO stating that further leniency in registration be avoided.	Implemented
S. No.	Name, Enrollment No., Deptt.	Request Accepted/ Not Accepted										
1.	Mr. Akshay Kumar Yadav (En. No.: 1799016), Deptt. of Mathematics	Not Accepted										
2.	Mr. Saptarshi Kolay (En. No. 14902011), Deptt. of Arch. & Planning.	Accepted the request as a special case; a warning be issued to the student by the AAO stating that further leniency in registration be avoided.										
94.15	To consider the seat matrix for Ph.D. admission in Autumn Semester 2023-2024.	The Senate considered and approved the seat matrix for Ph.D. admission in Autumn Semester 2023-2024.	Implemented									
94.17	To consider the revision in eligibility criteria for admission in the Ph.D. programmes offered by the Department of Biosciences and Bioengineering, Department of Polymer and Process Engg. and the Centre for Nanotechnology under the QIP scheme.	The Senate considered and approved the proposal to drop Pharmacy from the existing MEQs for admission into the Ph.D. programmes offered by the Department of Biosciences and Bioengineering, Department of Polymer and Process Engg. and the Centre for Nanotechnology under the QIP scheme.	Implemented									

94.18	To consider award of 42 Ph.D. Degrees, received after the 93 rd Senate for the students who have completed the requirements for award of degrees w.e.f. 26.12.2022.	The Senate considered and recommended to the Board of Governors to include these 42 PhD Degrees for the award to the students who have duly qualified for the same.	Recommendations were approved by the Board.
94.19	To Consider the representations of Mr. Veeram Chandra Reddy (Enrl No. 17918020), a Ph. D. student enrolled in the department of Management Studies on his various statements, arguments, and advise on this matter for a course of action.	The Senate considered the matter and advised that Mr. Veeram Chandra Reddy (Enrl. No.17918020) be asked to submit his thesis within three months and leave the campus following the submission. In case of non-compliance on his part, suitable action be taken against him.	Informed
94.16 is only the reporting item.			

Item No.	Reference to the Senate minutes	Extracts of the Minutes	Status of action taken
95.1	To consider award of 19 PhD Degrees, received after the 94 th Senate for the students who have completed the requirements for award of degrees w.e.f. 22.02.2023	The Senate considered and recommended to the Board of Governors to include 19 PhD Degrees to the students who have duly qualified for the award in 22 nd Convocation	Recommendations were approved by the Board.
95.2	To consider a proposal to rename the recently created "Centre for Flexible and Smart Energy Device"(CFSE) to "Centre for Sustainable Energy" (CSE).	The Senate deliberated in detail and accepted the proposal to recommend and rename the "Centre for Flexible and Smart Energy Device"(CFSE) to "Centre for Sustainable Energy" (CSE) to the Board of Governors for approval.	Recommendations were approved by the Board.
95.3	To deliberate & invite the opinion and suggestions of the Senate.	1. Vision of IITs for the next 25 years. The Senate deliberated on the theme and evolved that there should be a connect between Education, Research, Industry and Society. The Senate observed that keeping this as the central theme, a comprehensive vision document should be prepared. The document can also be used in preparation of a proposal for Institute of Eminence. An Equitable Society with Gender Diversity should invariably be focused in the vision of the Institute. 2. Outreach activities of IITs for inclusive growth of other technical Institutions and sharing the benefit of research to society. The Senate suggested that the curriculum should be designed in such a way that the students spend a	E-mail was sent to the faculty members to sought their opinion on vision, outreach activities and reservation policy at IIT Roorkee.

		semester or two in industry and/or rural area to get exposed to the real world problems and to enable them to find out feasible solutions to the identified problems. This approach will align the curriculum with the spirit of the NEP-2020, as well as will build an empathy in the young minds once they enter in their profession. It will empower the students to work with a clear vision for the industry in particular, and for the society at large. 3. Reservation policy - existing policy and the challenges in implementing the CEI Reservation in faculty recruitment, specifically in securing the due representations in IITs and measures to overcome these challenge. The Senate recommended that the departments should consider inclusivity more diligently while screening the applications for faculty positions. Further, it was suggested that a Committee be constituted to suggest the way to increase the percentage of faculty members in the departments across the categories.	
95.4	To consider the medals, awards and cash prizes for Convocation-2022.	Chairman, SCSP presented the recommendations on the Awards, Medals and Cash Prizes for the Convocation 2022. The Senate approved the awards, medals and prizes.	Informed to Chairman SCSP

Item No. 96.3: To consider the ESC, BSC and OEC Courses and Department wise Program Structures as per the new UG curriculum.

The IAPC, in its 71st meeting held on June 27, 2019, decided to review the curriculum to align it with the recent developments and present requirements. Accordingly, a 16-member undergraduate curriculum revision committee (UCRC), under the Chairmanship of DoAA, formulated a new UG curriculum.

The Senate in its 94th meeting held on 22.02.2023, accepted the new proposal of the UG Curriculum Revision Committee and suggested to send it to the academic departments and academic centres for designing the department wise programme specific structures, courses/course baskets according to the approved basic structure. The departments/centres/school were to submit the above to the Dean, Academic Affairs by the end of March 2023.

The departments/centres/school, after due deliberations, submitted the structures, courses and the course baskets for the UG programmes offered.

The IAPC in its 130th meeting (six sittings) held on Apr. 19, May 03/08/12/18/24, 2023 considered and recommended the following with modifications:

- I. **The Course baskets – ESCs, BSCs and OECs** to be offered by the Departments/ Centres/ School **(Appendix – A)**
- II. **Structures of the following UG Programmes (Appendix - B)**
 1. B.Arch.
 2. B.Tech. Biosciences and Bioengineering
 3. B.Tech. Civil Engineering
 4. B.Tech. Chemical Engineering
 5. B.Tech. Computer Science and Engineering
 6. B.Tech. Electrical Engineering
 7. B.Tech. Electronics and Communication Engineering
 8. B.Tech. Engineering Physics
 9. B.Tech. Mechanical Engineering
 10. B.Tech. Production and Industrial Engineering

11. B.Tech. Metallurgical and Materials Engineering
12. B.Tech. Data Science and Artificial Intelligence
13. IMT Geological Technology
14. IMT Geophysical Technology
15. BS-MS Economics
16. BS-MS Chemical Sciences
17. BS-MS Mathematics and Computing
18. BS-MS Physics

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

Offer by Department	Category	S_No	Course Code	Course_Title	Credit	L	T	P	Course_Offered	Opted by	Year	Semester	No of Students
AH-Hydro and Renewable Energy	ESSC	1		Environmental Science and Sustainability Course	3	3	0	0	Both				
		1	HRO-101	Alternate Fuels for Transportation	3	3	0	0	Both				
	OEC	2	HRO-102	Energy Resources, Economics and Sustainability	3	3	0	0	Both				
		3	HRO-103	Renewable Energy Resource Development Technology	3	3	0	0	Both				
		4	HRO-104	Small Hydro Power Development	3	3	0	0	Both				
		1	BEB-101	Introduction to Bioanalytical Techniques.	4	3	1	0	Spring				
		2	BEB-102	Biosciences for engineers	4	3	1	0	Autumn	CH	II	AUTUMN	117
	BSC	3	BEB-103	Public Health and Emerging Diseases	4	3	1	0	Autumn				
		4	BEB-104	Fundamentals of Neuroscience	3	2	1	0	Autumn				
		5	BEB-105	Basic Chemistry for Life Science	4	3	1	0	Spring				
		1	BEE-101	Biomedical Nanomaterials	4	3	0	2	Autumn				
	ESC	2	BEE-102	Introduction to Computational Biology	4	3	1	0	Spring	BSMSCY	I	SPRING	35
		3	BEE-103	Introduction to Biological Engineering	4	3	1	0	Autumn				
		4	BEE-104	Introduction to Bio-catalysis	3	3	0	0	Spring				
		5	BEE-105	Introduction to Biophotonics	3	3	0	0	Spring	BSMSCY	I	SPRING	35
	OEC	1	BEO-101	Intellectual Property Rights, Biosafety and Bioethics	4	3	1	0	Both				
		1	CEE-101	Building Services	3	2	1	0	Spring				
		2	CEE-102	Mechanics of Solids	4	2	2	0	Spring	ME	I	SPRING	208
										IN	I	SPRING	
	ESC	3	CEE-103	Theory of Structures	4	3	1	0	Autumn	AR	II	AUTUMN	30
		4	CEE-104	Design of Reinforced Concrete Elements	4	3	1	2/2	Autumn	AR	III	AUTUMN	30
		5	CEE-105	Design of Steel Elements	3	2	1	0	Spring	AR	III	SPRING	30
		6	CEE-106	Geospatial Techniques and Programming	4	3	0	2	Both	BSMSHS	II	SPRING	33
	ESSC	1	ESS-101	Environmental Science and Sustainability Course-1	3	3	0	0	Spring	CE, AR, GT, GPT	I	SPRING	283
		1	CEO-101	Probability Methods in Engineering Problems	3	3	0	0	Both				
	OEC	2	CEO-102	Simulation of Behavior-Induced Mobility	3	2	1	0	Both				
		3	CEO-103	Water Resources Engineering	3	3	0	2/2	Both				
		1	CHE-101	Energy Engineering	4	3	1	0	Autumn	GT	I	AUTUMN	114
	ESC									GPT	I	AUTUMN	
		2	CHE-102	Introduction to Process Technology						BSMSCY	I	AUTUMN	
	OEC	1	CHO-101	Computational Fluid Dynamics	4	3	1	0	Spring				
					4	3	1	0	Autumn				

CS--Computer Science and Engineering	ESC	1	CSE-101	Data Structures and Algorithms	4	3	1	0	Both	EE	II	AUTUMN	442
										ECE	I	AUTUMN	
										DSAI	II	AUTUMN	
										BSMSHS	I	AUTUMN	
										BSMSMA	I	AUTUMN	
										BE	II	AUTUMN	
										CH	II	SPRING	
CY--Chemistry	BSC	2	CSE-102	Introduction to Automata Theory	4	3	1	0	Spring	BSMSMA	II	SPRING	49
		1	CYB-101	Fundamentals of Organic Chemistry	4	3	0	2	Autumn	BE	II	AUTUMN	46
		2	CYB-102	Inorganic Chemistry - I	4	3	0	2	Spring				
		3	CYB-103	Physical Chemistry-I	4	3	0	2	Spring	CH	I	SPRING	199
										MT	I	SPRING	
EC--Electronics and Communication Engineering	ESC	1	ESS-103	Environmental Science and Sustainability Course-3	3	3	0	0	Spring	BSMSCY, CH, BE, BSMSHS	I	SPRING	231
		1	CYO-101	Organic Electronic Materials	3	2	1	0	Both				
		2	CYO-102	Functional Materials: Preparation, Structure and Properties	3	3	0	0	Both				
		3	CYO-103	Introduction to Instrumental methods of analysis	3	2	1	0	Both				
		4	CYO-104	Introduction to Computational Chemistry	3	2	1	0	Both				
		1	ECE-101	Fundamentals of Electronics	4	3	1	0	Both	EE	I	AUTUMN	360
										DSAI	I	AUTUMN	
EC--Electronics and Communication Engineering	ESC	2	ECE-102	Introduction to Communication System	4	3	1	0	Both	BE	I	AUTUMN	
										BSMSPH	I	AUTUMN	
										MT	II	AUTUMN	
										CSE	I	SPRING	
										DSAI	II	SPRING	
										EPH	II	SPRING	
										CSE	I	AUTUMN	
EC--Electronics and Communication Engineering	ESC	3	ECE-103	Digital Electronics	4	3	1	0	Both	BSMSPH	II	AUTUMN	136
										EE	I	SPRING	246
										GPT	I	SPRING	
										DSAI	I	SPRING	

EE--Electrical Engineering	ESC	1	EEE-101	Control System Engineering		4	3	1	0	Both	ECE	II	SPRING	109
		2	EEE-102	Basic Electrical Engineering		4	3	1	2/2	Both	EPH ME IN MT	I I I II	AUTUMN SPRING SPRING SPRING	340
		3	EEE-103	Measurements and Transducers		4	3	1	0	Both	EPH	I	SPRING	50
		1	EOE-101	Solid Mechanics		4	3	1	0	Both	CE	I	SPRING	174
EQ--Earthquake Engineering	BSC	1	ESB-101	Geological Processes		4	3	1	0	Both	GT	I	SPRING	79
		2	ESB-102	Global Geophysics		4	3	1	0	Both	GPT GT GPT	I II II	SPRING AUTUMN AUTUMN	79
		1	ESE-101	Geology for Engineers		4	3	1	0	Autumn	CE	II	AUTUMN	174
		1	ESO-101	Fractals and Applications		3	2	1	0	Both				
ES--Earth Sciences	OEC	2	ESO-102	Glaciology		3	2	1	0	Both				
		3	ESO-103	Planetary Geosciences		3	2	1	0	Both				
		4	ESO-104	Carbon Sequestration		3	2	1	0	Both				
		1	HYE-101	ENGINEERING HYDROLOGY		4	3	1	0	Spring	CE	II	SPRING	174
HY--HYDROLOGY	OEC	1	HYO-101	Desalination and membrane technology		3	1	0	3	Autumn				
											EE	II	AUTUMN	
											ECE	II	AUTUMN	
		1	MAB-103	Numerical Methods		4	3	1	0	Autumn	ME IN BSMSMA CSE DSAI	II II II II II	AUTUMN AUTUMN AUTUMN AUTUMN AUTUMN	839
MA--Mathematics	BSC	2	MAI-101	Mathematics I		4	3	1	0	Autumn	ALL UG PROGRAMMES	I	AUTUMN	1353
		3	MAI-102	Mathematics II		4	3	1	0	Spring	ALL UG PROGRAMMES	I	SPRING	1353
											BSMSHS	II	AUTUMN	
		4	MAB-104	Mathematical Methods		4	3	1	0	Autumn	EPH BSMSPH BSMSMA	II II II	AUTUMN AUTUMN AUTUMN	159
OEC	OEC	1	MAO-101	Optimization Techniques		4	3	1	0	Spring				
		2	MAO-102	Advanced Engineering Mathematics		4	3	1	0	Autumn				

ME--Mechanical and Industrial Engineering	ESC	1	MIE-103	Engineering Thermodynamics		4	3	1	2/2	Both				
		2	MIE-102	Manufacturing Processes		4	3	0	2	Both				
		3	MIE-101	Engineering Mechanics		4	3	1	0	Both	CH CE MT	I AUTUMN I AUTUMN I AUTUMN		373
MT--Metallurgical and Materials Engineering	ESC	1	MTE-101	Non Destructive Testing		4	3	1	0	Autumn				
		2	MTE-102	Materials Characterization		4	3	1	0	Spring	BE GT	I SPRING I SPRING		84
		3	MTE-103	Materials Science		4	3	1	0	Both	ME IN	I AUTUMN I AUTUMN		208
PH--Physics	OEC	1	MTO-101	Introduction to Nanomaterials		3	2	0	2	Both				
		2	MTO-102	Thin Film Technology		3	3	0	0	Both				
		1	PHB-102	Quantum and Statistical Mechanics		4	3	1	0	Spring	ECE	II SPRING		109
PH--Physics	BSC	2	PHI-101	PHI-101 Physics-I		4	3	1	2/2	Autumn	ALL UG PROGRAMMES	I AUTUMN		1353
		3	PHB-103	Modern Physics		4	3	1	0	Spring	BSMSHS BSMSCY	I SPRING I SPRING		68
		4	PHB-104	Engineering Optics		4	3	1	0	Spring				
Disaster Mitigation and Management	OEC	1	DMD-101	Participatory Nature-based Risk Resilience		4	3	1	0	Both				
		2	DMD-102	Introduction to Climate Change		4	3	1	0	Both				
		1	ESS-102	Environmental Science and Sustainability Course		3	3	0	0	Spring	EE,ECE,CSE,BSMSPH,EPH,DSAI,MA	I SPRING		549
	ESSC	2	ESS-104	Environmental Science and Sustainability Course		3	3	0	0	Spring	ME,PI,MT	I SPRING		290

**1-BACHELOR OF ARCHITECTURE
COMPONENT WISE DISTRIBUTION**

Main Curriculum Components	Sub Components	Approved Credits for B.Arch.	Approved Credits Range	Proposed Credits for B.Arch. by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	52
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		12	
	ESC	8-20		15	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
	CCCC	TBD		74	
	AI/ML	2		2	
Program Core Course	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	TBD	133	12	128
	Technical Communication	2		2	
	Internship/Professional Training	TBD		12	
	PEC	TBD		18	
	TEB	6-8		8	
	OEC	9-12		9-12	
	CORE	2		2	
	Total	190-200		191-194	
	MSC/DHC	18/20		18/20	
	Grand Total			209-214	

**DEPARTMENT OF ARCHITECTURE & PLANNING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code : **110-Bachelor of Architecture**
Department : **AR – Architecture & Planning**

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year-wise)
1	23	23	46
2	24/25	24/25	48/50
3	23/24	24	47/48
4	17	12	29
5	21	0	21
Grand Total			191-194
Total with Minor Specialization Courses	with additional 18-20 credits (mentioned in the parentheses)		209-214

	Components	Maximum	Minimum	Comments
	Discipline (DIS)	20	10	To be evaluated by DoSW
Non-Credit Elements (NCE)	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	32	10	1 week internship= 1 unit (To be coordinated by departments/centres/school)
	Participation in professional development programs by Industry experts/ field experts (PPD-1, PPD-2 & PPD-3)	12	6	To be coordinated by departments/centres/school (2 nd , 3 rd and 4 th Years)
Minimum non-credit to be earned: 30				

DEPARTMENT OF ARCHITECTURE & PLANNING

Program Code : 110 – Bachelor of Architecture
 Department : AR – Architecture & Planning
 Year : I

Teaching Scheme			Credits	Subject Area	Course Title	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)				
S. No.	Subject Code					L	T/D /I	P/S	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)															
1	HSI-101	Soft Skills	3	HSSC		2	0	2	2	0	10-25	25	15-25	30-40	-
2	MAI-101	Mathematics-I	4	BSC		3	1	0	3	0	20-35	-	20-30	40-50	-
3	PHI-101	Physics-I	4	BSC		3	1	2/2	3	0	15-30	20	15-25	30-40	-
4	TMI-101	Tinkering and Mentoring	4	T-2		-	-	-	-	-	70	30	-	-	-
				M-2		2	0	0	2	-	50	-	50	-	
5	ARC-101	Computer Programming for Architects	4	PCC		1	2	2	3	0	20 - 30	20 - 30	20 - 30	20-30	-
6	ARC-103	Foundation Studio-I	4	PCC		1	1	4	0	7	-	80	20	-	-
		Total	23												
(Spring)															
1	HSI-102	Indian Knowledge System	2	HSSC		2	0	0	3	0	20-35	-	20-30	40-50	-
2	MAI-102	Mathematics - II	4	BSC		3	1	0	3	0	20-35	-	20-30	40-50	-
3	CEE-106	Geospatial Techniques and Programming	4	ESC		3	0	2	3	0	10-25	25	15-25	30-40	-
4	ESS-101	Environmental Science and Sustainability	3	ESSC		3	0	0	3	0	20-35	-	20-30	40-50	-
5	ARC-102	Foundation Studio-II	4	PCC		1	1	4	0	7	-	80	20	-	-
6	ARC-104	Building Materials & Construction-I	3	PCC		1	0	4	3	0	-	60	20	-	20
7	ARC-106	Climatology in Architecture	3	PCC		2	1	0	3	0	20-35	-	20-30	40-50	-
		Total	23												

DEPARTMENT OF ARCHITECTURE & PLANNING

Program Code : 110 – Bachelor of Architecture
 Department : AR – Architecture & Planning
 Year : II

Teaching Scheme				Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)						
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T/D /I	P/S	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	HSSEC-I	HSS Elective Course-I	HSSEC	3											
2	OEC-I	Open Elective Course-I	OEC	3/4											
3	MSI-101	Fundamentals of Management	MC	3	3	0	0	0	3	0	20-35	-	20-30	40-50	-
4	ARC-201	Architectural Design Studio-I	PCC	5	1	2	4	0	7	-	80	20	-	-	-
5	ARC-203	Building Materials & Construction-II	PCC	3	1	0	4	4	3	0		40 - 60	20 - 30	20-30	-
6	ARC-205	History of Architecture-I	PCC	3	2	1	0	0	3	0	20-35	-	20-30	40-50	-
7	CEE-103	Theory of Structures	ESC	4	3	1	0	0	3	0	20-35	-	20-30	40-50	-
		Total		24/25											
(Spring)															
1	ARC-202	Computer Aided Architectural Design Studio-II	PCC	5	1	2	4	4	0	7	-	80	20	-	-
2	ARC-204	Building Materials & Construction-III	PCC	3	1	0	4	4	3	0		40 - 60	20 - 30	20-30	-
3	ARC-206	History of Architecture - II	PCC	3	2	1	0	0	3	0	20-35	-	20-30	40-50	-
4	ARC-208	Principles of Architecture	PCC	3	2	1	0	0	3	0	20-35	-	20-30	40-50	-
5	ARC-210	Landscape Design and Site Development	PCC	3	2	0	2	2	3	0	10-25	25	15-25	30-40	-
6	OEC-II	Open Elective Course-II	OEC	3/4											
7	DAI-101	Data Science	DSC	4	3	1	0	0	3	0	20-35	-	20-30	40-50	-
		Total		24/25											

DEPARTMENT OF ARCHITECTURE & PLANNING

Program Code : 110 – Bachelor of Architecture
 Department : AR – Architecture & Planning
 Year : III

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T/D/I	P/S	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	ARC-301	Integrated Architectural Design Studio-III	PCC	5	1	2	4	0	7	-	80	20	-	-
2	ARC-303	Building Services (Water Supply and Sanitation)	PCC	3	1	1	3	3	0	20-35	-	20-30	40-50	-
3	ARC-351	Fundamental of AI/ML	PCC	2	1	1	0	-	-	20-35	-	20-30	40-50	-
4	CEE-104	Design of Reinforced Concrete Elements	ESC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
5	OEC-III	Open Elective Course-III	OEC	3/4										
6	HSSEC-II	HSS Elective Course-II	HSSEC	3										
7	ART-I	Talent Enhancement Course-I	TEB	3	2	1	0	3	0	20-35	-	20-30	40-50	-
		Total		23/24										
(Spring)														
1	ARC-302	Building Services (HVAC & Electrical Systems)	PCC	3	1	1	3	3	0	20-35	-	20-30	40-50	-
2	ARC-304	Contemporary World Architecture	PCC	3	2	1	0			20-35	-	20-30	40-50	-
3	CEE-105	Design of Steel Elements	ESC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
4	ART-II	Talent Enhancement Course-II	TEB	5	1	2	4	0	7	-	80	20	-	-
5	ARL-I	Program Elective-I	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
6	ARL-II	Program Elective-II	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
7	ARC-399	Community Outreach	CORE	2	100									
8	ARC-391	Technical Communication	PCC	2	1	1	0	-	-	50	-	-	50	-
9	MSC/DH C-I	Minor Specialization Course-I/ Departmental Honours Course-I	MSC/DH C	3/4										
		Total		24/27-28										

DEPARTMENT OF ARCHITECTURE & PLANNING

Program Code : 110 – Bachelor of Architecture
 Department : AR – Architecture & Planning
 Year : IV

Teaching Scheme																	
S. No.		Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)						
						L	T/DP/S /I		Theory	Practical	CWS	PRS	MTE	EFE	PRE		
(Autumn)																	
1	ARC-401		Integrated Architectural Design Studio-IV	PCC	5	1	2	4	0	7	-	80	20	-	-		
2	ARC-403		Working Drawing, Specification and Estimation	PCC	3	1	0	4	0	3	-	40 - 60	20 - 30	-	20 - 30		
3	ARC-405		Construction Planning and Management	PCC	3	2	1	0	3	0	20-35	-	20-30	40-50	-		
4	ARL-III		Program Elective-III	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-		
5	ARL-IV		Program Elective-IV	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-		
6	MSC/DH C-II		Minor Specialization Course-II/ Departmental Honours Course-II	MSC/DH C	3/4												
7	MSC/DHC - III		Minor Specialization Course-III/ Departmental Honours Course-III	MSC/DH C	3/4												
			Total		17/ 23-25												
(Spring)																	
1	ARC-402		Professional Training	PCC	12	-	-	-	-	-	-	-	-	-	-	100	
			Total		12												

DEPARTMENT OF ARCHITECTURE & PLANNING

Program Code : 110 – Bachelor of Architecture
 Department : AR – Architecture & Planning
 Year : V

Teaching Scheme					Contact Hours/Week		Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T/D/P/S	Theory	Practical	CWS	PRS	MTE	EFE	PRE
(Autumn)													
1	ARP-501	Design Thesis – Project	PCC	12	0	2	0	-	-	-	-	-	100
2	ARC-503	Professional Practice, Valuation & Arbitration	PCC	3	2	1	0	3	-	20-35	-	20-30	40-50
3	ARL-V	Program Elective-V	PEC	3	2	1	0	3	-	20-35	-	20-30	40-50
4	ARL-VI	Program Elective-VI	PEC	3	2	1	0	3	-	20-35	-	20-30	40-50
5	MSC/DHC -IV	Minor Specialization Course-IV/ Departmental Honours Course-IV	MSC/DHC	3/4									
6	MSC/DHC -V	Minor Specialization Course-V/ Departmental Honours Course-V	MSC/DHC	3/4									
		Total		21/27-29									
(Spring)													
1	ARP-502	Internship	NCE	Report and Seminar									

List of Program Elective Courses

Teaching Scheme			Contact Hours/Week			Exam. Duration		Relative Weight (%)						
S. No.	Sub Code	Course Title	Sub. Area	Credits	L	T/D/I	P/S	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Program Elective - 1														
1	ARL-301	Structure and Architecture	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
2	ARL-303	Applied Art and Visual Sensitivity	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective - 2														
3	ARL-302	Product Design Prototyping and Fabrication	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
4	ARL-304	Industrialized Construction and Technology	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective - 3														
5	ARL-401	Modern Indian Architecture	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
6	ARL-403	Vernacular Architecture	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective - 4														
7	ARL-402	Disaster Resilient Built Environments	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
8	ARL-404	Acoustics and Illumination	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective - 5														
9	ARL-501	Hill Architecture	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
10	ARL-503	Housing and Real Estate	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective - 6														
11	ARL-502	Architecture and Urban Conservation	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
12	ARL-504	Architectural Journalism	PEC	3	2	1	0	3	0	20-35	-	20-30	40-50	-

List of Talent Enhancement Course

Teaching Scheme			Contact Hours/Week					Exam Duration		Relative Weight (%)										
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	C	W	S	PRS	M	T	E	E	T	E	PRE
TEB – A (Interior Design)																				
1	ART-101	Interior Design	TEB	3	2	1	0	3	0	20-35	-	20-30	40-50	-	-	-	-	-	-	-
2	ART-102	Interior Design Studio	TEB	5	1	2	4	0	7	-	-	80	20	-	-	-	-	-	-	-
TEB-B (Universal Design)																				
1	ART-103	Universal Design and Accessibility Planning	TEB	3	2	1	0	3	0	20-35	-	20-30	40-50	-	-	-	-	-	-	-
2	ART-104	Design for Universal Access	TEB	5	1	2	4	0	7	-	-	80	20	-	-	-	-	-	-	-
TEB-C (Urban Design)																				
1	ART-105	Urban Design	TEB	3	2	1	0	3	0	20-35	-	20-30	40-50	-	-	-	-	-	-	-
2	ART-106	Urban Design for Selected Typology	TEB	5	1	2	4	0	7	-	-	80	20	-	-	-	-	-	-	-
TEB-D (Sustainable Built Environment)																				
1	ART-107	Sustainable Built Environment (SBE)	TEB	3	2	1	0	3	0	20-35	-	20-30	40-50	-	-	-	-	-	-	-
2	ART-108	SBE Design for Indian Climatic Zones	TEB	5	1	2	4	0	7	-	-	80	20	-	-	-	-	-	-	-
TEB-E (Urban Planning)																				
1	ART-109	Urban Planning	TEB	3	2	1	0	3	0	20-35	-	20-30	40-50	-	-	-	-	-	-	-
2	ART-110	Urban Planning Studio	TEB	5	1	2	4	0	7	-	-	80	20	-	-	-	-	-	-	-
TEB-F (Human Settlement Planning)																				
1	ART-111	Ekistics	TEB	3	2	1	0	3	0	20-35	-	20-30	40-50	-	-	-	-	-	-	-
2	ART-112	Settlement Planning	TEB	5	1	2	4	0	7	-	-	80	20	-	-	-	-	-	-	-

Minor Specialisation Courses (20 credits)

SIno.	Code	Course	Semester	Credit
1	ARC-104	Building Materials & Construction-I	Spring	3
2	ARC-106	Climatology in Architecture	Spring	3
3	ARC-203	Building Materials and Construction-II	Autumn	3
4	ARC-206	History of Architecture-I	Autumn	3
5	ARC-204	Building Materials and Construction-III	Spring	3
6	ARC-205	History of Architecture-II	Autumn	3
7	ARC-208	Principles of Architecture	Autumn	3
8	ARC-210	Landscape Design and Site Development	Spring	3
9	ARC-304	Contemporary World Architecture	Spring	3
10	ARC-405	Construction Planning and Management	Autumn	3
11	ARC-503	Professional Practice, Valuation & Arbitration	Spring	3

Departmental Honours Courses (20 credits)

- A. Elective courses from B.Arch over and above the minimum
 B. Any of the following courses from M.Arch/MURP basket

Sl no.	Code	Course	Credit
1	ARC-603	Contemporary Architecture-Theories and Trends	3
2	ARC-605	Urban Design	3
3	ARC-607	Advanced Building Technologies	3
4	ARC-655	Ecology and Sustainable Development	3
5	ARC-657	Planning Theory and Techniques	3
6	ARC-659	Housing	3
7	ARC-661	Planning Legislation and Governance	3
8	ARC-604	Sustainable Built Environment	4
9	ARC-606	Megastructures	3
10	ARC-654	Infrastructure Planning	4
11	ARC-656	Rural Planning and Development	3

2-B. TECH. (BIOSCIENCE & BIOENGINEERING)
COMPONENT WISE DISTRIBUTION

Main Curriculum Components	Sub Components	Approved Credits for B. Tech.	Approved Credits Range	Proposed Credits for B. Tech. by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		16	
	ESC	8-20		12	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
Program Core Course	CCCC	40-48	87-91	45	91
	AI/ML	2		2	
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4	
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	6-10		8	
	PEC	22-26		24	
	TEB	6-8		6	
	OEC	9-12		9-12	
	CORE	2		2	
	Total	150-160		155-158	
	MSC/DHC	18/20		18/20	
	Grand Total			173-178	

DEPARTMENT OF BIOSCIENCE & BIOENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code : 125 **B. Tech. (Bioscience & Bioengineering)**
Department : BE **Bioscience & Bioengineering**

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year – wise)
1	23	24	47
2	23/24	24/25	47/49
3	23/24	18	41/42
4	16	4	20
Grand Total			155-158
Total with MSC/DHC	With addition 18-20 credits		173-178

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF BIOSCIENCE & BIOENGINEERING

Program Code : 125
 Department : BE
 Year : I

B. Tech. (Bioscience & Bioengineering)
 Department of Bioscience & Bioengineering

Teaching Scheme				Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)						
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	HSI-101	Soft Skills	HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-	
2	MAI-101	Mathematics-I	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	PHI-101	Physics-I	BSC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-	
4	BEC-101	Computer Programming	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
5	TMI-101	Tinkering and Mentoring	TMI	4	T-2	-	-	-	-	70	30	-	-	-	
					M-2	2	0	0	2	-	50	-	50	-	
6	ECE-101	Fundamentals of Electronics	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
		Total		23											
(Spring)															
1	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	0	20-35	-	20-30	40-50	-	
2	MAI-102	Mathematics-II	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	ESS-103	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
4	MTE-102	Material Characterization	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
5	BEC-102	Microbiology	PCC	3	2	0	2	3	0	10-25	25	15-25	30-40	-	
6	BEC-104	Biochemistry and Biophysics	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
7	BEC-191	Technical Communication	PCC	2	0	2	0	-	-	100					-
8	BEC-108	Bioinformatics	PCC	2	2	0	0	3	0	20-35	-	20-30	40-50	-	
		Total		24											

DEPARTMENT OF BIOSCIENCE & BIOENGINEERING

Program Code : 125 B. Tech. (Bioscience & Bioengineering)

Department : BE Department of Bioscience & Bioengineering

Year : II

Teaching Scheme					Contact Hours/Week			ExamDuration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	MSI-101	Fundamentals of Management	MC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
2	HSSEC-I	HSS Elective Course	HSSEC	3										
3	OEC-I	Open Elective Course-I	OEC	3/4										
4	CSE-101	Data Structures and Algorithms	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	CYB-101	Fundamentals of Organic Chemistry	BSC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
6	BEC-201	Transport Phenomenon in Biological System	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
7	BEC-203	Cell Biology and Genetics	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
		Total		23/24										
(Spring)														
1	OEC-II	Open Elective Course-II	OEC	3/4										
2	DAI-101	Data Science	DSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	BEC-202	Physiology of Animals and Plants	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4	BEC-204	Molecular Biology and Genetic Engineering	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
5	BEC-206	Structural Biology	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
6	BEC-208	Bioprocess Calculations	PCC	2	2	0	0	3	0	20-35	-	20-30	40-50	-
7	BEC-210	Immunology	PCC	2	2	0	0	3	0	20-35	-	20-30	40-50	-
8	BET-I	Talent Enhancement Course-I	TEB	3	0	0	6	-	-	-	50	-	-	50
		Total		24/25										

DEPARTMENT OF BIOSCIENCE & BIOENGINEERING

Program Code : 125 **B. Tech. (Bioscience & Bioengineering)**
Department : BE **Department of Bioscience & Bioengineering**
Year : III

		Teaching Scheme			Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	HSSEC-II	HSS Elective Course-II	HSSEC	3										
2	OEC-III	Open Elective Course-III	OEC	3/4										
3	BEC-351	Fundamentals of AI/ML	PCC	2	2	0	0	3	0	20-35	-	20-30	40-50	-
4	BEC-301	Bioprocess Engineering	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
5	BEC-303	Computational Biology	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
6	BEC-305	Animal and Plant Tissue Culture	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
7	BEC-399	Community Outreach	CORE	2						100				
8	BEL-I	Program Elective Course-I	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
		Total		23/24										
(Spring)														
1	BEC-300	Lab Based Project/ Industrial Oriented Problem Solving/ Case Study, etc.	PCC	4	0	0	8	-	-	-	-	-	100	-
2	BEC-302	Genomics, Proteomics and Metabolomics	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
3	BEL-II	Program Elective Course-II	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	BEL-III	Program Elective Course-III	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	BET-II	Talent Enhancement Course-II	TEB	3	0	0	6	-	-	-	50	-	-	50
6	MSC/DHC - I	Minor Specialization Course - I / Departmental Honours Course - I	MSC/ DHC	3/4										
		Total		18 /21-22										

DEPARTMENT OF BIOSCIENCE & BIOENGINEERING

Program Code : 125 **B. Tech. (Bioscience & Bioengineering)**
Department : BE **Department of Bioscience & Bioengineering**
Year : IV

Teaching Scheme															
S. No.	Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)					
					L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	BEP-400A/BEL	BTP/Project/Internship/Entrepreneurship/PEC*	PCC/PEC*	4	0	0	8	-	-	-	-	-	100	-	-
2	BEL-IV	Program Elective Course -IV	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	-
3	BEL-V	Program Elective Course -V	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	-
4	BEL-VI	Program Elective Course -VI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	-
5	MSC/DHC-II	Minor Specialization Course -II /Departmental Honours Course - II	MSC/DHC	3/4											
6	MSC/DHC-III	Minor Specialization Course -III /Departmental Honours Course - III	MSC/DHC	3/4											
		Total		16/22-24											
(Spring)															
1	BEP-400B/BEL	BTP/Project/Internship/Entrepreneurship/PEC*	PCC/PEC*	4	0	0	8	-	-	-	-	-	100	-	-
2	MSC/DHC-IV	Minor Specialization Course -IV /Departmental Honours Course – IV	MSC/DHC	3/4											
3	MSC/DHC-V	Minor Specialization Course - IV/Departmental Honours Course - IV	MSC/DHC	3/4											
		Total		04/10-12											

List of Program Elective Courses

S. No.		Teaching Scheme		Contact Hours/Week			Exam Duration		Relative Weight (%)											
		Subject Code	Course Title						Subject Area	Credit	L	T	P	Th.	Pr.	CWS	PRS	MTE	ETE	PRE
Basket-1 (Cell and Molecular Biology)																				
1.	BEL-401	Gene Regulation		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
2.	BEL-402	Food Biotechnology		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
3.	BEL-403	Virology		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
4.	BEL-404	Nano- Bioengineering		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
5.	BEL-405	Separation and Analysis of Biomolecules		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
6.	BEL-406	Drug Discovery		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
7.	BEL-407	Principles of Synthetic Biology		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
8.	BEL-408	Stem Cell Technology		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
9.	BEL-409	Industrial Bioprocessing		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
10.	BEL-410	High Throughput Sequencing		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
11.	BEL-411	Chemical Genetics		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
12.	BEL-412	Genetically Modified Organisms		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
13.	BEL-413	Vaccine Biotechnology		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
14.	BEL-414	Tissue Engineering		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
15.	BEL-415	Biomaterials and Devices		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
16.	BEL-416	Molecular Diagnostics		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
17.	BEL-417	Fundamentals of Neuroscience		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
18.	BEL-418	Biotherapeutics		PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					

19.	BEL-419	Molecular Genetics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
20.	BEL-420	Immunotechnology and Therapeutics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Basket-2 (Biological Engineering)														
21.	BEL-451	Bioprocess Control	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
22.	BEL-452	Bioprocess Modelling and Simulation	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
23.	BEL-453	Bioreactor Design and Analysis	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
24.	BEL-454	Bioprocess Optimization	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
25.	BEL-455	Bioseparation Engineering	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
26.	BEL-456	Bioelectronic Medical Devices	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
27.	BEL-457	Plant Design and Economics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Basket-3 (Structural and Computational Biology)														
28.	BEL-471	Machine Learning and Deep Learning	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
29.	BEL-472	Protein Engineering	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
30.	BEL-473	Biophotonics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
31.	BEL-474	Biomolecular NMR	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
32.	BEL-475	Biomolecular Modelling	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
33.	BEL-476	Systems Biology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
34.	BEL-477	Molecular Biophysics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
35.	BEL-478	Biomolecular Interactions	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
36.	BEL-479	X-Ray Crystallography	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
37.	BEL-480	Fundamentals of Cryo-EM	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
38.	BEL-481	Structural Bioinformatics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
39.	BEL-482	DNA Computing	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

List of Talent Enhancement Basket Courses

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weight (%)				
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	MTE	ETE	PRE
TEB-A														
1	BET-101	Emerging Techniques in Cell and Molecular Biology-I	TEB	3	0	0	6	-	-	-	50	-	-	50
2	BET-102	Emerging Techniques in Cell and Molecular Biology-II	TEB	3	0	0	6	-	-	-	50	-	-	50
TEB-B														
1	BET-103	3D Structural Characterization	TEB	3	0	0	6	-	-	-	50	-	-	50
2	BET-104	Computational Characterization of Biomolecules	TEB	3	0	0	6	-	-	-	50	-	-	50
TEB-C														
1	BET-105	Bioprocess Engineering-I	TEB	3	0	0	6	-	-	-	50	-	-	50
2	BET-106	Bioprocess Engineering-II	TEB	3	0	0	6	-	-	-	50	-	-	50

List of Minor Specialization Courses
Minor in Computational Biology and Bioinformatics

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weight (%)				
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	M T E	E T E	PRE
1	BE-XXX	Biosciences for engineers	MSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2	BEC-108	Bioinformatics	MSC	2	2	0	0	3	0	20-35	-	20-30	40-50	-
3	BEC-303	Computational Biology	MSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4	BE-XXX	Programming for Computational Biology	MSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	BEL-471	Machine Learning and Deep Learning	MSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6	BEL-481	Structural Bioinformatics	MSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

Minor in Cell and Molecular Biology

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weight (%)				
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	MTE	ETE	PRE
1	BE-XXX	Fundamentals of Biotechnology	MSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2	BEL-473	Biophotonics	MSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	BEL-417	Fundamentals of Neuroscience	MSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	BE-XXX	IPR and Bioethics	MSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	BE-XXX	Bionanotechnology	MSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6	BE-XXX	Recombinant DNA technology	MSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

List of Department Honours Specialization Courses:

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weight (%)								
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	MTE	E	T	E	P	R	E
1	BEL-XXX	Drug Discovery and Development	DHC	4	3	1	0	3	0	20-35	-	20-30	40-50				-	
2	BEL -XXX	Advanced Virology	DHC	4	3	1	0	3	0	20-35	-	20-30	40-50				-	
3	BEL -XXX	Microbial Genetics	DHC	4	3	1	0	3	0	20-35	-	20-30	40-50				-	
4	BEL -XXX	Protein Crystallography	DHC	4	3	1	0	3	0	20-35	-	20-30	40-50				-	
5	BEL -XXX	Advances in Food Biotechnology	DHC	4	3	1	0	3	0	20-35	-	20-30	40-50				-	
6	BEL -XXX	Biomedical Optics and Biophotonics	DHC	4	3	1	0	3	0	20-35	-	20-30	40-50				-	
7	BEL -XXX	Protein NMR	DHC	4	3	1	0	3	0	20-35	-	20-30	40-50				-	

3-B.Tech. (Civil Engineering)
Component wise distribution

Main Curriculum Components	Sub Components	Approved Credits for B.Tech.	Approved Credits Range	Proposed Credits for B.Tech. by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		12	
	ESC	8-20		16	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
	CCCC	40-48		48	
	AI/ML	2		2	
Program Core Course	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study/ Technical Communication	4	87-91	4	90
	BTP/Entrepreneurship/ Project-based internship/PEC	6-10		6	
	PEC	22-26		22	
	TEB	6-8		6	
	OEC	9-12		9-12	
	CORE	2		2	
	Total	150-160		154/157	
	MSC/DHC	18/20		18/20	
	Grand Total			172/177	

**DEPARTMENT OF CIVIL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code : 113
Department : CE

B.Tech. (Civil Engineering)
Civil Engineering

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year – wise)
1	23	19	42
2	24/25	23/24	47/49
3	24/25	19	43-44
4	14	8	22
Grand Total			154/157
Total with MSC/DHC	With addition 18-20 credits		172/177

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF CIVIL ENGINEERING

Program Code : 113 - B.Tech. (Civil Engineering)
 Department : Department of Civil Engineering
 Year : I

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	HSI-101	Soft Skills	HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-
2	MAI-101	Mathematics -I	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	PHI-101	Physics-I	BSC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
4	CEC-101	Computer Programming	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
5	TMI-101	Tinkering & Mentoring	TMI	4	T-2	-	-	-	-	70	30	-	-	-
					M-2	2	0	0	2	-	50	-	50	-
6	MIE-101	Engineering Mechanics	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
		Total		23										
(Spring)														
1	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	0	20-35	-	20-30	40-50	-
2	MAI-102	Mathematics-II	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	ESS-101	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4	CEC-102	Geospatial Engineering-I	PCC	3	2	0	2	3	0	10-25	25	15-25	30-40	-
5	CEC-104	Fluid Mechanics	PCC	3	3	0	2/2	3	0	15-30	20	15-25	30-40	-
6	EQE-101	Solid Mechanics	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
		Total		19										

DEPARTMENT OF CIVIL ENGINEERING

Program Code : 113 - B.Tech. (Civil Engineering)
Department : Department of Civil Engineering
Year : II

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	HSSEC-I	HSS Elective Course-I	HSSEC	3										
2	OEC-I	Open Elective Course-I	OEC	3/4										
3	MSI-101	Fundamentals of Management	MC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4	CEC-201	Geospatial Engineering -II	PCC	5	2	0	6*	3	2	10-25	10-25	15-25	30-40	10-25
5	CEC-203	Structural Analysis-I	PCC	3	3	0	2/2	3	2	15-30	20	15-25	30-40	-
6	CEC-205	Channel Hydraulics	PCC	3	3	0	2/2	3	0	15-30	20	15-25	30-40	-
7	ESE-101	Geology for Engineers	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
		Total		24/25										
(Spring)														
1	DAI-101	Data Science	DSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2	OEC-II	Open Elective Course-II	OEC	3/4										
3	CEC-202	Water Supply Engineering	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4	CEC-204	Structural Analysis -II	PCC	3	3	0	2/2	3	0	15-30	20	15-25	30-40	-
5	CEC-206	Design of Reinforced Concrete Elements	PCC	3	3	0	2/2	3	0	15-30	20	15-25	30-40	-
6	HYE-101	Engineering Hydrology	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7	CEL-I	Program Elective Course - I	PEC	3										
		Total		23/24										

***Includes field survey camp**

DEPARTMENT OF CIVIL ENGINEERING

Program Code : 113 - B.Tech. (Civil Engineering)
Department : Department of Civil Engineering
Year : III

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	HSSEC-II	HSS Elective Course-II	HSSEC	3										
2	OEC-III	Open Elective Course-III	OEC	3/4										
3	CEC-351	Fundamentals of AI/ML	PCC	2	2	0	0	2	0	20-35	-	20-30	30-40	-
4	CEC-301	Soil Mechanics	PCC	3	3	0	2/2	3	0	15-30	20	15-25	30-40	-
5	CEC-303	Waste Water Engineering	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
6	CEC-305	Design of Steel Elements	PCC	3	3	0	2/2	3	0	15-30	20	15-25	30-40	-
7	CEC-307	Highway and Traffic Engineering	PCC	3	3	0	2/2	3	0	15-30	20	15-25	30-40	-
8	CEC-399	Community Outreach	CORE	2							100			
9	CET-I	Talent Enhancement Course-I	TEB	2	1	0	2	2	0	10-20	20-30	15-25	30-40	-
		Total		24/25										
(Spring)														
1	CEC-300	Design of Structural Systems	PCC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
2	CEC-302	Foundation Engineering	PCC	3	3	0	2/2	3	-	15-30	20	15-25	30-40	-
3	CEC-304	Railway Engineering	PCC	3	3	0	0	3	-	20-35	0	20-30	40-50	-
4	CEL-II	Program Elective Course – II	PEC	3										
5	CEC-391	Technical Communication	PCC	2	0	2	0	0	0	-	100	-	-	-
6	CET-II	Talent Enhancement Course-II	TEB	4	2	1	2	3	-	10-25	25	15-25	30-40	-
7	MSC/DHC - I	Minor Specialization Course - I / Departmental Honours Course - I	MSC/DH C	3/4										
		Total		19/22-23										

DEPARTMENT OF CIVIL ENGINEERING

Program Code : 113 - B.Tech. (Civil Engineering)
Department : Department of Civil Engineering
Year : IV

Teaching Scheme														
S. No.	Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
					L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	CEP-400/ CEL	Project/Entrepreneurship/Project-Based Internship/PEC*	PCC/PE C*	6							100			
2	CEL-III	Program Elective Course – III	PEC	4										
3	CEL-IV	Program Elective Course – IV	PEC	4										
4	MSC/DHC - II	Minor Specialization Course - II / Departmental Honours Course – II	MSC/ DHC	3/4										
5	MSC/DHC - III	Minor Specialization Course - III / Departmental Honours Course - III	MSC/ DHC	3/4										
		Total		14/20-22										
(Spring)														
1	CEL-V	Program Elective Course-V	PEC	4										
2	CEL-VI	Program Elective Course-VI	PEC	4										
3	MSC/DHC – IV	Minor Specialization Course - IV / Departmental Honours Course – IV	MSC/DH C – IV	3/4										
4	MSC/DHC - V	Minor Specialization Course - V / Departmental Honours Course - V	MSC/DH C - V	3/4										
		Total		8/14-16										

List of Program Elective Courses

Second Year Spring (3 credits each)

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.	CEL-201	Building Materials	PEC	3	3	0	0	3	-	20-35	-	20-30	40-50	-
2.	CEL-202	Engineering Graphics	PEC	3	2	0	2	3	-	10-25	25	15-25	30-40	-
3.	CEL-203	Intelligent Transportation System	PEC	3	2	1	0	3	-	20-35	-	20-30	40-50	-

Third Year Spring (3 credits each)

Teaching Scheme															
S. No.	Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Exam. Duration		Relative Weight (%)					
					L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
1.	CEL-301	Construction Planning And Management	PEC	3	3	0	0	3	-	-	20-35	-	20-30	40-50	-
2.	CEL-302	System Analysis	PEC	3	3	0	2/2	3	-	-	15-30	20	15-25	30-40	-
3.	CEL-303	Airport Planning And Design	PEC	3	3	0	0	3	-	-	20-35	-	20-30	40-50	0
4.	CEL-304	Foundations Of Industrial Machines	PEC	3	2	1	0	3	-	-	20-35	-	20-30	40-50	0

List of Program Elective Courses

Fourth Year Autumn (4 credits each)

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.	CEL-4XX	Rock Engineering	PEC	4	3	1	0	3	0	20-35	-	20-35	40-50	-							
2.	CEL-531	Advanced Hydrology	PEC	4	3	1	0	3	0	20-35	-	20-35	40-50	-							
3.	CEL-534	Modeling, Simulation & Optimization	PEC	4	3	1	0	3	0	20-35	-	20-35	40-50	-							
4.	CEL-501	Environmental Modeling& Simulation	PEC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-							
5.	CEL-502	Environmental Separation Process	PEC	4	3	1	0	3	0	20-35	-	20-35	40-50	-							
6.	CEL-503	Waste Water Treatment	PEC	4	3	1	0	3	0	20-35	-	20-35	40-50	-							
7.	CEL-505	Statistics & Instrumentation For Environmental Engineers	PEC	4	3	1	2	3	0	15-30	20	15-25	30-40	-							
8.	CEL-524	Soil Dynamics And Machine Foundations	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-							
9.	CEL-542	Continuum Mechanics	PEC	4	3	1	0	3	0	20-35	-	20-35	40-50	-							
10.	CEL-543	Advanced Concrete Design	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-							
11.	CEL-544	Structural Dynamics	PEC	4	3	1	0	3	0	20-35	-	20-35	40-50	-							
12.	CEL-641	Behaviour & Design of Steel Structures	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-							
13.	CEL-561	Traffic Analysis And Design	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-							
14.	CEL-563	Urban Mass Transit Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-							
15.	CEL-564	Geometric Design	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-							
16.	CEL-565	Planning, Design And Construction of Rural Roads	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-							
17.	CEL-567	Transportation Systems Analysis	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-							
18.	CEL-568	Advanced Highway Material Characterisation	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-							
19.	CEL-5XX	Advanced Highway Construction And Maintenance	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-							
20.	CEN-511	Surveying Measurements And Adjustments	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-							
21.	CEN-512	Principles of Photogrammetry	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-							
22.	CEN-513	Remote Sensing And Image Processing	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-							

23.	CEN-514	Geodesy And Gps Surveying	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
24.	CEN-614	Theory And Applications of GIS	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
25.	CEL-5XX	Programming For Geospatial Data Analysis	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-

Fourth Year Spring (4 credits each)

1.	CEN-4XX	Ground Water Engineering	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	CEL-602	Water Quality Management	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	CEL-603	Industrial & Hazard Waste Management	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	CEL-604	Environmental Impact & Risk Assessment	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	CEN-605	Solid Waste Management	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	CEL-606	Environmental Remediation of Contaminated Sites	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7.	CEL-636	Hydropower Engineering	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
8.	CEL-625	Ground Improvement Engineering	PEC	4	2	1	0	3	0	20-35	-	20-30	40-50	-
9.	CEL-545	Finite Element Analysis	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
10.	CEL-642	Analysis And Design of Bridges	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
11.	CEL-643	Analysis And Design of High-rise Buildings	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
12.	CEL-644	Analysis And Design of Plates And Shells	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
13.	CEL-645	Mechanics of Composites	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14.	CEL-646	Engineering Design Optimization And Reliability	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
15.	CEL-647	Condition Assessment And Retrofitting Of Structures	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
16.	CEL-648	Concrete Technology	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
17.	CEL-649	Fracture Mechanics In Quasi-Brittle Materials	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
18.	CEL-650	Design of Bridge Sub-Structure	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
19.	CEL-651	Wind Engineering	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
20.	CEL-653	Introduction To Theories of Inelasticity	PEC	4	3	1	0	3	0	20-25	-	25-35	40-50	-
21.	CEL-6XX	Pavement Analysis And Design	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
22.	CEL-662	Intersection Design And Control	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
23.	CEL-663	Pavement Evaluation And Management	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
24.	CEL-664	Transportation Planning	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-

25.	CEL-665	Road Traffic Safety	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
26.	CEL-666	Transport Economics	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
27.	CEL-614	Theory And Applications Of GIS	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
28.	CEL-XXX	Transportation Data Analysis Techniques	PEC	4	3	1	0	3	0	25-35	-	20-30	40-50	0

Basket of Talent Enhancement Course

Teaching Scheme				Contact Hours/Week			Exam Duration		Relative Weight (%)											
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	C	W	S	P	R	S	MTE	E	T	E	PRE
TEB-I (Computer Aided Design)																				
1	CET-101	CAD in Structural Analysis	TEB	2	1	0	2	2	-	10-20	20-30	15-25	30-40	30-40	0					
2	CET-102	CAD in Geotechnical Engg.	TEB	4	2	1	2	2	-	10-20	20-30	15-25	30-40	30-40	0					
TEB-II (Material Testing)																				
1	CET-103	Highway Material Characterization	TEB	2	1	0	2	2	-	10-20	20-30	15-25	30-40	30-40	0					
2	CET-104	Structural Materials and Testing	TEB	4	2	1	2	2	-	10-20	20-30	15-25	30-40	30-40	0					

List of Open 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.	CEO-101	Probability Methods In Engineering Problems	OEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
2.	CEO-102	Simulation of Behavior-Induced Mobility	OEC	3	2	1	0	3	0	20-35	-	20-30	40-50	0
3.	CEO-103	Water Resources Engineering	OEC	3	3	0	2/2	3	0	15-30	20	15-25	30-40	-

Minor Specialization Courses (20 credits)

S.No.	Subject Code	Course Title	Semester	Credits
1	CEC-202	Water Supply Engineering	Spring	3
2	CEC-102	Geospatial Engineering-I	Spring	3
3	CEC-104	Fluid Mechanics	Spring	3
4	CEC-203	Structural Analysis-I	Autumn	3
5	CEC-307	Highway & Traffic Engg	Autumn	3
6	CEC-301	Soil Mechanics	Autumn	3
7	CEL-301	Construction Planning and Management	Spring	3
8	CEL-201	Building Materials	Spring	3

Departmental Honours Courses (20 credits)

S.No.	Subject Code	Course Title	Credits
1.	CEL-521	Advanced Numerical Analysis	4
2.	CEL-523	Engineering Behaviour Of Rocks	4
3.	CEL-525	Fem In Geotechnical Engineering	4
4.	CEL-542	Continuum Mechanics	4
5.	CEL-543	Advanced Concrete Design	4
6.	CEL-544	Structural Dynamics	4
7.	CEL-545	Finite Element Analysis	4
8.	CEL-623	Stability Analysis Of Slopes	4
9.	CEL-624	Design Of Under-Ground Excavations	4
10.	CEL-628	Constitutive Modelling Of Geological Materials	4
11.	CEL-629	Earthquake Resistant Design Of Geotechnical Structures	4
12.	CEL-501	Environmental Modelling& Simulation	4
13.	CEL-502	Environmental Separation Process	4
14.	CEL-504	Environmental Chemistry	4
15.	CEL-505	Statistics & Instrumentation For Environmental Engineers	4
16.	CEL-603	Industrial& Hazard Waste Management	4
17.	CEL-606	Environmental Remediation Of Contaminated Sites	4
18.	CEL-611	Analytical And Digital Photogrammetry	4
19.	CEL-612	Advanced Digital Image Processing	4
20.	CEL-613	Thermal, Microwave And Hyperspectral Remote Sensing	4
21.	CEL-615	Geoinformatics For Natural Disasters	4

22.	CEL-616	Geoinformatics For Landuse Surveys	4
23.	CEL-617	Satellite Geodesy	4
24.	CEL-618	Modelling And Analysis Of Geospatial Data	4
25.	CEL-534	Modeling, Simulation & Optimization	4
26.	CEL-638	Climate Change And Its Impact On Water Resources	4
27.	CEL-561	Traffic Analysis And Design	4
28.	CEL-563	Urban Mass Transit Systems	4
29.	CEL-564	Geometric Design	4
30.	CEL-565	Planning, Design And Construction Of Rural Roads	4
31.	CEL-567	Transportation Systems Analysis	4
32.	CEL-568	Advanced Highway Material Characterization	4
33.	CEL-5XX	Advanced Highway Construction And Maintenance	4
34.	CEL-6XX	Pavement Analysis And Design	4
35.	CEL-662	Intersection Design And Control	4
36.	CEL-663	Pavement Evaluation And Management	4
37.	CEN-664	Transportation Planning	4
38.	CEL-665	Road Traffic Safety	4
39.	CEL-666	Transport Economics	4
40.	CEL-632	Hydraulic Structures	4
41.	CEL-XXX	Transportation Data Analysis Techniques	4

4-B. TECH. (CHEMICAL ENGINEERING)
COMPONENT WISE DISTRIBUTION

Main Curriculum Components	Sub Components	Approved Credits for B. Tech.	Approved Credits Range	Proposed Credits for B. Tech. by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		20	
	ESC	8-20		8	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
Program Core Course	CCCC	40-48	87-91	47	91
	AI/ML	2		2	
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4	
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	6-10		8	
	PEC	22-26		22	
	TEB	6-8		6	
	OEC	9-12		9-12	
	CORE	2		2	
	Total	150-160		155-158	
	MSC/DHC	18/20		18/20	
	Grand Total			173/178	

**DEPARTMENT OF CHEMICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code : 112 **B. Tech. (Chemical Engineering)**
Department : CH **Chemical Engineering**

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year – wise)
1	23	21	44
2	23/24	21/22	44/46
3	21/22	22	43/44
4	12	12	24
Grand Total			155/158
Total with MSC/DHC	With addition 18-20 credits		173/178

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the dept./Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF CHEMICAL ENGINEERING

Program Code : 112 - B.Tech. (Chemical Engineering)
 Department : Department of Chemical Engineering
 Year : I

Teaching Scheme			Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)						
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	EFE	PRE
(Autumn)														
1	HSI-101	Soft Skills	HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-
2	MAI-101	Mathematics-1	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	PHI-101	Physics-1	BSC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
4	CHC-101	Computer Programming	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
5	TMI-101	Tinkering and Mentoring	TMI	T-2	-	-	-	-	-	70	30	-	-	-
				M-2	2	0	0	2	-	50	-	50	-	-
6	MIE-101	Engineering Mechanics	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
		Total		23										
(Spring)														
1	CYB-103	Physical Chemistry-I	BSC	4	3	0	2	3	0	20-35	-	20-30	40-50	-
2	CHC-102	Chemical Process Calculations	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	CHC-104	Fluid Mechanics	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	0	20-35	-	20-30	40-50	-
5	MAI-102	Mathematics-II	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6	ESS-103	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
		Total		21										

DEPARTMENT OF CHEMICAL ENGINEERING

Program Code : 112 - B.Tech. (Chemical Engineering)
 Department : Department of Chemical Engineering
 Year : II

		Teaching Scheme			Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	EFE	PRE
(Autumn)														
1.	HSSEC-1	HSS Elective Course	HSSEC	3										
2.	OEC-1	Open Elective Course	OEC	3/4										
3.	MSI-101	Fundamentals of Management	MC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4.	BSB-102	Biosciences for Engineers	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	CHC-201	Heat Transfer	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	CHC-203	Chemical Engineering Thermodynamics	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7.	CHC-205	Chemical Engineering Lab-I	PCC	2	0	0	4	-	-	-	50	-	-	50
		Total		23/24										
(Spring)														
1.	DAI-101	Data Science	DSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	OEC-II	Open Elective Course	OEC	3/4										
3.	CSE-101	Data Structure and Algorithm	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	CHC-202	Chemical Reaction Engineering	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	CHC-204	Mass Transfer	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	CHC-206	Chemical Engineering Lab-II	PCC	2	0	0	4	-	-	-	50	-	-	50
		Total		21/22										

DEPARTMENT OF CHEMICAL ENGINEERING

Program Code : 112 - B.Tech. (Chemical Engineering)
 Department : Department of Chemical Engineering
 Year : III

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1.	HSSEC-1	HSS Elective Course	HSSEC	3										
2.	OEC-1	Open Elective Course	OEC	3/4										
3.	CHC-351	Fundamentals of AI/ML	PCC	2	2	0	0	3	0	20-35	-	20-30	40-50	-
4.	CHC-301	Computer Applications in Chemical Engineering	PCC	2	0	0	4	-	-	-	50	-	-	50
5.	CHT-I	Talent Enhancement Course-I	TEB	3	2	0	2	3	0	10-25	25	15-25	30-40	-
6.	CHC-303	Chemical Engineering Lab-III	PCC	2	0	0	4	-	-	-	50	-	-	50
7.	CHC-305	Process Equipment Design	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
8.	CHC-399	Community Outreach	CORE	2								100		
		Total		21/22										
(Spring)														
1	CHC-300	Case Study /Industry Oriented Problem/ Lab Based Project	PCC	4	0	0	8	-	-	-	50	-	-	50
2	CHC-302	Process Instrumentation and Control	PCC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
3	CHC-304	Plant Design and Process Economics	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4	CHC-391	Technical Communication	PCC	2	0	2	0	-	-			100		
5	CHL-I	Program Elective-I	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
6	CHL-II	Program Elective-II	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
7	CHT-II	Talent Enhancement Course-II	TEB	3	2	0	2	3	0	10-25	25	15-25	30-40	-
8	MSC/DHC-I	Minor Specialization Course-I/ Departmental Honours Course-I	MSC/DHC	3/4										
		Total		22/25-26										

DEPARTMENT OF CHEMICAL ENGINEERING

Program Code : 112 - B.Tech. (Chemical Engineering)
Department : Department of Chemical Engineering
Year : IV

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)	Relative Weights(%)					
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1.	CHP-400A/CHL	Project/Entrepreneurship/ Project-based Internship/PEC*	PCC/PEC*	4								100		
2.	CHL-III	Program Elective-III	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	CHL-IV	Program Elective-IV	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	MSC/DHC-II	Minor Specialization Course-II / Departmental Honours Course-II	MSC/DHC	3/4										
5.	MSC/DHC-III	Minor Specialization Course-III / Departmental Honours Course-III	MSC/DHC	3/4										
		Total		12/18-20										
(Spring)														
1.	CHP-400B/CHL	Project/Entrepreneurship/ Project-based Internship/PEC*	PCC/PEC*	4								100		
2.	CHL-V	Program Elective-V	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	CHL-VI	Program Elective-VI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	MSC/DHC-IV	Minor Specialization Course-IV / Departmental Honours Course-IV	MSC/DHC	3/4										
5.	MSC/DHC-V	Minor Specialization Course-V/ Departmental Honours Course-V	MSC/DHC	3/4										
		Total		12/18-20										

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.	CHL-323	Transport Phenomena	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
2.	CHL-324	Industrial Pollution Abatement	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
3.	CHL-326	Fluidization Engineering	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4.	CHL-327	Petroleum Refining	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
5.	CHL-328	Petrochemicals	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
6.	CHL-329	Fertilizer Technology	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
7.	CHL-511	Process Integration	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
8.	CHL-513	Biochemical Engineering	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
9.	CHL-515	Computational Fluid Dynamics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
10	CHL-517	Optimization of Chemical Processes	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
11	CHL-510	Advanced Process Control	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
12	CHL-512	Solid and Hazardous Waste Management	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
13	CHL-514	Pollution Control Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14	CHL-516	Kinetics of Polymerization	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
15	CHL-518	Waste to Energy Conversion	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
16	CHL-520	Oil and Gas Transport	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
17	CHL-522	Nanotechnology in Chemical Engineering	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
18	CHL-524	Microfluidics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
19	CHL-526	Supercritical Fluids: Theory and Applications	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
20	CHL-528	Introduction to Granular Rheology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
21	CHL-530	Drug Delivery	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
22	CHL-532	Colloids and Interfacial Science	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
23	CHL-534	Novel Separation Techniques	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

24	CHL-536	Design of Experiments and Parameter Estimation	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
25	CHL-538	Industrial Safety and Hazard Management	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
26	CHL-540	Multiphase Flow	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

List of Talent Enhancement Basket Courses

Teaching Scheme			Contact Hours/Week			Exam Duration		Relative Weight (%)						
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	C W S	PRS	MTE	E T E	PRE
TEB-A														
1	CHT-101	Advanced Characterization Techniques-I	TEB	3	2	0	2	3	0	10-25	25	15-25	30-40	-
2	CHT-102	Advanced Characterization Techniques-II	TEB	3	2	0	2	3	0	10-25	25	15-25	30-40	-
TEB-B														
1	CHT-103	Process Modeling and Simulations-I	TEB	3	2	0	2	3	0	10-25	25	15-25	30-40	-
2	CHT-104	Process Modeling and Simulations-II	TEB	3	2	0	2	3	0	10-25	25	15-25	30-40	-

List of OEC course

SN	Code	Course title	Semester	Credits
1	CHO-101	Computational Fluid Dynamics	Autumn	4

Minor Specialization Courses

S.No.	Code	Course title	Semester	Credits
1	CHC-102	Chemical Process Calculations	Spring	4
2	CHC-104	Fluid Mechanics	Spring	4
3	CHC-201	Heat Transfer	Autumn	4
4	CHC-203	Chemical Engineering Thermodynamics	Autumn	4
5	CHC-202	Chemical Reaction Engineering	Spring	4
6	CHC-204	Mass Transfer	Spring	4
7	CHC-305	Process Equipment Design	Autumn	4

Departmental Honours Courses

S.No.	Code	Course title	Credits
1	CHL-511	Process Integration	4
2	CHL-513	Biochemical Engineering	4
3	CHL-515	Computational Fluid Dynamics	4
4	CHL-517	Optimization of Chemical Processes	4
5	CHL-510	Advanced Process Control	4
6	CHL-512	Solid and Hazardous Waste Management	4
7	CHL-514	Pollution Control Systems	4
8	CHL-516	Kinetics of Polymerization	4
9	CHL-518	Waste to Energy Conversion	4
10	CHL-520	Oil and Gas Transport	4
11	CHL-522	Nanotechnology in Chemical Engineering	4
12	CHL-524	Microfluidics	4
13	CHL-526	Supercritical Fluids: Theory and Applications	4
14	CHL-528	Introduction to Granular Rheology	4
15	CHL-530	Drug Delivery	4
16	CHL-532	Colloids and Interfacial Science	4
17	CHL-534	Novel Separation Techniques	4
18	CHL-536	Design of Experiments and Parameter Estimation	4
19	CHL-538	Industrial Safety and Hazard Management	4
20	CHL-540	Multiphase Flow	4

5-B.Tech. (Computer Science & Engineering)
Component wise distribution

Main Curriculum Components	Sub Components	Approved Credits for B.Tech.	Approved Credits Range	Proposed Credits for B.Tech. by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		16	
	ESC	8-20		12	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
	CCCC	40-48		40	
Program Core Course	AI/ML	2	87-91	2	88
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4	
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	6-10		10	
	PEC	22-26		24	
	TEB	6-8		6	
	OEC	9-12		9-12	
	CORE	2		2	
	Total	150-160		152-155	
	MSC/DHC	18/20		18/20	
	Grand Total			170-175	

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code : 114 **B.Tech. (Computer Science & Engineering)**
Department : CSE **Computer Science & Engineering**

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year – wise)
1	23	17	40
2	23/24	23/24	46/48
3	24/25	20	44/45
4	16	6	22
Grand Total			152-155
Total with MSC/DHC	With addition 18-20 credits		170-175

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Program Code : 114 - B.Tech.(Computer Science & Engineering)
 Department : Department of Computer Science & Engineering
 Year : I

Teaching Scheme						Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)						
S. No.	Subject Code	Course Title	Subject Area	Credits	L			T		P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)																	
1	HSI-101	Soft Skills	HSSC	3	2	0	2	2	0	0	10-25	25	15-25	30-40	-		
2	MAI-101	Mathematics-I	BSC	4	3	1	0	3	0	0	20-35	-	20-30	40-50	-		
3	PHI-101	Physics-I	BSC	4	3	1	2/2	3	0	0	15-30	20	15-25	30-40	-		
4	CSC-101	Programming with C and C++	PCC	4	3	0	2	3	0	0	10-25	25	15-25	30-40	-		
5	TMI-101	Tinkering and Mentoring	TMI	4	-	-	-	-	-	-	70	30	-	-	-		
					2	0	0	2	-	0	50	-	-	50	-		
6	ECE-103	Digital Electronics	ESC	4	3	1	0	3	0	0	20-35	-	20-30	40-50	-		
(Spring)																	
1	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	0	0	20-35	-	20-30	40-50	-		
2	MAI-102	Mathematics-II	BSC	4	3	1	0	3	0	0	20-35	-	20-30	40-50	-		
3	ESS-102	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	0	20-35	-	20-30	40-50	-		
4	ECE-102	Introduction to Communication System	ESC	4	3	1	0	3	0	0	20-35	-	20-30	40-50	-		
5	CSC-102	Data Structures	PCC	4	3	0	2	3	0	0	10-25	25	15-25	30-40	-		

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Program Code : 114 - B.Tech.(Computer Science & Engineering)
 Department : Department of Computer Science & Engineering
 Year : II

Teaching Scheme						Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	HSSEC-I	HSS Elective Course	HSSEC	3											
2	OEC-I	Open Elective Course-I	OEC	3/4											
3	MSI-101	Fundamentals of Management	MC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
4	MAB-103	Numerical Methods	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
5	CSC-201	Computer Organization & Architecture	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
6	CSC-203	Design and Analysis of Algorithms	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
7	CST-I	Talent Enhancement Course-I	TEB	2	0	0	4	-	-	-	100	-	-	-	
		Total		23/24											
(Spring)															
1	OEC-II	Open Elective Course-II	OEC	3/4											
2	DAI-101	Data Science	DSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	CSC-202	Theory of Computation	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
4	CSC-204	Operating Systems	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
5	CSC-206	Software Engineering	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
6	CEE-106	Geospatial Techniques and Programming	ESC	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
		Total		23/24											

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Program Code : 114 - B.Tech. (Computer Science & Engineering)
Department : Department of Computer Science & Engineering
Year : III

Teaching Scheme			Contact Hours/Week		Exam Duration (Hrs.)		Relative Weights (%)							
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	HSSEC-II	HSS Elective Course	HSSEC	3										
2	OEC-III	Open Elective Course-III	OEC	3/4										
3	CSC-351	Fundamentals of AI/ML	PCC	2	2	0	0	2	0	20-35	-	20-30	40-50	-
4	CSC-301	Database Management Systems	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	CSC-303	Computer Networks	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6	CSC-305	Compiler Design	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7	CSC-399	Community Outreach	CORE	2								100		
8	CST-II	Talent Enhancement Course-II	TEB	2	0	0	4	-	-	-	100	-	-	-
		Total		24/25										
(Spring)														
1	CSC-300	Engineering Analysis and Design (LBP/IOP/DTP)	PCC	4	0	0	8	-	-	-	50	-	-	50
2	CSC-391	Technical Communication	PCC	2	0	0	4	-	-	-	50	-	-	50
3	CST-III	Talent Enhancement Course-III	TEB	2	0	0	4	-	-	-	100	-	-	-
4	CSL-I	Program Elective Course-I	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	CSL-II	Program Elective Course-II	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6	CSL-III	Program Elective Course-III	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7	MSC/DHC-I	Minor Specialization Course-I / Departmental Honours Course-I	MSC/DHC	3/4										
		Total		20/23-24										

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Program Code : 114 - B.Tech.(Computer Science & Engineering)
Department : Department of Computer Science & Engineering
Year : IV

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	EFE	PRE
(Autumn)														
1	CSP-400A/CSL	Project/Entrepreneurship/ Project-based Internship/PEC*	PCC/PEC*	4							100			
2	CSL-IV	Program Elective Course-IV	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	CSL-V	Program Elective Course-V	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	CSL-VI	Program Elective Course-VI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	MSC/DHC-II	Minor Specialization Course-II/ Departmental Honours Course-II	MSC/ DHC	3/4										
6	MSC/DHC-III	Minor Specialization Course-III/ Departmental Honours Course-III	MSC/ DHC	3/4										
		Total		16/22-24										
(Spring)														
1	CSP-400B/CSL	Project/Entrepreneurship/ Project-based Internship/PEC*	PCC/PEC*	6							100			
2	MSC/DHC – IV	Minor Specialization Course-IV/ Departmental Honours Course-IV	MSC/ DHC	3/4										
3	MSC/DHC - V	Minor Specialization Course-V/ Departmental Honours Course-V	MSC/ DHC	3/4										
		Total		6/12-14										

List of Program Elective Courses/ Departmental Honors 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.	CSL-371	Artificial Intelligence	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	CSL -372	Computer Graphics	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	CSL -373	Probability Theory for Computer Engineers	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	CSL -381	Information Retrieval	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	CSL-382	Machine Learning	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	CSL-374	Software Testing	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7.	CSL-5xx	Software-Defined Networking and Applications	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
8.	CSL-5xx	Computer Vision	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
9.	CSL-376	Parallel and Distributed Algorithms	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
10.	CSL-476	Software Project Management	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
11.	CSL-377	Bioinformatics	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
12.	CSL-380	Intrusion Detection Systems	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
13.	CSL-3xx	Quantum Computation	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14.	CSL-510	Network Programming	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
15.	CSL-511	Advanced Database Management Systems	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
16.	CSL-512	Formal Methods and Software Verification	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
17.	CSL-513	Information and Network Security	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
18.	CSL-514	Advanced Automata Theory	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
19.	CSL-515	Data Mining and Warehousing	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
20.	CSL-4xx	Modelling and Simulation	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
21.	CSL-517	Advanced Topics in Software Engineering	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
22.	CSL-518	Logic and Automated Reasoning	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

23.	CSL-519	Social Network Analysis	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
24.	CSL-520	Cloud Computing	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
25.	CSL-521	Mobile and Pervasive Computing	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
26.	CSL-3xx	Advanced Graph Theory	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
27.	CSL-523	Computational Geometry	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
28.	CSL-524	Algorithms and Foundations of Chip Design	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
29.	CSL-526	Machine Learning	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
30.	CSL-527	Internet of Things	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
31.	CSL-3xx	Design and Verification of Graphics Processing Units	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
32.	CSL-530	Design and Analysis of Symmetric Cryptosystems	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
33.	CSL-531	Dynamic Graph Algorithms	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
34.	CSL-532	Data Stream Mining	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

List of Talent Enhancement Basket Courses

Teaching Scheme			Contact Hours/Week					Exam Duration		Relative Weight (%)				
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	MTE	ETE	PRE
TEB-A (Systems)														
1	CST-101	Cyber Physical Systems	TEB	2	0	0	4	-	-	-	100	-	-	-
2	CST-102	Linux Programming	TEB	2	0	0	4	-	-	-	100	-	-	-
3	CST-103	System Programming	TEB	2	0	0	4	-	-	-	100	-	-	-
TEB-B (Intelligent Computing)														
1	CST-104	Applications of ML	TEB	2	0	0	4	-	-	-	100	-	-	-
2	CST-105	Applications of DL	TEB	2	0	0	4	-	-	-	100	-	-	-
3	CST-106	Applications of NLP	TEB	2	0	0	4	-	-	-	100	-	-	-
TEB-C (Cyber Security)														
1	CST-107	Cryptography	TEB	2	0	0	4	-	-	-	100	-	-	-
2	CST-108	Secure Socket Programming	TEB	2	0	0	4	-	-	-	100	-	-	-
3	CST-109	Cloud Security	TEB	2	0	0	4	-	-	-	100	-	-	-

Minor Specialization Courses

S.No.	Code	Course title	Semester	Credits
1	CSC-102	Data Structures	Spring	4
2	CSC-201	Computer Organization & Architecture	Autumn	4
3	CSC-202	Theory of Computation	Spring	4
4	CSC-203	Design and Analysis of Algorithms	Autumn	4
5	CSC-204	Operating Systems	Spring	4
6	CSC-303	Computer Networks	Autumn	4
7	CSC-301	Database Management Systems	Autumn	4
8	CSC-206	Software Engineering	Spring	4

6-B. TECH. (ELECTRICAL ENGINEERING)
COMPONENT WISE DISTRIBUTION

Main Curriculum Components	Sub Components	Approved Credits for B. Tech.	Approved Credits Range	Proposed Credits for B. Tech. by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		16	
	ESC	8-20		12	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
	CCCC	40-48		40	
Program Core Course	AI/ML	2	87-91	2	88
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4	
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	6-10		8	
	PEC	22-26		24	
	TEB	6-8		8	
	OEC	9-12		9-12	
	CORE	2		2	
	Total	150-160		152-155	
	MSC/DHC	18/20		18/20	
	Grand Total			170/175	

**DEPARTMENT OF ELECTRICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code : 115 **B. Tech. (Electrical Engineering)**
Department : EE **Electrical Engineering**

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year – wise)
1	23	20	43
2	21/22	24/25	45/47
3	22/23	18	40/41
4	16	08	24
Grand Total			152/155
Total with MSC/DHC	With addition 18-20 credits		170/175

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF ELECTRICAL ENGINEERING

Program Code : 115 **B. Tech. (Electrical Engineering)**
Department : EE **Department of Electrical Engineering**
Year : I

Teaching Scheme/																
S. No.	Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)						
					L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE		
(Autumn)																
1	HSI-101	Soft Skills	HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-	-	-
2	MAI-101	Mathematics-I	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	-	-
3	PHI-101	Physics-I	BSC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-	-	-
4	EEC-101	Programming with C++	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-	-	-
5	TMI-101	Tinkering and Mentoring	TMI	4	T-2	-	-	-	-	70	30	-	-	-	-	-
					M-2	2	0	0	2	-	50	-	-	50	-	-
6	ECE-101	Fundamentals of Electronics	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	-	-
		Total		23												
(Spring)																
1	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	0	20-35	-	20-30	40-50	-	-	-
2	MAI-102	Mathematics-II	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	-	-
3	ESS-102	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	-	-
4	ECE-103	Digital Electronics	ESC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-	-	-
5	EEC-102	Basic Electrical Science	PCC	3	2	1	0	3	0	20-35	-	20-30	40-50	-	-	-
6	EEC-104	Signals and Systems	PCC	4	3	1	0	3	-	20-35	-	20-30	40-50	-	-	-
		Total		20												

DEPARTMENT OF ELECTRICAL ENGINEERING

Program Code : 115 **B. Tech. (Electrical Engineering)**
Department : EE **Department of Electrical Engineering**
Year : II

Teaching Scheme						Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	MSI-101	Fundamentals of Management	MC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
2	MAB-103	Numerical Methods	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	CSE-101	Data Structures and Algorithms	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
4	EEC-201	Network Theory	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
5	HSSEC-I	HSS Elective Course	HSSEC	3											
6	OEC-I	Open Elective Course-I	OEC	3/4											
		Total		21/22											
(Spring)															
1	DAI-101	Data Science	DSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
2	EEC-202	Electrical & Electronic Measurements	PCC	4	3	0	2	3	2	10-25	25	15-25	30-40	-	
3	EEC-204	Control Systems	PCC	5	3	1	2	3	0	10-25	25	15-25	30-40	-	
4	EEC-206	Electrical Machines	PCC	4	3	1	2	3	3	10-25	25	15-25	30-40	-	
5	EEC-208	Power Systems-I	PCC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-	
6	OEC-II	Open Elective Course-II	OEC	3/4											
		Total		24/25											

DEPARTMENT OF ELECTRICAL ENGINEERING

Program Code : 115 B. Tech. (Electrical Engineering)
 Department : EE Department of Electrical Engineering
 Year : III

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	EEC-351	Fundamentals of AI/ML	PCC	2	2	0	0	2	0	20-35	-	20-30	40-50	-
2	EEC-301	Power Systems-II	PCC	4	3	0	2			10-25	25	15-25	30-40	-
3	EEC-303	Power Electronics	PCC	4	3	1	2/2	3	2	15-30	20	15-25	30-40	-
4	EEC-399	Community Outreach	CORE	2						100				
5	EET-I	Talent Enhancement Course-I	TEB	4	0	0	8	-	-	-	50	-	-	50
6	HSSEC-II	HSS Elective Course-II	HSSEC	3										
7	OEC-III	Open Elective Course-III	OEC	3/4										
		Total		22/23										
(Spring)														
1	EEL-I	Program Elective Course - I	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2	EEL-II	Program Elective Course - II	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	EEC-300	Engineering Analysis and Design	PCC	4	2	0	2	2	0	10-25	25	15-25	30-40	-
5	EEC-391	Technical Communication	PCC	2	0	0	4	0	0	-	-	-	100	-
6	EET-II	Talent Enhancement Course-II	TEB	4	0	0	8	-	-	-	50	-	-	50
7	MSC/DHC - I	Minor Specialization Course - I / Departmental Honours Course - I	MSC/DHC	3/4										
		Total		18										
				/21-22										

DEPARTMENT OF ELECTRICAL ENGINEERING

Program Code : 115 B. Tech. (Electrical Engineering)
 Department : EE Department of Electrical Engineering
 Year : IV

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	EEL-III	Program Elective Course -III	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2	EEL-IV	Program Elective Course -IV	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	EEL-V	Program Elective Course -V	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	EEL-VI	Program Elective Course -VI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	MSC/DHC-II	Minor Specialization Course -II /Departmental Honours Course - II	MSC/ DHC	3/4										
6	MSC/DHC-III	Minor Specialization Course -III /Departmental Honours Course - III	MSC/ DHC	3/4										
		Total		16/22-24										
(Spring)														
1	EEP-400/EEL	BTP/Project/Internship/Entrepreneurship/ PEC*	PCC/PEC*	8									100	
4	MSC/DHC-IV	Minor Specialization Course -IV /Departmental Honours Course – IV	MSC/ DHC	3/4										
5	MSC/DHC-V	Minor Specialization Course - IV/Departmental Honours Course - IV	MSC/ DHC	3/4										
		Total		08/14-16										

ELECTRICAL ENGINEERING DEPARTMENT
PEC List Undergraduate Program

General Elective List

Teaching Scheme					Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub Code	Course Title	Sub. Area	Credits	L	T	P	Th	Pr	CWS	PRS	MTE	ETE	PRE
1.	EEL-351	Artificial Neural Networks	PEC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
2.	EEL-352	Digital Image Processing	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	EEL-353	Digital Design with VHDL	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
4.	EEL-354	Digital Control Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	EEL-355	Digital Signal Processing	PEC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
6.	EEL-357	Advanced Microprocessors and Interfacing	PEC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
7.	EEL-358	Data Structures	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
8.	EEL-359	Single Chip Microcontroller and Its Applications	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
9.	EEL-360	Embedded Systems	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
10.	EEL-365	Digital Signal Processors	PEC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
11.	EEL-361	Optimization Techniques	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
12.	EEL-363	Fuzzy Logic Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
13.	EEL-364	Utilization and Traction	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14.	EEL-365	Numerical Methods for Electrical Engineering	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
15.	EEL-366	Computational Electromagnetics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
16.	EEL-XXX	Cyber Security Aspects in Power Systems	PEC											
17.	EEL-XXX	AI Application in Modern Power Systems	PEC											
18.	EEL-XXX	Dynamic Estimation and Control of Modern Power System	PEC											

Program Elective List (PEC) suggested by different Group

1. Power Electronics and Electric Drives (EDPE)

S.No.	Code	Title	Area	Cr	L	T	P	TH	PH	CWS	PRS	MTE	ETE	PRE
1.	EEL-540	Advanced Power Electronics	PEC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
2.	EEL-542	Advanced Electric Drives	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
3.	EEL-543	FACTS Devices	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	EEL-641	Microcontroller and Its Applications to Power Converters	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
5.	EEL-642	DSP Controlled Electric Drives	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
6.	EEL-643	Electric Drives for Hybrid Vehicles	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7.	EEL-647	Control Techniques in Power Electronics for AC Drives	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
8.	EEL-648	Pulse Width Modulation for Power Converters	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
9.	EEL-649	Enhanced Power Quality AC-DC Converters	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
10.	EEL-650	Switch Mode Power Supply	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
11.	EEL-651	Power Quality Improvement Techniques	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
12.	EEL-690	Advanced Computer Controlled Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
13.	EEL-541	Analysis of Electrical Machines	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
14	EEL-542	Advanced Electric Drives	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
15	EEL-643	Electric Drives for Hybrid Vehicles	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
16	EEL-644	Design of Electric Drives	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
17	EEL-645	Instrumentation in Electric Drives	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
18	EEL-646	Drive System in Electric Traction	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
19	EEL-652	CAD of Power Apparatus	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
20	EEL-653	Selected Topics in Machines and Transformers	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
21	EEL-654	Synchronous Machines and System Stability	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
22	EEL-655	Special Machines	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
23	EEL-656	Testing and Commissioning of Electrical Equipment	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
24	EEL-501	Electric Vehicles: Power Train & Drives	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
25	EEL-503	Energy Storage Techniques	PEC	4	3	0	0	3	-	20-35	-	20-30	40-50	-
26	EEL-505	Charging Infrastructure	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
27	EEL-509	Automobile Engineering for Electric Vehicles	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-

28	EEL-673	Design of WBG Device based Power Converters	PEC	4	3	0	2/2	3	0	15-30	20	15-25	30-40	-
29	EEL-302	Electric Drives	PEC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
30	EEL-634	High Power Converters for EV	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
31	EEL-635	Digital Implementation for Power Electronics Systems	PEC	4	3	0	2/2	3	0	15-30	20	15-25	30-40	-

2. Power System Engineering (PSE)

S.No.	Code	Title	Area	Cr	L	T	P	TH	PH	CWS	PRS	MTE	ETE	PRE
1.	EEL-543	FACTS Devices	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	EEL-560	Computer Aided Power System Analysis	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
3.	EEL-561	Power System Operation and Control	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	EEL-562	Distribution System Analysis and Operation	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	EEL-563	EHV AC Transmission Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	EEL-564	HVDC Transmission Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7.	EEL-651	Power Quality Improvement Techniques	PEC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
8.	EEL-660	High Voltage Technique	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
9.	EEL-661	Power System Planning	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
10.	EEL-663	Flexible AC Transmission Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
11.	EEL-664	Wind Energy	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
12.	EEL-665	Relaying and Switchgear	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
13.	EEL-666	Distribution System Automation	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14.	EEL-667	Power System Reliability	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
15.	EEL-668	Digital Protection of Power Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
16.	EEL-669	Power System Dynamics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
17.	EEL-670	Substation Automation	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
18.	EEL-671	Power System Deregulation	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
19.	EEL-681	Wide Area System Monitoring Control	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
20.	EEL-612	Electrical Transients in Power System	PEC	4	3	0	2	3	2	10-25	25	15-25	30-40	-
21	EEL-672	Smart Grid Technology	PEC	4	3	0	2	3	2	10-25	25	15-25	30-40	-
22	EEL-XXX	Engineering Optimization Methods	PEC	4	3	0	2	3	2	10-25	25	15-25	30-40	-
23	EEL-695	Modelling and Control of Sustainable Energy System	PEC	4	3	0	2	3	2	10-25	25	15-25	30-40	-
24	EEL-XXX	Micro-grid Analysis, Control, and Protection	To be approved.											

3. Systems and Control (S & C):

S.No.	Code	Title	Area	Cr	L	T	P	TH	PH	CWS	PRS	MTE	ETE	PRE
1.	EEL-580	Advanced Linear Control Systems	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
2.	EEL-581	Intelligent Control Techniques	PEC	4	3	0	2	3		10-25	25	15-25	30-40	
3.	EEL-582	Advanced System Engineering	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
4.	EEL-585	Non Linear Systems and Control	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
5.	EEL-680	Machine Learning	PEC	4	3	1	0	3	-	20-35	-	20-35	40-50	-
6.	EEL-681	Wide Area System Monitoring Control	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
7.	EEL-682	Advanced Digital System Design	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
8.	EEL-683	Introduction to Robotics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
9.	EEL-684	System Reliability	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
10.	EEL-685	Stochastic Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
11.	EEL-686	Optimal Control	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
12.	EEL-687	Operation Research	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
13.	EEL-688	Interval Control Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
14.	EEL-689	Modeling and Simulation	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
15.	EEL-690	Advanced Computer Controlled Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
16.	EEL-692	Graph Theory and Applications	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
17.	EEL-657	Digital Control of Power Converters	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
18.	EEL-659	Control and Management of Smart Grid	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
19.	EEL-672	Smart Grid Technology	PEC	4	3	0	2	3	2	10-25	25	15-25	30-40	-
20	EEL-584	Mathematics for Systems and Control	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
21	EEL-615	Robust Control	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
22	EEL-694	Advances in Model Order Reduction Techniques	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
23	EEL-696	Intelligent Control of Robotic Systems	PEC	4	3	0	2/2	3	-	15-30	20	15-25	30-40	-
24	EEL-697	Dynamics and Control of Autonomous Vehicles	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
25	EEL-698	Advances in Sampled-Data Systems	PEC	4	3	1	0	3	-	20-35	0	20-30	40-50	-
26	EEL-507	Control Systems for Electric Vehicle	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
27	EEL-613	Sliding Mode Control and Observation	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-

28	EEL-611	FPGA Implementation of Signal Processing	PEC	4	3	1	0	3	-	20-35	-	20-30	40—50	-
29	EEL-521	Digital Signal and Image Processing	PEC	4	3	0	2	3	-	10-25	-	15-25	30-40	-
30	EEL-620	Process Instrumentation and Control	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
31	EEL-624	Telemetry and SCADA	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
32	EEL-612	Electrical Transients in Power Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
33	EEL-667	Power system Reliability	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
34	EEL-669	Power System Dynamics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
35	EEL-561	Power System Operation and Control	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-

4. Instrumentation and Signal Processing

Sl. No.	Code	Subject	Area	Cr	L	T	P	TH	PH	CWS	PRS	MTE	ETE	PRE
1	EEL-XXX	Sensors and Instrumentation	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
2	EEL-XXX	Biomedical Instrumentation	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
3	EEL-XXX	Measurement Errors and Statistical Analysis	PEC	4	3	1	0	3	-	20-35	0	20-30	40-50	-
4	EEL-XXX	Noise and Interference in Instrumentation	PEC	4	3	1	0	3	-	20-35	0	20-30	40-50	-
5	EEL-XXX	Ultrasonic and Laser Instrumentation	PEC	4	3	1	0	3	-	20-35	0	20-30	40-50	-
6	EEL-XXX	Power System Instrumentation	PEC	4	3	1	0	3	-	20-35	0	20-30	40-50	-
7	EEL-XXX	Process Instrumentation and Control	PEC	4	3	1	0	3	-	20-35	0	20-30	40-50	-
8	EEL-XXX	Bioelectric Signals and Processing	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
9	EEL-XXX	Medical Imaging	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
10	EEL-XXX	Computer Applications in Medical Engineering	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
11	EEL-XXX	FPGA Implementation of Signal Processing Systems	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
12	EEL-XXX	Introduction to Robotics	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
13	EEL-XXX	Biomedical Robotics	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
14	EEL-XXX	Machine Learning for Signal Processing	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
15	EEL-XXX	Intelligent Sensors and Instrumentation	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
16	EEL-XXX	Advanced Industrial and Electronic	PEC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
17	EEL-XXX	Telemetry and SCADA	PEC	4	3	1	0	3	-	20-35	0	20-30	40-50	-

List of Talent Enhancement Course

Teaching Scheme				Contact Hours/Week				Exam Duration		Relative Weight (%)						
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	M	T	E	ETE	PRE
TEB-A																
1.	EET-101	Microprocessor and Applications-I	TEB	4	0	0	8	-	-	-	50	-	-	-	-	50
2.	EET-102	Microcontroller and Applications-II	TEB	4	0	0	8	-	-	-	50	-	-	-	-	50
TEB-B																
1	EET-103	Design of Electronic Circuits	TEB	4	0	0	8	-	-	-	50	-	-	-	-	50
2.	EET-104	PCB Design and Fabrications	TEB	4	0	0	8	-	-	-	50	-	-	-	-	50
TEB-C																
1	EET-105	Special Experiment on Machines	TEB	4	0	0	8	-	-	-	50	-	-	-	-	50
2.	EET-106	Special Experiment on Power Electronics and Devices	TEB	4	0	0	8	-	-	-	50	-	-	-	-	50
TEB-D																
1	EET-107	Prototyping and Design of Power Converters	TEB	4	0	0	8	-	-	-	50	-	-	-	-	50
2.	EET-108	Development of BMS	TEB	4	0	0	8	-	-	-	50	-	-	-	-	50
TEB-E																
1	EET-109	Power and Energy Management-I	TEB	4	0	0	8	-	-	-	50	-	-	-	-	50
2.	EET-110	Power and Energy Management-II	TEB	4	0	0	8	-	-	-	50	-	-	-	-	50
TEB-F																
1	EET-111	Substation automation-I	TEB	4	0	0	8	-	-	-	50	-	-	-	-	50
2.	EET-112	Substation automation-II	TEB	4	0	0	8	-	-	-	50	-	-	-	-	50

TEB-G											
1	EET-113	Distribution System SCADA-I	TEB	4	0	0	0	8	-	-	50
2.	EET-114	Distribution System SCADA-II	TEB	4	0	0	0	8	-	-	50
TEB-H											
1	EET-115	Numerical Modeling of Power Apparatus-I	TEB	4	0	0	0	8	-	-	50
2.	EET-116	Numerical Modeling of Power Apparatus-II	TEB	4	0	0	0	8	-	-	50
TEB-I											
1	EET-117	Solar Energy System for EV Application-I	TEB	4	0	0	0	8	-	-	50
2.	EET-118	Solar Energy System for EV Application-II	TEB	4	0	0	0	8	-	-	50
TEB-J											
1	EET-119	Dynamic Estimation and Control of Power System-I	TEB	4	0	0	0	8	-	-	50
2.	EET-120	Dynamic Estimation and Control of Power System-II	TEB	4	0	0	0	8	-	-	50
TEB-K											
1	EET-121	Digital Design for Industrial Applications-I	TEB	4	0	0	0	8	-	-	50
2.	EET-122	Digital Design for Industrial Applications-II	TEB	4	0	0	0	8	-	-	50
TEB-L											
1	EET-123	Industrial Controller Design-I	TEB	4	0	0	0	8	-	-	50
2.	EET-124	Industrial Controller Design-II	TEB	4	0	0	0	8	-	-	50

TEB-M												
1	EET-125	Introduction to Robotic Operating System	TEB	4	0	0	8	-	-	-	50	50
2.	EET-126	Introduction to Robot Design	TEB	4	0	0	8	-	-	-	50	50
TEB-N												
1	EET-127	SCADA and Application-I	TEB	4	0	0	8	-	-	-	50	50
2.	EET-128	SCADA and Application-II	TEB	4	0	0	8	-	-	-	50	50
TEB-O												
1	EET-129	Instrumentation Laboratory-I	TEB	4	0	0	8	-	-	-	50	50
2.	EET-130	Instrumentation Laboratory-II	TEB	4	0	0	8	-	-	-	50	50
TEB-P												
1	EET-131	Medical Signal Monitoring	TEB	4	0	0	8	-	-	-	50	50
2.	EET-132	Medical Signal Analysis	TEB	4	0	0	8	-	-	-	50	50

Minor Specializations Courses (18-20 credits)

S.No.	Subject Code	Course Title	Semester		Credits
			Autumn	Spring	
1	EEC-202	Electrical and Electronic Measurement		•	4
2	EEC-208	Power System-I		•	4
3	EEC-204	Control Systems		•	5
4	EEC-206	Electrical Machines		•	4
5	EEC-303	Power Electronics	•		4
6	EEC-201	Network Theory	•		4
7	EEC-104	Signals and Systems		•	4

Departmental Honours Courses (18-20 credits)

S.No.	Code	Title	Credits
1.	EEL-540	Advanced Power Electronics	4
2.	EEL-650	Switch Mode Power Supply	4
3.	EEL-541	Analysis of Electrical Machines	4
4.	EEL-655	Special Machines	4
5	EEL-561	Power System Operation and Control	4
6.	EEL-564	HVDC Transmission Systems	4
7.	EEL-668	Digital Protection of Power Systems	4
8.	EEL-612	Electrical Transients in Power System	4
9.	EEL-580	Advanced Linear Control Systems	4
10.	EEL-585	Non-Linear Systems and Control	4
11.	EEL-686	Optimal Control	4
12.	EEL-694	Advances in Model Order Reduction Techniques	4
13	EEL-XXX	Biomedical Instrumentation	4

14	EEL-XXX	Digital Signal and Image Processing	4
15	EEL-XXX	Advanced Industrial and Electronic Instrumentation	4
16	EEL-XXX	Telemetry and SCADA	4

7-B.TECH. (ELECTRONICS & COMMUNICATION ENGINEERING)
COMPONENT WISE DISTRIBUTION

Main Curriculum Components	Sub Components	Approved Credits for B.Tech.	Approved Credits Range	Proposed Credits for B.Tech. by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		20	
	ESC	8-20		8	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
	CCCC	40-48		45	
	AI/ML	2		2	
Program Core Course	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4	87-91	4	91
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	6-10		10	
	PEC	22-26		22	
	TEB	6-8		6	
	OEC	9-12		9-12	
	CORE	2		2	
	Total	150-160		155-158	
	MSC/DHC	18/20		18/20	
	Grand Total			173/178	

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code : 116 **B.Tech. (Electronics & Communication Engineering)**
Department : ECE **Electronics & Communication Engineering**

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year – wise)
1	23	21	44
2	23/24	23/24	46/48
3	21/22	18/22	39/44
4	12/20	14/22	26/42
Grand Total			155/178
Total with MSC/DHC	With addition 18-20 credits		173/198

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Program Code : 116 - B.Tech. (Electronics and Communication Engineering)
Department : Department of Electronics and Communication Engineering
Year : I

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	HSI-101	Soft Skills	HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-
2	MAI-101	Mathematics-I	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	PHI-101	Physics-I	BSC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
4	ECC-101	Introduction to Programming	PCC	4	3	0	2/2	3	0	15-30	20	15-25	30-40	-
5	TMI-101	Tinkering and Mentoring	TMI	T-2	-	-	-	-	-	70	30	-	-	-
				M-2	2	0	0	2	-	50	-	-	50	-
6	CSE-101	Data Structures and Algorithms	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
		Total		23										
(Spring)														
1	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	0	20-35	-	20-30	40-50	-
2	MAI-102	Mathematics-II	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	ESS-102	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4	ECC-102	Semiconductor Devices and Applications	PCC	4	3	0	2/2	3	0	15-30	20	15-25	30-40	-
5	ECC-104	Digital Logic and Systems	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6	ECC-106	Signals and Systems	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
		Total		21										

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Program Code : 116 - B.Tech.(Electronics and Communication Engineering)
 Department : Department of Electronics and Communication Engineering
 Year : II

Teaching Scheme			Credits	Subject Area	Course Title	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code					L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)															
1	MSI-101	Fundamentals of Management	MC	3	0	0	3	0	0	20-35	-	20-30	40-50	-	
2	MAB-103	Numerical Methods	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	ECC-201	Fundamentals of Communication System	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
4	ECC-203	Electromagnetics and Radiating Systems	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
5	ECC-205	Network Theory	PCC	2	2	0	0	2	0	20-35	-	20-30	40-50	-	
6	HSSEC-I	HSS Elective Course-I	HSSEC	3											
7	OEC-I	Open Elective Course-I	OEC	3/4											
		Total		23/24											
(Spring)															
1	DAI-101	Data Science	DSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
2	PHB-102	Quantum and Statistical Mechanics	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	EEE-101	Control System Engineering	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
4	ECT-I	Talent Enhancement Course-I	TEB	2	0	0	4	-	-	-	50	-	-	50	
5	ECC-202	Digital Communications	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
6	ECC-204	Analog Circuits	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
7	OEC-II	Open Elective Course-II	OEC	3/4											
		Total		23/24											

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Program Code : 116 - B.Tech.(Electronics and Communication Engineering)

Department : Department of Electronics and Communication Engineering

Year : III

Teaching Scheme				Subject Area	Credits	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)							
S. No.	Subject Code	Course Title	L			T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE				
(Autumn)																		
1	ECC-351	Fundamentals of AI/ML	PCC	2	2	0	0	2	0	20-35	-	20-30	40-50	-				
2	ECC-301	Digital Signal Processing	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-				
3	ECC-303	Microwave Engineering	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-				
4	ECC-305	Digital Electronics and Linear IC Lab	PCC	2	0	0	3	-	-	-	50	-	-	50				
5	ECC-399	Community Outreach	CORE	2	0	0	3	-	-	100								
6	ECT-II	Talent Enhancement Course-II	TEB	2	0	0	4	-	-	-	50	-	-	50				
7	HSSEC-II	HSS Elective Course-II	HSSEC	3														
8	OEC-III	Open Elective Course-III	OEC	3/4														
		Total		21/22														
(Spring)																		
1	ECL-I	Program Elective Course - I	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-				
2	ECL-II	Program Elective Course - II	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-				
3	ECC-300	Lab Based Project/Industry oriented problem solving	PCC	4	0	1	6	-	-	-	50	-	-	50				
4	ECC-302	Microwave Laboratory	PCC	2	0	0	4	-	-	-	50	-	-	50				
5	ECC-304	Communication Systems Lab	PCC	2	0	0	4	-	-	-	50	-	-	50				
6	ECC-306	Technical Communication	PCC	2	0	2	0				100							
7	ECT-III	Talent Enhancement Course-III	TEB	2	0	0	4	-	-	-	50	-	-	50				
8	MSC/DHC - I	Minor Specialization Course - I / Departmental Honours Course - I	MSC/DHC	3/4														
		Total		18/21-22														

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Program Code : 116 - B.Tech.(Electronics and Communication Engineering)
Department : Department of Electronics and Communication Engineering
Year : IV

Teaching Scheme															
S. No.	Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)					
					L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	ECP-400A/ ECL	BTP/Project/Internship/Entrepreneurship/PEC *	PCC/PEC*	4								100			
2	ECL-III	Program Elective Course -III	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	ECL-IV	Program Elective Course -IV	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
4	MSC/DHC-II	Minor Specialization Course -II /Departmental Honours Course - II	MSC/ DHC	3/4											
5	MSC/DHC-III	Minor Specialization Course -III /Departmental Honours Course - III	MSC/ DHC	3/4											
		Total		12/18-20											
(Spring)															
1	ECP-400B/ECL	BTP/Project/Internship/Entrepreneurship/PEC *	PCC/PEC*	6								100			
2	ECL-V	Program Elective Course -V	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	ECL-VI	Program Elective Course -VI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
4	MSC/DHC-IV	Minor Specialization Course -IV /Departmental Honours Course – IV	MSC/ DHC	3/4											
5	MSC/DHC-V	Minor Specialization Course - IV/Departmental Honours Course - IV	MSC/ DHC	3/4											
		Total		14/20-22											

List of Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
1.	ECL-343	Fundamentals of Microelectronics	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
2.	ECL-360	Introduction to Information and Communication Theory	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
3.	ECL-347	Introduction to Microwave Semiconductor Device Modelling Techniques	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4.	ECL-316	Digital Image processing	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
5.	ECL-357	Electronics Subsystems	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
6.	ECL-358	Machine Learning in Semiconductor Manufacturing	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
7.	ECL-514	Detection and Estimation Theory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
8.	ECL-614	Adaptive Signal Processing Techniques	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
9.	ECL-618	Wireless Technologies: 5G and Beyond	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
10.	ECL-619	Introduction to Compressed Sensing	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
11.	ECL-620	Advanced Wireless Communication	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
12.	ECL-577	VLSI Technology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
13.	ECL-584	Mixed Signal Circuits	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14.	ECL-587	Nanoscale Devices	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
15.	ECL-591	VLSI Physical Design	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
16.	ECL-561	Compact Modelling of Semiconductor Devices	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
17.	ECL-526	Statistical Machine Learning for Variation-Aware Electronic Device and Circuit Simulation	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
18.	ECL-635	Magnetic Random Access Memory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
19.	ECL-550	Radar Signal Processing	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
20.	ECL-631	RF Receiver Design	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
21.	ECL-515	Information and Coding Theory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
22.	ECL-519	Wireless Communication Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

23.	ECL-525	Hardware Architecture for deep-learning	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
24.	ECL-573	Digital VLSI Circuit Design	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
25.	ECL-579	Foundations of Semiconductor Device Physics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
26.	ECL-581	Analog VLSI Circuit Design	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
27.	ECL-542	Microwave Integrated Circuits	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
28.	ECL-544	Advanced Radar Engineering	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

List of Talent Enhancement Course

Teaching Scheme			Contact Hours/Week				Exam Duration		Relative Weight (%)					
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	MTE	ETE	PRE
RFM-1 (TEB-A)														
1	ECT-101	RF Simulation Techniques	TEB	2	0	0	4	-	-	-	50	-	-	50
2	ECT-102	Design of Passive Microwave Components	TEB	2	0	0	4	-	-	-	50	-	-	50
3	ECT-103	Microwave Measurement Techniques	TEB	2	0	0	4	-	-	-	50	-	-	50
CNSP-1 (TEB-B)														
1	ECT-104	Communication Networks	TEB	2	0	0	4	-	-	-	50	-	-	50
2	ECT-105	Optical Communication Technologies	TEB	2	0	0	4	-	-	-	50	-	-	50
3	ECT-106	Software Defined Radios	TEB	2	0	0	4	-	-	-	50	-	-	50
CNSP-2 (TEB-C)														
1	ECT-107	Introduction to Bio-Signal and Image Analysis	TEB	2	0	0	4	-	-	-	50	-	-	50
2	ECT-108	Principles and Techniques of FMCW Radar Systems	TEB	2	0	0	4	-	-	-	50	-	-	50
3	ECT-109	Advanced DSP	TEB	2	0	0	4	-	-	-	50	-	-	50
MVLSI-1 (TEB-D)														
1	ECT-110	Digital System Design Using High Level Language	TEB	2	0	0	4	-	-	-	50	-	-	50
2	ECT-111	VLSI Circuit Design	TEB	2	0	0	4	-	-	-	50	-	-	50
3	ECT-112	Physical Design	TEB	2	0	0	4	-	-	-	50	-	-	50
MVLSI-2 (TEB-E)														
1	ECT-113	Analog Circuit Design	TEB	2	0	0	4	-	-	-	50	-	-	50
2	ECT-114	Mixed Signal System Design	TEB	2	0	0	4	-	-	-	50	-	-	50
3	ECT-115	Measurement Techniques	TEB	2	0	0	4	-	-	-	50	-	-	50

MVLSI-3 (TEB-F)													
1	ECT-116	Fabrication Techniques	TEB	2	0	0	4	-	-	-	50	-	50
2	ECT-117	Semiconductor Characterization	TEB	2	0	0	4	-	-	-	50	-	50
3	ECT-118	Device Modeling	TEB	2	0	0	4	-	-	-	50	-	50
MVLSI-4 (TEB-G)													
1	ECT-119	Microprocessor and Computer Architecture	TEB	2	0	0	4	-	-	-	50	-	50
2	ECT-120	VLSI DSP	TEB	2	0	0	4	-	-	-	50	-	50
3	ECT-121	Embedded Systems	TEB	2	0	0	4	-	-	-	50	-	50
MVLSI-5 (TEB-H)													
1	ECT-122	Emerging Materials and Devices	TEB	2	0	0	4	-	-	-	50	-	50
2	ECT-123	Memories	TEB	2	0	0	4	-	-	-	50	-	50
3	ECT-124	Emerging Computing Techniques	TEB	2	0	0	4	-	-	-	50	-	50

Minor Specializations Courses (20 credits)

S.No.	Code	Course title	Semester	Credits
1	ECC-102	Semiconductor Devices and Applications	Spring	4
2	ECC-104	Digital Logic and Systems	Spring	4
3	ECC-106	Signals and Systems	Autumn	4
4	ECC-201	Fundamentals of Communication System	Autumn	4
5	ECC-203	Electromagnetics and Radiating Systems	Spring	4
6	ECC-202	Digital Communications	Spring	3
7	ECC-204	Analog Circuits	Autumn	3
8	ECC-303	Microwave Engineering	Autumn	4
9	ECC-301	Digital Signal Processing	Autumn	3

Departmental Honours Courses (20 credits)

S.No.	Code	Course title	Semester	Credits
1	ECL-614	Adaptive Signal Processing Techniques	Spring	4
2	ECL-618	Wireless Technologies: 5G and Beyond	Spring	4
3	ECL-620	Advanced Wireless Communication	Autumn	4
4	ECL-577	VLSI Technology	Autumn	4
5	ECL-584	Mixed Signal Circuits	Spring	4
6	ECL-573	Digital VLSI Circuit Design	Spring	4
7	ECL-542	Microwave Integrated Circuits	Autumn	4
8	ECL-544	Advanced Radar Engineering	Autumn	4
9	ECL-631	RF Receiver Design	Autumn	4

**8-B.TECH. (ENGINEERING PHYSICS)
COMPONENT WISE DISTRIBUTION**

Main Curriculum Components	Sub Components	Approved Credits for B.Tech.	Approved Credits Range	Proposed Credits for B.Tech. by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		16	
	ESC	8-20		12	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
	CCCC	40-48		48	
Program Core Course	AI/ML	2	87-91	2	90
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4	
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	6-10		6	
	PEC	22-26		22	
	TEB	6-8		6	
	OEC	9-12		9-12	
	CORE	2		2	
	Total	150-160		154-157	
	MSC/DHC	18/20		18/20	
	Grand Total			172-177	

DEPARTMENT OF PHYSICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code : 122 **B.Tech. (Engineering Physics)**
Department : PH **Physics**

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year – wise)
1	23	20	43
2	21/22	22/23	43/45
3	24/25	22	46/47
4	16	6	22
Grand Total			154-157
Total with MSC/DHC	With addition 18-20 credits		172-177

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF PHYSICS

Program Code : 122 - B.Tech.(Engineering Physics)
Department : Department of Physics
Year : I

Teaching Scheme			Credits	Subject Area	Course Title	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)				
S. No.	Subject Code	L				T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	HSI-101	Soft Skills	HSSC	3	2	0	2	2	0	0	10-25	25	15-25	30-40	-
2	MAI-101	Mathematics-I	BSC	4	3	1	0	3	0	0	20-35	-	20-30	40-50	-
3	PHI-101	Physics-I	BSC	4	3	1	2/2	3	0	0	15-30	20	15-25	30-40	-
4	PHC-101	Computer Programming	PCC	4	3	0	2	3	-	0	10-25	25	15-25	30-40	-
5	TMI-101	Tinkering and Mentoring	TMI	4	T-2	-	-	-	-	0	70	30	-	-	-
			M-2	2	0	0	0	2	-	0	50	-	-	50	-
6	EEE-102	Basic Electrical Engineering	ESC	4	3	1	2/2	3	0	0	15-30	20	15-25	30-40	-
		Total		23											
(Spring)															
1	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	0	0	20-35	-	20-30	40-50	-
2	MAI-102	Mathematics-II	BSC	4	3	1	0	3	0	0	20-35	-	20-30	40-50	-
3	ESS-102	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	0	20-35	-	20-30	40-50	-
4	PHC-102	Mechanics and Relativity	PCC	3	3	0	0	3	0	0	20-35	-	20-30	40-50	-
5	PHC-104	Analog Electronics	PCC	4	3	1	0	3	0	0	10-25	25	15-25	30-40	-
6	EEE-103	Measurements and Transducers	ESC	4	3	1	0	3	0	0	20-35	-	20-30	40-50	-
		Total		20											

DEPARTMENT OF PHYSICS

Program Code : 122 - B.Tech. (Engineering Physics)
 Department : Department of Physics
 Year : II

Teaching Scheme				Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)					
S. No.	Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Theory	Practical	CWS	PRS	MTE	ETE	PRE
					L	T	P							
(Autumn)														
1	MSI-101	Fundamentals of Management	MC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
2	MAB-104	Mathematical Methods	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	PHC-203	Thermal & Statistical Physics	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4	PHC-205	Digital Electronics	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
5	PHC-207	Physics Lab – II	PCC	2	0	0	4	-	-	-	50	-	-	50
6	HSSEC-I	HSS Elective Course	HSSEC	3										
7	OEC-I	Open Elective Course	OEC	3/4										
		Total		21/22										
(Spring)														
1	DAI-101	Data Science	DSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2	ECE-102	Introduction to Communication System	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	PHC-202	Mathematical Physics	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4	PHC-204	Quantum Mechanics - I	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	PHC-206	Applied Optics	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
6	OEC-II	Open Elective Course	OEC	3/4										
		Total		22/23										

DEPARTMENT OF PHYSICS

Program Code : 122 - B.Tech. (Engineering Physics)
Department : Department of Physics
Year : III

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	PHC-351	Fundamentals of AI/ML	PCC	2	2	0	0	2	0	20-35	-	20-30	40-50	-
2	PHC-301	Atomic and Molecular Spectroscopy	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
3	PHC-303	Signals and Systems	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4	PHC-391	Technical Communication	PCC	2	0	0	4	-	-	-	50	-	-	50
5	PHC-399	Community Outreach	CORE	2								100		
6	PHT-I	Talent Enhancement Course-I	TEB	2	0	1	3	-	-			100		
7	HSSEC-II	HSS Elective Course	HSSEC	3										
8	OEC-III	Open Elective Course	OEC	3/4										
9	PHL-I	Program Elective Course –I	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
		Total		24/25										
(Spring)														
1	PHC-300	Engineering Analysis and Design /Lab Based Project/ Practical Problems	PCC	4										
2	PHC-302	Condensed Matter Physics	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
3	PHC-304	Nuclear Physics & Applications	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4	PHC-306	Microprocessor and Microcontroller	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
5	PHC-308	Quantum Electronics and Devices	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
6	PHT-II	Talent Enhancement Course-II	TEB	4	1	1	3	-	-			100		
7	PHL-II	Program Elective Course -II	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
8	MSC-I	Minor Specialization Course - I	MSC	3/4										
		Total		22/25-26										

DEPARTMENT OF PHYSICS

Program Code : 122 - B.Tech. (Engineering Physics)
 Department : Department of Physics
 Year : IV

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	PHL-III	Program Elective Course –III	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2	PHL-IV	Program Elective Course –IV	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	PHL-V	Program Elective Course –V	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	PHL-VI	Program Elective Course –VI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	MSC-II	Minor Specialization Course - II	MSC	3/4										
6	MSC-III	Minor Specialization Course -III	MSC	3/4										
		Total		16/22-24										
(Spring)														
1	PHP-400/PHL	BTP/Project-Internship/Entrepreneurship/PEC*	PCC/PEC*	6								100		
3	MSC-IV	Minor Specialization Course -IV	MSC	3/4										
4	MSC-IV	Minor Specialization Course -IV	MSC	3/4										
		Total		6/12-14										

List of Program Elective Courses

PECs (Programme Elective Courses) in 3rd year:

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
1.	PHC-311	Classical Electrodynamics	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
2.	PHC-313	Classical Mechanics	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
3.	PHC-314	Statistical Mechanics	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4.	PHC-316	Quantum Mechanics – II	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
5.	PHL-305	Fiber and Integrated Optics	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
6.	PHL-306	Accelerator Physics	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
7.	PHL-307	Essential Mathematics for AI	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
8.	PHL-308	Computer Architecture for AI	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
9.	PHL-309	Machine Learning	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
10.	PHL-310	Money, Banking and Financial Markets	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
11.	PHL-311	Nuclear Instrumentation	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
12.	PHL-312	Numerical Techniques, including FEM, FDM, FDTD, FIM	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
13.	PHL-313	Solar Energy Materials and Devices	PEC											

PECs (Programme Elective Courses) in 4th year:

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
1	PHL-501	Nuclear Astrophysics	PCC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
2	PHL-502	Physics of Nano systems	PCC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
3	PHL-503	Super fluidity and Superconductivity	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
4	PHL-504	Fiber and Nonlinear Optics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
5	PHL-505	Quantum Optics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
6	PHL-506	Advanced Quantum Computing	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
7	PHL-507	Advanced topics in Mathematical Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
8	PHL-508	Introduction to Superstring Theory	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
9	PHL-509	Advanced Electroceramics Technology	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
10	PHL-510	Advanced Characterization Techniques	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
11	PHL-511	Atomic and Molecular Collision Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
12	PHL-512	A Primer in Quantum Field Theory	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
13	PHL-513	Astrophysics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
14	PHL-514	Solar-Terrestrial Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
15	PHL-515	General Relativity	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
16	PHL-516	Computational Nuclear Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
17	PHL-517	Particle Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
18	PHL-518	Advanced Atomic and Molecular Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
19	PHL-520	Quantum Theory of Solids	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
20	PHL-521	Weather Forecasting	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
21	PHL-522	Nuclear Instrumentation	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
22	PHL-523	Physics and Technology of Thin Films	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
23	PHL-524	Advanced Nuclear reactions	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
24	PHL-525	Semiconductor Photonics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
25	PHL-526	Advanced Light Sources	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
26	PHL-527	Superconducting Radio Frequency for particle accelerators	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-

List of Talent Enhancement Course

Teaching Scheme			Contact Hours/Week			Exam Duration		Relative Weight (%)						
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	MTE	ETE	PRE
TEB-A														
1	PHT-101	Experimental Techniques in Quantum Materials	TEB	2	0	1	3	-	-			100		
2	PHT-102	Ad. Experimental Techniques in Quantum Materials	TEB	4	1	1	3	-	-			100		
TEB-B														
1	PHT-103	Experimental Techniques in Laser Physics	TEB	2	0	1	3	-	-			100		
2	PHT-104	Ad. Experimental Techniques in Photonics	TEB	4	1	1	3	-	-			100		
TEB-C														
1	PHT-105	Experimental Techniques in Gamma Spectroscopy	TEB	2	0	1	3	-	-			100		
2	PHT-106	Experimental Techniques in Charged Particle Spectroscopy	TEB	4	1	1	3	-	-			100		
TEB-D														
1	PHT-107	Methods and Experiments in Atmospheric and Space Physics	TEB	2	0	1	3	-	-			100		
2	PHT-108	Ad. Experimental Techniques in Atmospheric and Space Physics	TEB	4	1	1	3	-	-			100		
TEB-E														
1	PHT-109	Principles of Electroceramic Processing & Fabrication	TEB	2	0	1	3	-	-			100		
2	PHT-110	Advanced Techniques of Electroceramic Characterization	TEB	4	1	1	3	-	-			100		

TEB-F									
1	PHT-111	Theoretical & Computational Techniques	TEB	2	0	1	3	-	100
2	PHT-112	Ad. Computational Techniques	TEB	4	1	1	3	-	100

Minor Specialisation Courses

S.No.	Code	Course title	Semester	Credits
1	PHC-102	Mechanics and Relativity	Spring	3
2	PHC-206	Applied Optics	Spring	4
3	PHC-311	Classical Electrodynamics	Autumn	4
4	PHC-313	Classical Mechanics	Autumn	4
5	PHC-204	Quantum Mechanics - I	Spring	4
6	PHC-316	Quantum Mechanics - II	Spring	3
7	PHC-302	Condensed Matter Physics	Spring	3
8	PHC-308	Quantum Electronics and Devices	Spring	3

9-B.Tech. (Mechanical Engineering)
Component wise distribution

Main Curriculum Components	Sub Components	Approved Credits for B.Tech.	Approved Credits Range	Proposed Credits for B.Tech. by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		16	
	ESC	8-20		12	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
	CCCC	40-48		44	
Program Core Course	AI/ML	2	87-91	2	90
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4	
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	6-10		8	
	PEC	22-26		24	
	TEB	6-8		6	
	OEC	9-12		9-12	
	CORE	2		2	
	Total	150-160		154-157	
	MSC/DHC	18/20		18/20	
	Grand Total			172-174	

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code : 117 **B.Tech. (Mechanical Engineering)**
Department : ME **Mechanical & Industrial Engineering**

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year – wise)
1	23	21	44
2	23/24	23/24	46/48
3	19/20	21/25	40/45
4	12/20	12/20	24/40
Grand Total			154/157
Total with MSC/DHC	With addition 18-20 credits		172/174

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING

Program Code : 117 - B.Tech.(Mechanical Engineering)
 Department : Department of Mechanical and Industrial Engineering
 Year : I

Teaching Scheme			Credits	Subject Area	Course Title	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)				
S. No.	Subject Code					L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)															
1	HSI-101	Soft Skills	HSSC	3	2	0	2	2	0	0	10-25	25	15-25	30-40	-
2	MAI-101	Mathematics-I	BSC	4	3	1	0	3	0	0	20-35	-	20-30	40-50	-
3	PHI-101	Physics-I	BSC	4	3	1	2/2	3	0	0	15-30	20	15-25	30-40	-
4	MIC-101	Programming and Data Structure	PCC	4	3	0	2	3	0	0	10-25	25	15-25	30-40	-
5	TMI-101	Tinkering and Mentoring	TMI	4	T-2	-	-	-	-	-	70	30	-	-	-
			M-2	2	0	0	2	-	50	-	-	50	-		
6	MTE-103	Materials Science	ESC	4	3	1	0	3	0	0	20-35	-	20-30	40-50	-
		Total		23											
(Spring)															
1	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	0	0	20-35	-	20-30	40-50	-
2	MAI-102	Mathematics-II	BSC	4	3	1	0	3	0	0	20-35	-	20-30	40-50	-
3	ESS-104	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	0	20-35	-	20-30	40-50	-
4	EEE-102	Basic Electrical Engineering	ESC	4	3	1	2/2	3	0	0	15-30	20	15-25	30-40	-
5	CEE-102	Mechanics of Solids	ESC	4	3	1	0	3	0	0	20-35	-	20-30	40-50	-
6	MIC-102	Engineering Thermodynamics	PCC	4	3	1	2/2	3	0	0	15-30	20	15-25	30-40	-
		Total		21											

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING

Program Code : 117 - B.Tech.(Mechanical Engineering)
 Department : Department of Mechanical and Industrial Engineering
 Year : II

Teaching Scheme				Subject Area	Credits	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	L			T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	OEC-I	Open Elective Course-I													
2	DAI-101	Data Science	4	3	1	0	3	0	20-35	-	20-30	40-50	-		
3	MAB-103	Numerical Methods	4	3	1	0	3	0	20-35	-	20-30	40-50	-		
4	MIC-201	Mechanical Engineering Drawing	4	2	0	4 (2*2)	3	0	15-30	20	15-25	30-40	-		
5	MIC-203	Manufacturing Technology	4	3	0	2	3	0	10-25	25	15-25	30-40	-		
6	MIC-205	Fluid Mechanics	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-		
		Total	23/24												
(Spring)															
1	OEC-II	Open Elective Course-II	3/4												
2	HSSEC-I	HSS Elective Course	3												
3	MSI-101	Fundamentals of Management	3	3	0	0	3	0	20-35	-	20-30	40-50	-		
4	MIC-202	Theory of Machines	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-		
5	MIC-204	Energy Conversion	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-		
6	MIC-206	Theory of Production Processes	4	3	0	2	3	0	10-25	25	15-25	30-40	-		
7	MIT-I	Talent Enhancement Course-I	2												
		Total	23/24												

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING

Program Code : 117 - B.Tech.(Mechanical Engineering)
Department : Department of Mechanical and Industrial Engineering
Year : III

Teaching Scheme															
S. No.	Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)					
					L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	OEC-III	Open Elective Course-III	OEC	3/4											
2	MIC-351	Fundamentals of AI/ML	PCC	2	2	0	0	2	0	0	20-35	-	20-30	40-50	-
3	MIC-303	Mechanics of Materials	PCC	4	3	1	2/2	3	0	0	15-30	20	15-25	30-40	-
4	MIC-305	Heat and Mass Transfer	PCC	4	3	1	2/2	3	0	0	15-30	20	15-25	30-40	-
5	MIT-II	Talent Enhancement Course-II	TEB	2											
6	MIC-391	Technical Communication	PCC	2	0	2	0				100	-	-	-	-
7	MIC-399	Community Outreach	CORE	2									100		
		Total		19/20											
(Spring)															
1	HSSEC-II	HSS Elective Course	HSSEC	3											
2	MIC-300	Engineering Analysis and Design(Design Thinking based project)/ Industry Oriented Problem Solving/ Lab-based Projects/ Practical Problems/ Case Study	PCC	4	0	0	8	-	-	100		-		-	-
3	MIC-302	Machine Design	PCC	4	3	0	2	3	0	0	10-25	25	15-25	30-40	-
4	MIL-I	Program Elective Course-I	PEC	4	3	1	0	3	0	0	20-35	-	20-30	40-50	-
5	MIL-II	Program Elective Course-II	PEC	4	3	1	0	3	0	0	20-35	-	20-30	40-50	-
6	MIT-III	Talent Enhancement Course-III	TEB	2							-	-	-	100	-
7	MSC/DHC-I	Minor Specialization Course-I / Departmental Honours Course-I	MSC/DHC	3/4											
		Total		21/24-25											

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING

Program Code : 117 - B.Tech.(Mechanical Engineering)
 Department : Department of Mechanical and Industrial Engineering
 Year : IV

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	EFE	PRE
(Autumn)														
1	MIP-400A/MIL	Project/Entrepreneurship/ Project-based Internship/PEC*	PCC/PEC*	4							100			
2	MIL-III	Program Elective Course-III	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	MIL-IV	Program Elective Course-IV	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	MSC/DHC-II	Minor Specialization Course-II / Departmental Honours Course-II	MSC/DHC	4										
5	MSC/DHC-III	Minor Specialization Course-III / Departmental Honours Course-III	MSC/DHC	4										
		Total		12/20										
(Spring)														
1	MIP-400B/MIL	Project/Entrepreneurship/ Project-based Internship/PEC*	PCC/PEC*	4							100			
2	MIL-V	Program Elective Course-V	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	MIL-VI	Program Elective Course-VI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	MSC/DHC-IV	Minor Specialization Course-IV / Departmental Honours Course-IV	MSC/DHC	4										
5	MSC/DHC-V	Minor Specialization Course-V / Departmental Honours Course-V	MSC/DHC	4										
		Total		12/20										

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.	MIL-320	Automobile Engineering	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
2.	MIL-321	Vibration and Noise	PEC	4	3	1	2/2	3	-	15-25	15-20	15-25	30-40	-
3.	MIL-322	Principles of Lubrication Technology	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
4.	MIL-323	Design of Pressure Vessels & Piping	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
5.	MIL-324	FEM applications in Mechanical Engg.	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
6.	MIL-325	Numerical Methods in Manufacturing	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
7.	MIL-326	Value Engineering	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
8.	MIL-327	Reverse Engineering	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
9.	MIL-328	Manufacturing System Analysis	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
10.	MIL-329	Computer Integrated Manufacturing	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
11.	MIL-330	Ergonomics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
12.	MIL-331	Total Quality Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
13.	MIL-332	Industrial Hazards and Safety	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
14.	MIL-333	Industrial Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
15.	MIL-334	Facilities Design	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
16.	MIL-335	Concurrent Engineering	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
17.	MIL-336	Financial Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
18.	MIL-337	Processing of Non-Metals	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
19.	MIL-338	Measurement & Instrumentation	PEC	4	3	1	2/2	3	-	15-25	15-20	15-25	30-40	-
20.	MIL-339	Design of Heat Exchangers	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
21.	MIL-340	Refrigeration and Air-Conditioning	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
22.	MIL-341	Thermal Systems Design	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-

23.	MIL-342	Environmental Pollution and Control	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
24.	MIL-343	Power Plants	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
25.	MIL-344	Industrial Combustion	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
26.	MIL-345	Compressible Flow	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
27.	MIL-346	Waste Heat recovery Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
28.	MIL-349	Fire Dynamics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
29.	MIL-350	Industrial Ventilation and Air Conditioning	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
30.	MIL-351	Gas Dynamics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
31.	MIL-352	Experimental Methods in Thermal Engineering	PEC	4	3	1	2/2	3	-	15-30	20	15-30	30-40	-
32.	MIL-354	Automatic Control	PEC	4	3	1	2/2	3	-	15-30	20	15-30	30-40	-
33.	MIL-3xx	Learning from Engineering Failures	PEC	4	2	0	4	3	-	20-35	-	20-30	40-50	-
34.	MIL-3xx	Production Planning and Control	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
35.	MIL-3xx	Engineering Economy	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
36.	MIL-311	Operations Research	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
37.	MIL-310	Quality Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
38.	MIL-313	Work System Design	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
39.	MIL-411	Maintenance Technology for Rotating Components	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
40.	MIL-412	Vehicle Dynamics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
41.	MIL-413	Micro Electro Mechanical Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
42.	MIL-415	Piping Technology	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
43.	MIL-416	Non Linear Dynamics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
44.	MIL-417	Energy and Variational Principles in Engineering Mechanics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
45.	MIL-500	Instrumentation and Experimental Methods	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
46.	MIL-502	Robotics and Control	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
47.	MIL-508	Advanced Automatic Control	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
48.	MIL-509	Extended Finite Element Methods	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
49.	MIL-515	Manufacturing System Analysis	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
50.	MIL-516	Artificial Intelligence	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-

51.	MIL-517	Automated Materials Handling Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
52.	MIL-523	Gas Turbines & Compressors	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
53.	MIL-524	Two Phase Flow & Heat Transfer	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
54.	MIL-525	Solar Energy	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
55.	MIL-526	Advanced Gas Dynamics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
56.	MIL-527	Computational Fluid Dynamics & Heat Transfer	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
57.	MIL-528	Boundary Layer Theory	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
58.	MIL-529	Turbulent Flows	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
59.	MIL-530	Cold Preservation of Foods	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
60.	MIL-531	Hydro-dynamic Machines	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
61.	MIL-532	Renewable Energy Systems	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
62.	MIL-533	Refrigeration & Air-Conditioning System Design	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
63.	MIL-534	Air Conditioning and Ventilation	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
64.	MIL-535	Cryogenic Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
65.	MIL-536	Convective Heat and Mass Transfer	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
66.	MIL-537	I. C. Engines	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
67.	MIL-538	I. C. Engine Combustion Processes Modelling	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
68.	MIL-539	Micro and Nano Scale Thermal Engineering	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
69.	MIL-540	Combustion	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
70.	MIL-541	Bio-Fluid Mechanics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
71.	MIL-542	Energy Management	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
72.	MIL-543	Fluid Power Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
73.	MIL-544	Design of Heat Exchangers	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
74.	MIL-545	Fuel Cells	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
75.	MIL-547	Product and Process Optimization	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
76.	MIL-550	Advanced Machine Design	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
77.	MIL-551	Dynamics of Mechanical Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
78.	MIL-552	Advanced Mechanics of Solids	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
79.	MIL-553	Industrial Tribology	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-

80.	MIL-554	Computer Aided Mechanism Design	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
81.	MIL-555	Experimental Stress Analysis	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
82.	MIL-556	Dynamics of Road Vehicles	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
83.	MIL-557	Finite Element Methods	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
84.	MIL-558	Fracture Mechanics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
85.	MIL-559	Computer Aided Design	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
86.	MIL-560	Mechanics of Composite Materials	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
87.	MIL-561	Advanced Mechanical Vibrations	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
88.	MIL-562	Noise Control in Mechanical Systems	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
89.	MIL-563	Mechatronics	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
90.	MIL-565	Smart Materials, Structures, and Devices	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
91.	MIL-566	Computer Aided Analysis of Mechanical Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
92.	MIL-567	Computer Graphics	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
93.	MIL-568	Advanced Robotics	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
94.	MIL-569	Expert System Design	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
95.	MIL-572	Advanced manufacturing Process	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
96.	MIL-573	Design for Manufacturability	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
97.	MIL-574	Maintenance Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
98.	MIL-575	Product Design and Development	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
99.	MIL-576	Machine Tool Design and Numerical Control	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
100.	MIL-577	Industrial Automation	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
101.	MIL-578	Computer Aided Process Planning	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
102.	MIL-579	Information Systems and Data Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
103.	MIL-580	Welding Science	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
104.	MIL-581	Manufacturing Resources Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
105.	MIL-582	Flexible Manufacturing Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
106.	MIL-583	Materials Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
107.	MIL-584	Operations Research	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
108.	MIL-585	Supply Chain Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-

109.	MIL-586	Metal Forming	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
110.	MIL-587	Metal Casting	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
111.	MIL-588	Non-Traditional Machining Processes	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
112.	MIL-593	Non-Conventional Welding Processes	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
113.	MIL-594	Safety Aspects of Welded Structures	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
114.	MIL-595	Failure Analysis of Welding Joints	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
115.	MIL-596	Automation & Application of Robots in Welding	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
116.	MIL-597	Welding Procedures for Specific Applications	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
117.	MIL-598	Weldability of Metals	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
118.	MIL-599	Surface Engineering	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
119.	MIL-601	Additive manufacturing	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
120.	MIL-602	Bond Graph Modelling of Engineering Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
121.	MIL-603	Finite Element Method for Thermal Engineering	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
122.	MIL-604	Fire Dynamics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
123.	MIL-605	Friction and wear	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
124.	MIL-606	Numerical Methods in Manufacturing	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
125.	MIL-607	Processing of non-metals	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
126.	MIL-608	Fatigue in Structures & Materials	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
127.	MIL-609	Solid state joining processes.	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
128.	MIL-610	Laser Material Processing	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
129.	MIL-611	Nanomechanics to Multiscale Modeling	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
130.	MIL-612	Hydrodynamic Stability	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
131.	MIL-613	Fusion Joining Technologies	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
132.	MIL-614	Solid State Joining Technologies	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
133.	MIL-615	Material Characterization & Testing	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
134.	MIL-621	Instrumentation and Experimental Methods	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
135.	MIL-622	Metallurgical Aspects in Joining and Additive Manufacturing	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
136.	MIL-623	Inspection and Testing for Quality Assurance	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
137.	MIL-624	Design and Analysis of Joints	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-

138.	MIL-625	Safety Analysis of Metallic Joints	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
139.	MIL-626	Failure Analysis and Prevention	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
140.	MIL-627	Hybrid Joining Technologies	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
141.	MIL-628	FEM for Manufacturing Processes	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
142.	MIL-629	Reverse Engineering and Rapid Tooling	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
143.	MIL-630	Residual Stress and Distortion	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
144.	MIL-631	Dissimilar Metal Joining	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
145.	MIL-6xx	Aircraft Propulsion	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
146.	MIL-6xx	Isogeometric Analysis	PEC	4	3	0	2	3	-	15-30	20	15-25	30-40	-

List of Talent Enhancement Course (3 courses of 2 credits each: Total 06 credits)

Teaching Scheme			Contact Hours/Week				Exam Duration		Relative Weight (%)					
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	MTE	ETE	PRE
TEB-A (DESIGN)														
1	MIT-101	Solid Modelling	TEB	2	0	0	4	-	-	-	50	-	-	50
2	MIT-102	CAE	TEB	2	0	0	4	-	-	-	50	-	-	50
3	MIT-103	Design Optimization	TEB	2	0	0	4	-	-	-	50	-	-	50
TEB-B (ADDITIVE MANUFACTURING)														
1	MIT-104	Solid Modeling & Reverse Engineering	TEB	2	1	0	2	-	-	-	50	-	-	50
2	MIT-105	Data Processing for Additive Manufacturing	TEB	2	1	0	2	-	-	-	50	-	-	50
3	MIT-106	Rapid Prototyping	TEB	2	1	0	2	-	-	-	50	-	-	50
TEB-C (INDUSTRIAL AUTOMATION)														
1	MIT-107	Introduction to Automation	TEB	2	1	1	0	-	-	25	-	25	50	-
2	MIT-108	System Integration	TEB	2	1	0	2	-	-	-	50	-	-	50
3	MIT-109	Cloud Computing	TEB	2	1	0	2	-	-	-	50	-	-	50
TEB-D (WELDING ENGINEERING)														
1	MIT-110	Design Guidelines for Welding	TEB	2	1	0	2	-	-	-	50	-	-	50
2	MIT-111	Advanced Welding Processes	TEB	2	1	0	2	-	-	-	50	-	-	50
3	MIT-112	Quality Assurance in Weldments	TEB	2	1	0	2	-	-	-	50	-	-	50

TEB-E (COMPUTATIONAL THERMO-FLUIDS)														
1	MIT-113	Basics of Computational Thermo-fluids	TEB	2	2	0	0	-	-	20-35	-	20-30	40-50	-
2	MIT-114	Thermofluid Simulation Software	TEB	2	1	0	2	-	-	-	50	-	-	50
3	MIT-115	Problem based Learning with Simulation Tools	TEB	2	0	0	4	-	-	-	50	-	-	50
TEB-F (MEASUREMENT IN THERMAL SYSTEMS)														
1	MIT-116	Basics of Measurements	TEB	2	2	0	2/2	-	-	-	50	-	-	50
2	MIT-117	Data Acquisition and Analysis	TEB	2	1	0	2	-	-	-	50	-	-	50
3	MIT-118	Instrumentation and measurement techniques	TEB	2	2	0	2/2	-	-	-	50	-	-	50
TEB-G (FLUID MACHINERY & FLUID POWER)														
1	MIT-119	Introduction to Fluid Machines and Fluid Power	TEB	2	2	0	0	-	-	20-35	-	20-30	40-50	-
2	MIT-120	Hydrodynamic Machines	TEB	2	2	0	2/2	-	-	-	50	-	-	50
3	MIT-121	Fluid Power Systems	TEB	2	2	0	0	-	-	20-35	-	20-30	40-50	-
TEB-H (HVAC)														
1	MIT-122	Fundamentals of HVAC	TEB	2	2	0	2/2	-	-	-	50	-	-	50
2	MIT-123	HVAC Systems and Equipment	TEB	2	1	0	2	-	-	-	50	-	-	50
3	MIT-124	HVAC Applications	TEB	2	1	0	2	-	-	-	50	-	-	50

Minor Specialization Courses

SN	Course Code	Course Name	Credits	Semester
1.	MIC-102	Engineering Thermodynamics	4	Spring
2.	MIC-201	Mechanical Engineering Drawing	4	Autumn
3.	MIC-203	Manufacturing Technology	4	Autumn
4.	MIC-205	Fluid Mechanics	4	Autumn
5.	MIC-202	Theory of Machines	4	Spring
6.	MIC-204	Energy Conversion	4	Spring
7.	MIC-206	Theory of Production Processes	4	Spring
8.	MIC-303	Mechanics of Materials	4	Autumn
9.	MIC-305	Heat and Mass Transfer	4	Autumn
10.	MIC-302	Machine Design	4	Spring

Departmental Honors Courses

All PG/pre-Ph. D. courses of Department of Mechanical and Industrial Engineering

10-B.TECH. (PRODUCTION & INDUSTRIAL ENGINEERING)
COMPONENT WISE DISTRIBUTION

Main Curriculum Components	Sub Components	Approved Credits for B.Tech.	Approved Credits Range	Proposed Credits for B.Tech. by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		16	
	ESC	8-20		12	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
	CCCC	40-48		44	
Program Core Course	AI/ML	2	87-91	2	90
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4	
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	6-10		8	
	PEC	22-26		24	
	TEB	6-8		6	
	OEC	9-12		9-12	
	CORE	2		2	
	Total	150-160		154-157	
	MSC/DHC	18/20		18/20	
	Grand Total			172-174	

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code : 119 **B.Tech. (Production & Industrial Engineering)**
Department : ME **Mechanical & Industrial Engineering**

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year – wise)
1	23	21	44
2	23/24	23/24	46/48
3	19/20	21	40/41
4	12	12	24
Grand Total			154-157
Total with MSC/DHC	With addition 18-20 credits		172-177

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING

Program Code : 119 - B.Tech.(Production & Industrial Engineering)
 Department : Department of Mechanical and Industrial Engineering
 Year : I

Teaching Scheme/						Credits		Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE			
(Autumn)																	
1	HSI-101	Soft Skills	HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-			
2	MAI-101	Mathematics-I	BSC	4	3	1	0	3	-	20-35	-	20-30	40-50	-			
3	PHI-101	Physics-I	BSC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-			
4	MIC-101	Programming and Data Structure	PCC	4	3	0	2	3	-	10-25	25	15-25	30-40	-			
5	TMI-101	Tinkering and Mentoring	TMI	T-2	-	-	-	-	-	70	30	-	-	-			
				M-2	2	0	0	2	-	50	-	50	-				
6	MTE-103	Materials Science	ESC	4	3	1	0	3	-	20-35	-	20-30	40-50	-			
		Total		23													
(Spring)																	
1	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	-	20-35	-	20-30	40-50	-			
2	MAI-102	Mathematics-II	BSC	4	3	1	0	3	-	20-35	-	20-30	40-50	-			
3	ESS-104	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-			
4	EEE-102	Basic Electrical Engineering	ESC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-			
5	CEE-101	Mechanics of Solids	ESC	4	3	1	0	3	-	20-35	-	20-30	40-50	-			
6	MIC-102	Engineering Thermodynamics	PCC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-			
		Total		21													

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING

Program Code : 119 - B.Tech.(Production & Industrial Engineering)
 Department : Department of Mechanical and Industrial Engineering
 Year : II

Teaching Scheme						Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)					
S. No.	Subject Code	Course Title	Subject Area	Credits	L			P		Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)																
1	OEC-I	Open Elective Course-I	OEC	3/4												
2	DAI-101	Data Science	DSC	4	3	1	0	3	-			20-35	-	20-30	40-50	-
3	MAB-103	Numerical Methods	BSC	4	3	1	0	3	-			20-35	-	20-30	40-50	-
4	MIC-201	Mechanical Engineering Drawing	PCC	4	2	0	4 (2*2)	3	-			20-35	-	20-30	40-50	-
5	MIC-203	Manufacturing Technology	PCC	4	3	0	2	3	-			10-25	25	15-25	30-40	-
6	MIC-205	Fluid Mechanics	PCC	4	3	1	2/2	3	-			15-30	20	15-25	30-40	-
		Total		23/24												
(Spring)																
1	OEC-II	Open Elective Course-II	OEC	3/4												
2	HSSEC-I	HSS Elective Course-I	HSSEC	3												
3	MSI-101	Fundamentals of Management	MC	3	3	0	0	3	-			20-35	-	20-30	40-50	-
4	MIC-202	Theory of Machines	PCC	4	3	1	2/2	3	-			15-30	20	15-25	30-40	-
5	MIC-206	Theory of Production Processes	PCC	4	3	0	2	3	-			10-25	25	15-25	30-40	-
6	MIC-208	Principles of Industrial Engineering	PCC	4	3	1	0	3	-			20-35	-	20-30	40-50	-
7	MIT-I	Talent Enhancement Course-I	TEB	2												
		Total		23/24												

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING

Program Code : 119 - B.Tech.(Production & Industrial Engineering)
 Department : Department of Mechanical and Industrial Engineering
 Year : III

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	EFE	PRE
(Autumn)														
1	OEC-III	Open Elective Course	OEC	3/4										
2	MIC-351	Fundamentals of AI/ML	PCC	2	2	0	0			20-35	-	20-30	40-50	-
3	MIC-305	Heat and Mass Transfer	PCC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
4	MIC-307	Operations Management	PCC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
5	MIT-II	Talent Enhancement Course-II	TEB	2										
6	MIC-391	Technical Communication	PCC	2	0	2	0			100	-	-	-	-
7	MIC-399	Community Outreach	CORE	2								100		
		Total		19/20										
(Spring)														
1	HSSEC-II	HSS Elective Course-I	HSSEC	3										
2	MIC-300	Engineering Analysis and Design (Design Thinking based project)/ Industry Oriented Problem Solving/ Lab-based Projects/ Practical Problems/ Case Study	PCC	4	0	0	8	-	-	100	-	-	-	-
3	MIC-302	Machine Design	PCC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
4	MIL-I	Program Elective Course-I	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
5	MIL-II	Program Elective Course-II	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
6	MIT-III	Talent Enhancement Course-III	TEB	2										
7	MSC/DHC-I	Minor Specialization Course-I / Departmental Honours Course-I	MSC/DHC	3/4										
		Total		21/24-25										

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING

Program Code : IN - B.Tech.(Production & Industrial)
Department : Department of Mechanical and Industrial Engineering
Year : IV

Teaching Scheme				Credits	Subject Area	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	L			T	P	Theory	Practical	CWS	PRS	MTE	EFE	PRE	
(Autumn)															
1	MIP-400A/MIL	Project/Entrepreneurship/ Project-based Internship/PEC*				4						100			
2	MIL-III	Program Elective Course-III		3	1	0	3	-		20-35	-	20-30	40-50	-	
3	MIL-IV	Program Elective Course-IV		3	1	0	3	-		20-35	-	20-30	40-50	-	
4	MSC/DHC-II	Minor Specialization Course-II / Departmental Honours Course-II				3/4									
5	MSC/DHC-III	Minor Specialization Course-III / Departmental Honours Course-III				3/4									
		Total				12/ 18-20									
(Spring)															
1	MIP-400B/MIL	Project/Entrepreneurship/ Project-based Internship/PEC*				4						100			
2	MIL-V	Program Elective Course-V		3	1	0	3	-		20-35	-	20-30	40-50	-	
3	MIL-VI	Program Elective Course-VI		3	1	0	3	-		20-35	-	20-30	40-50	-	
4	MSC/DHC-IV	Minor Specialization Course-IV / Departmental Honours Course-IV				3/4									
5	MSC/DHC-V	Minor Specialization Course-V / Departmental Honours Course-V				3/4									
		Total				12/ 18-20									

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.	MIL-320	Automobile Engineering	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
2.	MIL-321	Vibration and Noise	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
3.	MIL-322	Principles of Lubrication Technology	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
4.	MIL-323	Design of Pressure Vessels & Piping	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
5.	MIL-324	FEM applications in Mechanical Engg.	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
6.	MIL-325	Numerical Methods in Manufacturing	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
7.	MIL-326	Value Engineering	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
8.	MIL-327	Reverse Engineering	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
9.	MIL-328	Manufacturing System Analysis	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
10.	MIL-329	Computer Integrated Manufacturing	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
11.	MIL-330	Ergonomics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
12.	MIL-331	Total Quality Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
13.	MIL-332	Industrial Hazards and Safety	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
14.	MIL-333	Industrial Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
15.	MIL-334	Facilities Design	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
16.	MIL-335	Concurrent Engineering	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
17.	MIL-336	Financial Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
18.	MIL-337	Processing of Non-Metals	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
19.	MIL-338	Measurement & Instrumentation	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
20.	MIL-339	Design of Heat Exchangers	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
21.	MIL-340	Refrigeration and Air-Conditioning	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
22.	MIL-341	Thermal Systems Design	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
23.	MIL-342	Environmental Pollution and Control	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-

24.	MIL-343	Power Plants	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
25.	MIL-344	Industrial Combustion	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
26.	MIL-345	Compressible Flow	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
27.	MIL-346	Waste Heat recovery Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
28.	MIL-349	Fire Dynamics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
29.	MIL-350	Industrial Ventilation and Air Conditioning	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
30.	MIL-351	Gas Dynamics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
31.	MIL-352	Experimental Methods in Thermal Engineering	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
32.	MIL-354	Automatic Control	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
33.	MIL-3xx	Learning from Engineering Failures	PEC	4	2	0	4	3	-	15-30	20	15-25	30-40	-
34.	MIL-3xx	Production Planning and Control	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
35.	MIL-3xx	Engineering Economy	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
36.	MIL-311	Operations Research	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
37.	MIL-310	Quality Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
38.	MIL-313	Work System Design	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
39.	MIL-411	Maintenance Technology for Rotating Components	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
40.	MIL-412	Vehicle Dynamics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
41.	MIL-413	Micro Electro Mechanical Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
42.	MIL-415	Piping Technology	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
43.	MIL-416	Non Linear Dynamics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
44.	MIL-417	Energy and Variational Principles in Engineering Mechanics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
45.	MIL-500	Instrumentation and Experimental Methods	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
46.	MIL-502	Robotics and Control	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
47.	MIL-508	Advanced Automatic Control	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
48.	MIL-509	Extended Finite Element Methods	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
49.	MIL-515	Manufacturing System Analysis	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
50.	MIL-516	Artificial Intelligence	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
51.	MIL-517	Automated Materials Handling Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-

52.	MIL-523	Gas Turbines & Compressors	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
53.	MIL-524	Two Phase Flow & Heat Transfer	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
54.	MIL-525	Solar Energy	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
55.	MIL-526	Advanced Gas Dynamics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
56.	MIL-527	Computational Fluid Dynamics & Heat Transfer	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
57.	MIL-528	Boundary Layer Theory	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
58.	MIL-529	Turbulent Flows	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
59.	MIL-530	Cold Preservation of Foods	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
60.	MIL-531	Hydro-dynamic Machines	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
61.	MIL-532	Renewable Energy Systems	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
62.	MIL-533	Refrigeration & Air-Conditioning System Design	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
63.	MIL-534	Air Conditioning and Ventilation	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
64.	MIL-535	Cryogenic Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
65.	MIL-536	Convective Heat and Mass Transfer	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
66.	MIL-537	I. C. Engines	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
67.	MIL-538	I. C. Engine Combustion Processes Modelling	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
68.	MIL-539	Micro and Nano Scale Thermal Engineering	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
69.	MIL-540	Combustion	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
70.	MIL-541	Bio-Fluid Mechanics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
71.	MIL-542	Energy Management	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
72.	MIL-543	Fluid Power Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
73.	MIL-544	Design of Heat Exchangers	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
74.	MIL-545	Fuel Cells	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
75.	MIL-547	Product and Process Optimization	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
76.	MIL-550	Advanced Machine Design	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
77.	MIL-551	Dynamics of Mechanical Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
78.	MIL-552	Advanced Mechanics of Solids	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
79.	MIL-553	Industrial Tribology	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
80.	MIL-554	Computer Aided Mechanism Design	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-

81.	MIL-555	Experimental Stress Analysis	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
82.	MIL-556	Dynamics of Road Vehicles	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
83.	MIL-557	Finite Element Methods	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
84.	MIL-558	Fracture Mechanics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
85.	MIL-559	Computer Aided Design	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
86.	MIL-560	Mechanics of Composite Materials	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
87.	MIL-561	Advanced Mechanical Vibrations	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
88.	MIL-562	Noise Control in Mechanical Systems	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
89.	MIL-563	Mechatronics	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
90.	MIL-565	Smart Materials, Structures, and Devices	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
91.	MIL-566	Computer Aided Analysis of Mechanical Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
92.	MIL-567	Computer Graphics	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
93.	MIL-568	Advanced Robotics	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
94.	MIL-569	Expert System Design	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
95.	MIL-572	Advanced manufacturing Process	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
96.	MIL-573	Design for Manufacturability	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
97.	MIL-574	Maintenance Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
98.	MIL-575	Product Design and Development	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
99.	MIL-576	Machine Tool Design and Numerical Control	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
100.	MIL-577	Industrial Automation	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
101.	MIL-578	Computer Aided Process Planning	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
102.	MIL-579	Information Systems and Data Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
103.	MIL-580	Welding Science	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
104.	MIL-581	Manufacturing Resources Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
105.	MIL-582	Flexible Manufacturing Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
106.	MIL-583	Materials Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
107.	MIL-584	Operations Research	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
108.	MIL-585	Supply Chain Management	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
109.	MIL-586	Metal Forming	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-

110.	MIL-587	Metal Casting	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
111.	MIL-588	Non-Traditional Machining Processes	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
112.	MIL-593	Non-Conventional Welding Processes	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
113.	MIL-594	Safety Aspects of Welded Structures	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
114.	MIL-595	Failure Analysis of Welding Joints	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
115.	MIL-596	Automation & Application of Robots in Welding	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
116.	MIL-597	Welding Procedures for Specific Applications	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
117.	MIL-598	Weldability of Metals	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
118.	MIL-599	Surface Engineering	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
119.	MIL-601	Additive manufacturing	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
120.	MIL-602	Bond Graph Modelling of Engineering Systems	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
121.	MIL-603	Finite Element Method for Thermal Engineering	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
122.	MIL-604	Fire Dynamics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
123.	MIL-605	Friction and wear	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
124.	MIL-606	Numerical Methods in Manufacturing	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
125.	MIL-607	Processing of non-metals	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
126.	MIL-608	Fatigue in Structures & Materials	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
127.	MIL-609	Solid State Joining Processes	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
128.	MIL-610	Laser Material Processing	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
129.	MIL-611	Nanomechanics to Multiscale Modeling	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
130.	MIL-612	Hydrodynamic Stability	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
131.	MIL-613	Fusion Joining Technologies	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
132.	MIL-614	Solid State Joining Technologies	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
133.	MIL-615	Material Characterization & Testing	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
134.	MIL-621	Instrumentation and Experimental Methods	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
135.	MIL-622	Metallurgical Aspects in Joining and Additive Manufacturing	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
136.	MIL-623	Inspection and Testing for Quality Assurance	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
137.	MIL-624	Design and Analysis of Joints	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
138.	MIL-625	Safety Analysis of Metallic Joints	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-

139.	MIL-626	Failure Analysis and Prevention	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
140.	MIL-627	Hybrid Joining Technologies	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
141.	MIL-628	FEM for Manufacturing Processes	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
142.	MIL-629	Reverse Engineering and Rapid Tooling	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
143.	MIL-630	Residual Stress and Distortion	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
144.	MIL-631	Dissimilar Metal Joining	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
145.	MIL-6xx	Aircraft Propulsion	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
146.	MIL-6xx	Isogeometric Analysis	PEC	4	3	0	2	3	0	15-30	20	15-25	30-40	-

List of Talent Enhancement Course

(3 courses of 2 credits each: Total 06 credits)

Teaching Scheme			Contact Hours/Week			Exam Duration		Relative Weight (%)						
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	MTE	ETE	PRE
TEB-A (DESIGN)														
1	MIT-101	Solid Modelling	TEB	2	0	0	4	-	-	-	50	-	-	50
2	MIT-102	CAE	TEB	2	0	0	4	-	-	-	50	-	-	50
3	MIT-103	Design Optimization	TEB	2	0	0	4	-	-	-	50	-	-	50
TEB-B (ADDITIVE MANUFACTURING)														
1	MIT-104	Solid Modeling & Reverse Engineering	TEB	2	1	0	2	-	-	-	50	-	-	50
2	MIT-105	Data Processing for Additive Manufacturing	TEB	2	1	0	2	-	-	-	50	-	-	50
3	MIT-106	Rapid Prototyping	TEB	2	1	0	2	-	-	-	50	-	-	50
TEB-C (INDUSTRIAL AUTOMATION)														
1	MIT-107	Introduction to Automation	TEB	2	1	1	0	-	-	25	-	25	50	-
2	MIT-108	System Integration	TEB	2	1	0	2	-	-	-	50	-	-	50
3	MIT-109	Cloud Computing	TEB	2	1	0	2	-	-	-	50	-	-	50
TEB-D (WELDING ENGINEERING)														
1	MIT-110	Design Guidelines for Welding	TEB	2	1	0	2	-	-	-	50	-	-	50
2	MIT-111	Advanced Welding Processes	TEB	2	1	0	2	-	-	-	50	-	-	50
3	MIT-112	Quality Assurance in Weldments	TEB	2	1	0	2	-	-	-	50	-	-	50

TEB-E (COMPUTATIONAL THERMO-FLUIDS)														
1	MIT-113	Basics of Computational Thermo-fluids	TEB	2	2	0	0	-	-	20-35	-	20-30	40-50	-
2	MIT-114	Thermofluid Simulation Software	TEB	2	1	0	2	-	-	-	50	-	-	50
3	MIT-115	Problem based Learning with Simulation Tools	TEB	2	0	0	4	-	-	-	50	-	-	50
TEB-F (MEASUREMENT IN THERMAL SYSTEMS)														
1	MIT-116	Basics of Measurements	TEB	2	2	0	2/2	-	-	-	50	-	-	50
2	MIT-117	Data Acquisition and Analysis	TEB	2	1	0	2	-	-	-	50	-	-	50
3	MIT-118	Instrumentation and measurement techniques	TEB	2	2	0	2/2	-	-	-	50	-	-	50
TEB-G (FLUID MACHINERY & FLUID POWER)														
1	MIT-119	Introduction to Fluid Machines and Fluid Power	TEB	2	2	0	0	-	-	20-35	-	20-30	40-50	-
2	MIT-120	Hydrodynamic Machines	TEB	2	2	0	2/2	-	-	-	50	-	-	50
3	MIT-121	Fluid Power Systems	TEB	2	2	0	0	-	-	20-35	-	20-30	40-50	-
TEB-H (HVAC)														
1	MIT-122	Fundamentals of HVAC	TEB	2	2	0	2/2	-	-	-	50	-	-	50
2	MIT-123	HVAC Systems and Equipment	TEB	2	1	0	2	-	-	-	50	-	-	50
3	MIT-124	HVAC Applications	TEB	2	1	0	2	-	-	-	50	-	-	50

Minor Specialization Courses

SN	Course Code	Course Name	Credits	Semester
1.	MIC-102	Engineering Thermodynamics	4	Spring
2.	MIC-201	Mechanical Engineering Drawing	4	Autumn
3.	MIC-203	Manufacturing Technology	4	Autumn
4.	MIC-205	Fluid Mechanics	4	Autumn
5.	MIC-202	Theory of Machines	4	Spring
6.	MIC-206	Theory of Production Processes	4	Spring
7.	MIC-208	Principles of Industrial Engineering	4	Spring
8.	MIC-305	Heat and Mass Transfer	4	Autumn
9.	MIC-307	Operations Management	4	Autumn
10.	MIC-302	Machine Design	4	Spring

Departmental Honors Courses

- All PG/pre-Ph. D. courses of Department of Mechanical and Industrial Engineering

11-B. TECH. (METALLURGICAL & MATERIALS ENGINEERING)
COMPONENT WISE DISTRIBUTION

Main Curriculum Components	Sub Components	Approved Credits for B. Tech.	Approved Credits Range	Proposed Credits for B. Tech. by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	57
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		16	
	ESC	8-20		16	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
Program Core Course	CCCC	40-48	87-91	45	89
	AI/ML	2		2	
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4	
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	6-10		8	
	PEC	22-26		22	
	TEB	6-8		6	
	OEC	9-12		9-12	
	CORE	2		2	
	Total	150-160		157-160	
	MSC/DHC	18/20		18/20	
	Grand Total			175-180	

DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code : 118 **B. Tech. (Metallurgical & Materials Engineering)**
Department : MT **Metallurgical & Materials Engineering**

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year – wise)
1	23	23	46
2	23/24	24/25	47/49
3	20/21	20	40/41
4	12	12	24
Grand Total			157-160
Total with MSC/DHC	With addition 18-20 credits		175-180

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt./Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING

Program Code : MT - B.Tech.(Metallurgical and Materials Engineering)
 Department : Department of Metallurgical and Materials Engineering
 Year : I

Teaching Scheme														
S. No.	Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)				
					L	T	P	Theory	Practical	CWS	PRS	MTE	EFE	PRE
(Autumn)														
1	HSI-101	Soft Skills	HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-
2	MAI-101	Mathematics-I	BSC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
3	PHI-101	Physics-I	BSC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
4	MTC-101	Computer Programming	PCC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
5	TMI-101	Tinkering and Mentoring	TMI	4	-	-	-	-	-	70	30	-	-	-
			M-2	2	0	0	2	-	50	-	-	50	-	
6	MIE-101	Engineering Mechanics	ESC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
		Total		23										
(Spring)														
1	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	-	20-35	-	20-30	40-50	-
2	CYB-103	Physical Chemistry-I	BSC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
3	MAI-102	Mathematics-II	BSC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
4	ESS-104	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
5	CSE-101	Data Structures and Algorithms	ESC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
6	MTC-102	Introduction to Materials Engineering	PCC	3	3	0	0	3	-	20-35	-	20-30	40-50	-
7	MTC-104	Metallurgical Thermodynamics and Kinetics	PCC	3	2	1	0	3	-	20-35	-	20-30	40-50	-
		Total		23										

DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING

Program Code : MT - B.Tech.(Metallurgical and Materials Engineering)
 Department : Department of Metallurgical and Materials Engineering
 Year : II

Teaching Scheme						Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)							
S. No.	Subject Code	Course Title	Subject Area	Credits	L			T		P		Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)																		
1	OEC-I	Open Elective Course-I	OEC	3/4														
2	DAI-101	Data Science	DSC	4	3	1	0	3				-		20-35	-	20-30	40-50	-
3	ECE-101	Fundamentals of Electronics	ESC	4	3	1	0	3				-		20-35	-	20-30	40-50	-
4	MTC-201	Phase Transformation and Heat Treatment	PCC	4	3	0	2	3				-		10-25	25	15-25	30-40	-
5	MTC-203	Mechanical Behaviour of Materials	PCC	4	3	0	2	3				-		10-25	25	15-25	30-40	-
6	MTC-205	Iron and Steel Making	PCC	4	3	0	2/2	3				-		15-30	20	15-25	30-40	-
		Total		23/24														
(Spring)																		
1	OEC-II	Open Elective Course-II	OEC	3/4														
2	HSSEC-I	HSS Elective Course	HSSEC	3														
3	MSI-101	Fundamentals of Management	MC	3	3	0	0	3				-		20-35	-	20-30	40-50	-
4	EEE-102	Basic Electrical Engineering	ESC	4	3	1	2/2	3				-		15-30	20	15-25	30-40	-
5	MTC-202	Metal Processing	PCC	4	3	1	0	3				-		20-35	-	20-30	40-50	-
6	MTC-204	Characterization Techniques for Materials	PCC	4	3	0	2	3				-		10-25	25	15-25	30-40	-
7	MTC-206	Engineering Polymers and Composites	PCC	3	3	0	0	3				-		20-35	-	20-30	40-50	-
		Total		24/25														

DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING

Program Code : MT - B.Tech.(Metallurgical and Materials Engineering)
 Department : Department of Metallurgical and Materials Engineering
 Year : III

Teaching Scheme				Subject Area	Credits	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	L			T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	OEC-III	Open Elective Course-III													
2	MTC-351	AI/ML in Materials Engineering	2	0	0				20-35	-	20-30	40-50		-	
3	MTC-301	Electrical and Electronic Materials	3	2	0	2	3	0	10-25	25	15-25	30-40		-	
4	MTC-303	Metal Processing lab	2	0	0	4	-	0	-	50	-	-		50	
5	MTC-391	Technical Communication	2	0	2	0	-	0	100	-	-	-		-	
6	MTC-399	Community Outreach	2								100				
7	MTT-I	Talent Enhancement Course-I	3	2	1	0	3	0	20-35	-	20-30	40-50		-	
8	MTL-I	Program Elective Course-I	3	3	0	0	3	0							
		Total	20/21												
(Spring)															
1	HSSEC-II	HSS Elective Course-II	3												
2	MTC-300	Engineering Analysis and Design	4	2	0	4	3	0	10-25	25	15-25	30-40		-	
3	MTC-302	Corrosion Engineering	3	3	0	2/2	3	0	15-30	20	15-25	30-40		-	
4	MTC-304	Ceramics and Metal Powder Processing	4	3	0	2	3	0	10-25	25	15-25	30-40		-	
5	MTT-II	Talent Enhancement Course-II	3	2	1	0	3	0	20-35	-	20-30	40-50		-	
6	MTL-II	Program Elective Course-II	3	3	0	0	3	0	20-35	-	20-30	40-50		-	
7	MSC/DHC-I	Minor Specialization Course-I / Departmental Honours Course-I	3/4												
		Total	20/23-24												

DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING

Program Code : MT - B.Tech.(Metallurgical and Materials Engineering)
 Department : Department of Metallurgical and Materials Engineering
 Year : IV

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	EFE	PRE
(Autumn)														
1	MTP-400A/MTL	Project/Entrepreneurship/ Project-based Internship/PEC*	PCC/PEC*	4							100			
2	MTL-III	PEC-III	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
3	MTL-IV	PEC-IV	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
4	MSC/DHC-II	Minor Specialization Course-II / Departmental Honours Course-II	MSC/ DHC	3/4										
5	MSC/DHC-III	Minor Specialization Course-III / Departmental Honours Course-III	MSC/ DHC	3/4										
				12/ 18-20										
(Spring)														
1	MTP-400B/ MTL	Project/Entrepreneurship/ Project-based Internship/PEC*	PCC/ PEC*	4							100			
2	MTL-V	PEC-V	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
3	MTL-VI	PEC-VI	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
4	MSC/DHC-IV	Minor Specialization Course-IV/ Departmental Honours Course-IV	MSC/ DHC	3/4										
5	MSC/DHC-V	Minor Specialization Course-V / Departmental Honours Course-V	MSC/ DHC	3/4										
		Total		12/ 18-20										

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	PR S	MTE	ETE	PRE
1.	MTL-311	Fuel, Furnaces and Refractories	PEC	3	2	1	0	3	-	20-35	-	20-30	40-50	-
2.	MTL-312	Mineral Processing	PEC	3	2	0	2	3	-	10-25	25	15-25	30-40	-
3.	MTL-313	Introduction to Nanomaterials	PEC	3	2	0	2	3	-	10-25	25	15-25	30-40	-
4.	MTL-314	Thin Film Technology	PEC	3	3	0	0	3	-	20-35	-	20-30	40-50	-
5.	MTL-315	Transport Phenomena	PEC	3	2	1	0	3	-	20-35	-	20-30	40-50	-
6.	MTL-511	Principles of Solidification	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
7.	MTL-512	Engineering Ceramics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
8.	MTL-513	Principles of Materials Selection	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
9.	MTL-514	High Temperature Materials	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
10.	MTL-515	Composite Materials	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
11.	MTL-516	Diffusion in Solids	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
12.	MTL-517	Defects in Crystalline Materials	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
13.	MTL-518	Nanotechnology: Materials & Devices	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
14.	MTL-519	Advanced Steel Technology	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
15.	MTL-520	Physical Metallurgy of light metals & alloys	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
16.	MTL-521	Corrosion protection methods	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
17.	MTL-522	Microsensor, MEMS & Smart Devices	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
18.	MTL-523	Electro-Ceramics	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
19.	MTL-524	Materials for Renewable Energy	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
20.	MTL-525	Biomaterials	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
21.	MTL-526	Energy storage Materials	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
22.	MTL-527	Failure Analysis	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
23.	MTL-528	Tribology of Engineering Materials	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
24.	MTL-529	Non-ferrous extraction	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
25.	MTL-530	Materials Modeling and Simulation	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-

List of Talent Enhancement Basket Courses

Teaching Scheme			Contact Hours/Week				Exam Duration		Relative Weight (%)						
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	MTE	E	T	PRE
TEB-A (Materials Processing)															
1	MTT-101	Additive Manufacturing	TEB	3	2	1	0	3	-	20-35	-	20-30	40-50	-	-
2	MTT-102	Metal Recovery and Recycling	TEB	3	2	1	0	3	-	20-35	-	20-30	40-50	-	-
3	MTT-103	Metallurgy of Joining	TEB	3	2	1	0	3	-	20-35	-	20-30	40-50	-	-
TEB-B (Materials Characterization)															
1	MTT-104	X-ray Diffraction Techniques	TEB	3	2	1	0	3	-	20-35	-	20-30	40-50	-	-
2	MTT-105	Electron Microscopy	TEB	3	2	1	0	3	-	20-35	-	20-30	40-50	-	-
3	MTT-106	Crystallographic Texture	TEB	3	2	1	0	3	-	20-35	-	20-30	40-50	-	-

Open electives:

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.	MTO-101	Introduction to Nanomaterials	OEC	3	2	0	2	3	-	10-25	25	15-25	30-40	-
2.	MTO-102	Thin Film Technology	OEC	3	3	0	0	3	-	20-35	-	20-30	40-50	-

Minor Specialisation Courses

S.No.	Code	Course title	Semester	Credits
1	MTC-102	Introduction to Materials Engineering	Spring	3
2	MTC-104	Metallurgical Thermodynamics and Kinetics	Spring	3
3	MTC-201	Phase Transformation and Heat Treatment	Autumn	4
4	MTC-203	Mechanical Behaviour of Materials	Autumn	4
5	MTC-205	Iron and Steel Making	Autumn	4
6	MTC-202	Metal Processing	Spring	4
7	MTC-204	Characterization Techniques for Materials	Spring	4
8	MTC-206	Engineering Polymers and Composites	Spring	3
9	MTC-301	Electrical and Electronic Materials	Autumn	3
10	MTC-302	Corrosion Engineering	Spring	3
11	MTC-304	Ceramics and Metal Powder Processing	Spring	4

Departmental Honours Courses: All PG Program Elective Courses of the Department of Metallurgical & Materials Engineering.

12-B. TECH. (DATA SCIENCE AND ARTIFICIAL INTELLIGENCE)
COMPONENT WISE DISTRIBUTION

Main Curriculum Components	Sub Components	Approved Credits for B. Tech.	Approved Credits Range	Proposed Credits for B. Tech. by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	57
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		16	
	ESC	8-20		16	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
	CCCC	40-48		40	
	AI/ML	2		2	
Program Core Course	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4	87-91	4	88
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	6-10		10	
	PEC	22-26		24	
	TEB	6-8		6	
	OEC	9-12		9-12	
	CORE	2		2	
	Total	150-160		156-159	
	MSC/DHC	18/20		18/20	
	Grand Total			174/179	

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

Program Code : 125 **B. Tech. (Data Science and Artificial Intelligence)**
Department : DSAI **Mehta Family School for Data Science and Artificial Intelligence**

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year – wise)
1	23	21	44
2	23/24	21/22	44/46
3	21/22	21	42/43
4	20	6	26
Grand Total			156/159
Total with MSC/DHC	With addition 18-20 credits		174/179

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

MEHTA FAMILY SCHOOL FOR DATA SCIENCE AND ARTIFICIAL INTELLIGENCE

Program Code : 125 **B. Tech. (Data Science and Artificial Intelligence)**
Department : DSAI **Mehta Family School for Data Science and Artificial Intelligence**
Year : I

Teaching Scheme				Subject Area		Credits	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)				
S. No.	Subject Code	Course Title		Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	EFE	PRE	
(Autumn)																
1	HSI-101	Soft Skills		HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-	
2	MAI-101	Mathematics-I		BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	PHI-101	Physics-I		BSC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-	
4	DAC-101	Computer Programming in C++		PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
5	TMI-101	Tinkering and Mentoring		TMI	4	T-2	-	-	-	-	70	30	-	-	-	
					M-2	2	0	0	2	-	50	-	50	-		
6	ECE-101	Fundamental of Electronics		ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
		Total			23											
(Spring)																
1	HSI-102	Indian Knowledge System		HSSC	2	2	0	0	3	0	20-35	-	20-30	40-50	-	
2	MAI-102	Mathematics-II		BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	ESS-102	Environmental Science and Sustainability		ESSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
4	DAC-102	Computer Organization and Architecture		PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
5	DAC-104	Programming in Python		PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
6	ECE-103	Digital Electronics		ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
		Total			21											

MEHTA FAMILY SCHOOL FOR DATA SCIENCE AND ARTIFICIAL INTELLIGENCE

Program Code : 125 **B. Tech. (Data Science and Artificial Intelligence)**
Department : DSAI **Mehta Family School for Data Science and Artificial Intelligence**
Year : II

Teaching Scheme										Contact Hours/Week		Exam Duration (Hrs.)		Relative Weights (%)						
S. No.	Subject Code	Course Title	Subject Area	Credits	L			T			P			Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)																				
1	DAI-101	Data Science	DSC	4	3		1	0	3	0	20-35	-	20-30	40-50	-					
2	OEC-I	Open Elective Course	OEC	3/4																
3	MAB-103	Numerical Methods	BSC	4	3		1	0	3	0	20-35	-	20-30	40-50	-					
4	DAC-201	Discrete Structures	PCC	4	3		1	0	3	0	20-35	-	20-30	40-50	-					
5	DAC-203	Artificial Intelligence	PCC	4	3		1	0	3	0	20-35	-	20-30	40-50	-					
6	CSE-101	Data Structure and Algorithm	ESC	4	3		1	0	3	0	20-35	-	20-30	40-50	-					
		Total		23/24																
(Spring)																				
1	HSSEC-I	HSS Elective Course-I	HSSEC	3				0	3	0	20-35	-	20-30	40-50	-					
2	MSI-101	Fundamentals of Management	MC	3	3		0	0	3	0	20-35	-	20-30	40-50	-					
3	OEC-II	Open Elective Course-II	OEC	3/4																
4	DAC-202	Applied Machine Learning	PCC	4	3		1	0	3	0	20-35	-	20-30	40-50	-					
5	DAC-204	Programming for DS and AI	PCC	2	0		0	4	-	-	-	100	-	-	-					
6	ECE-102	Introduction to Communication Systems	ESC	4	3		1	0	3	0	20-35	-	20-30	40-50	-					
7	DAT-I	Talent Enhancement Course-I	TEB	2	0		0	3	-	-	-	-	-	100	-					
		Total		21/22																

MEHTA FAMILY SCHOOL FOR DATA SCIENCE AND ARTIFICIAL INTELLIGENCE

Program Code : 125 **B. Tech. (Data Science and Artificial Intelligence)**
Department : DSAI **Mehta Family School for Data Science and Artificial Intelligence**
Year : III

Teaching Scheme			Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights (%)						
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	OEC-III	Open Elective Course	OEC	3/4										
2	DAC-351	Fundamentals of AI/ML	PCC	2	2	0	0	2	0	20-35	-	20-30	40-50	-
3	DAC-301	Deep Learning	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	DAC-303	Computer Network	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	DAC-305	Principle of Databases	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6	DAC-399	Community Outreach	CORE	2	100									
7	DAT-II	Talent Enhancement Course-II	TEB	2	0	0	3	-	-	-	-	-	100	-
		Total		21/22										
(Spring)														
1	HSSEC-II	HSS Elective Course-II	HSSEC	3										
2	DAC-300	Case Study (Industry Oriented Problem/ Lab Based Project)*	PCC	4	0	0	8	0	0	50	-	-	-	50
3	DAC-391	Technical Communication	PCC	2	0	0	4	0	-	-	100	-	-	-
4	DAC-304	AI/ML Lab	PCC	2	0	0	4	0	-	-	100	-	-	-
5	DAL-I	Program Elective Course- I	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6	DAL-II	Program Elective Course- II	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7	DAT-III	Talent Enhancement Course-III	TEB	2	0	0	3	-	-	-	-	-	100	-
8	MSC/DHC - I	Minor Specialization Course - I / Departmental Honours Course - I	MSC/ DHC	3/4										
		Total		21/ 24-25										

MEHTA FAMILY SCHOOL FOR DATA SCIENCE AND ARTIFICIAL INTELLIGENCE

Program Code : 125 B. Tech. (Data Science and Artificial Intelligence)
 Department : DSAI Mehta Family School for Data Science and Artificial Intelligence
 Year : IV

Teaching Scheme													Exam Duration (Hrs.)		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Theory		Practical		CWS	PRS	MTE	ETE	PRE			
					L	T	P												
(Autumn)																			
1	DAP-400A/DAL	Project (BTP-I)/Entrepreneurship**/Project-based Internship/PEC*	PCC/PEC*	4						3	0	20-35	-	20-30	40-50	-			
2	DAL-III	Program Elective Course -III	PEC	4	3	1	0			3	0	20-35	-	20-30	40-50	-			
3	DAL-IV	Program Elective Course -IV	PEC	4	3	1	0			3	0	20-35	-	20-30	40-50	-			
4	DAL-V	Program Elective Course -V	PEC	4	3	1	0			3	0	20-35	-	20-30	40-50	-			
5	DAL-VI	Program Elective Course -VI	PEC	4	3	1	0			3	0	20-35	-	20-30	40-50	-			
6	MSC/DHC-2	Minor Specialization Course –II/ Departmental Honours Course - II	MSC/ DHC	3/4															
7	MSC/DHC-3	Minor Specialization Course –III/ Departmental Honours Course - III	MSC/ DHC	3/4															
		Total		20/26-28															
(Spring)																			
1	DAP-400B/DAL	Project (BTP-I)/Entrepreneurship**/Project-based Internship/PEC*	PCC/PEC*	6										100					
2	MSC/DHC-IV	Minor Specialization Course –IV / Departmental Honours Course – IV	MSC/ DHC	3/4															
3	MSC/DHC-V	Minor Specialization Course -V/ Departmental Honours Course - V	MSC/ DHC	3/4															
		Total		6/12-14															

3rd Year Electives

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.	DAL-301	Casual Inference	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	DAL-302	Information Theory and Cryptography	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	DAL-303	Information Retrieval	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	DAL-304	Computer Architecture for AI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	DAL-305	Intelligent Cloud Computing	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	DAL-306	Intelligent and Learning Agents	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7.	DAL-307	Intelligent Robotics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
8.	DAL-308	Applications of AI in Healthcare	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

4th Year Electives

9.	DAL-401	E-commerce	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
10.	DAL-402	Security and Privacy	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
11.	DAL-403	AI in Neuroscience & Cognitive Behaviour	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
12.	DAL-404	AI based Diagnostics tools	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
13.	DAL-565	Computer Vision	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14.	DAL -559	Stochastic Processes and Applications	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
15.	DAL -628	Evolutionary Algorithms	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
16.	DAL -558	Data Stream Mining	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
17.	DAL -564	AI and Medical Physics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
18.	DAL -562	AI for Investment	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
19.	DAL -567	Introduction to Materials Informatics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
20.	DAL -561	AI for Earth Observations	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
21.	DAL -519	Social Network Analysis	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
22.	DAL -568	ML and AI Applications in Earth	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

		Sciences																	
23.	DAL -571	Big Data Analytics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50						-
24.	DAL -576	Data Science in Bioinformatics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50						-
25.	DAL -579	Leveraging Data Science for Finance	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50						-
26.	DAL -581	Advanced Applications of Pattern Recognition	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50						-
27.	DAL -582	Recommended Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50						-
28.	DAL -583	Data-Driven Analytics for Smart Transportation Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50						-
29.	DAL -5xx	AI for Fluid Mechanics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50						-

List of Talent Enhancement Course

Teaching Scheme			Contact Hours/Week						Exam Duration		Relative Weight (%)				
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	MTE	ETE	PRE	
TEB-A (Computer Vision and Image Processing)															
1.	DAT-101	Computer Vision	TEB	2	0	0	0	4	-	-	-	-	100	-	
2.	DAT-102	Image Enhancement Techniques	TEB	2	0	0	0	4	-	-	-	-	100	-	
3.	DAT-103	AI based earth imaging	TEB	2	0	0	0	4	-	-	-	-	100	-	
TEB-B (AI for Sustainable Development Goals (SDG))															
4.	DAT-104	AI for Energy	TEB	2	0	0	0	4	-	-	-	-	100	-	
5.	DAT-105	AI for Healthcare	TEB	2	0	0	0	4	-	-	-	-	100	-	
6.	DAT-106	AI for Smart Transportation	TEB	2	0	0	0	4	-	-	-	-	100	-	
TEB-C (AI for Economics)															
7.	DAT-107	AI for e-commerce	TEB	2	0	0	0	4	-	-	-	-	100	-	
8.	DAT-108	AI Data Mining and Warehousing for online market places	TEB	2	0	0	0	4	-	-	-	-	100	-	
9.	DAT-109	AI for asset management	TEB	2	0	0	0	4	-	-	-	-	100	-	

Minor Specialization Courses

S.No.	Code	Course title	Semester	Credits
1	DAC-102	Computer Organization and Architecture	Spring	4
2	DAC-104	Programming in Python	Spring	4
3	DAC-203	Artificial Intelligence	Autumn	4
4	DAC-202	Applied Machine Learning	Spring	4
5	DAC-303	Computer Networks	Autumn	4

Departmental Honours Courses

Sub. Code	Title	Credits
DAL-507	Advanced Data Structures and Algorithms	4
DAL-xxx	Statistical Machine Learning	4
DAL-503	Hardware Architectures for AI	4
DAL-xxx	AI Driven Non-linear Dynamics	4
DAL-xxx	Optimization in Machine Learning	4
All PG PECs / Pre-PhD courses of MFS		

13-Department of Earth Sciences
5 year Integrated M.Tech. (Geological Technology)

Component wise distribution

Main Curriculum Components	Sub Components	Approved Credits for 5 year BSMS	Approved Credits Range	Proposed credits for 5 year BSMS by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		20	
	ESC	8-20		8	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
Program Core Course	CCCC	52-62	127-133	62	130
	AI/ML	2		2	
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4	
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC/Thesis	16		16	
	PEC	32-40		36	
	TEB	6-8		8	
	OEC	9-12		9-12	
	CORE	2		2	
	Total	190-200		194-197	
	MSC/DHC	18/20		18/20	
	Grand Total			212-217	

DEPARTMENT OF EARTH SCIENCES
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
5 year Integrated M.Tech. (Geological Technology)

Program Code : 410-Int. M.Tech. (Geological Technology)
 Department : ES - Earth Sciences

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year-wise)
1	23	23	46
2	24/25	22/23	46/48
3	22/23	24	46/47
4	21	19	40
5	8	8	16
Grand Total			194-197
Total with Minor Specialization Courses	with additional 18-20 credits (mentioned in the parentheses)		212-217

	Components	Maximum	Minimum	Comments
	Discipline (DIS)	20	10	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
Non-Credit Elements (NCE)	Internship (INT)	32	10	1 week internship= 1 unit (To be coordinated by departments/centres/school)
	Participation in professional development programs by Industry experts/ field experts (PPD-1, PPD-2 & PPD-3)	12	6	To be coordinated by departments/centres/school (2 nd , 3 rd and 4 th Years)
Minimum non-credit to be earned: 30				

DEPARTMENT OF EARTH SCIENCES

Program Code : 410 –Int. M.Tech. (Geological Technology)
 Department : ES - Earth Sciences
 Year : I

		Teaching Scheme				Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub.Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	HSI-101	Soft Skills	HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-	
2	MAI-101	Mathematics-I	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	PHI-101	Physics-I	BSC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-	
4	ESC-101	Computer Programming	PCC	4	3	0	2	3	2	10-25	25	15-25	30-40	-	
5	TMI-101	Tinkering and Mentoring	TMI	4	-	-	-	-	-	70	30	-	-	-	
					2	0	0	2	-	50	-	-	50	-	
6	CHE-101	Energy Engineering	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
		Total		23											
(Spring)															
1.	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	0	20-35	-	20-30	40-50	-	
2.	MAI-102	Mathematics-II	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3.	ESS-101	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
4.	ESB-101	Geological Processes	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
5.	ESC-102	Mineralogy and Petrology	PCC	4	3	0	2	3	2	10-25	25	15-25	30-40	-	
6.	ESC-191	Technical Communication	PCC	2	0	0	4	0	0	-	-	-	100	-	
7.	MTE-102	Material Characterization	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
				23											

DEPARTMENT OF EARTH SCIENCES

Program Code : 410 –Int. M.Tech. (Geological Technology)
 Department : ES - Earth Sciences
 Year : II

		Teaching Scheme				Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub.Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	OEC-I	Open Elective Course-I	OEC	3/4											
2	DAI-101	Data Science	DSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	ESC-201	Structural Geology	PCC	3	2	0	2	3	0	10-25	25	15-25	30-40	-	
4	ESC-203	Palaeontology	PCC	3	2	0	2	3	0	10-25	25	15-25	30-40	-	
5	ESC-205	Metamorphic Petrology	PCC	3	2	0	2	3	0	10-25	25	15-25	30-40	-	
6	ESB-102	Global Geophysics	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
7	EST-I	Talent Enhancement Course-I	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
		Total		24/25											
(Spring)															
1	HSSEC-I	HSS Elective Course-I	HSSEC	3											
2	OEC-II	Open Elective Course-II	OEC	3/4											
3	MSI-101	Fundamentals of Management	MC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
4	ESC-202	Economic Geology	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
5	ESC-204	Igneous Petrology	PCC	3	2	0	2	3	0	10-25	25	15-25	30-40	-	
6	ESC-206	Sedimentology	PCC	3	2	0	2	3	0	10-25	25	15-25	30-40	-	
7	ESC-208	Field Training	PCC	3	0	0	6	0	0	-	-	-	100	-	
		Total		22/23											

DEPARTMENT OF EARTH SCIENCES

Program Code : **410 –Int. M.Tech. (Geological Technology)**
 Department : **ES - Earth Sciences**
 Year : **III**

		Teaching Scheme				Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub.Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	OEC-III	Open Elective Course-III	OEC	3/4											
2	ESC-351	Fundamental of AI/ML	PCC	2	2	0	0	2	0	20-35	-	20-30	40-50	-	
3	ESC-301	Geomorphology	PCC	3	2	1	0	3	0	20-35	-	20-30	40-50	-	
4	ESC-303	Ore Geology and Mineral Exploration	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
5	ESL-I	Program Elective Course-I	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
6	EST-II	Talent Enhancement Course-II	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
7	ESC-399	Community Outreach	CORE	2						100					
		Total		22/23											
(Spring)															
1	HSSEC-II	HSS Elective Course-II	HSSEC	3											
2	ESC-300	Industry Oriented Projects/ Field Training	PCC	4	-	-	8	0	0	-	-	-	100		
3	ESC-302	Geochemistry and Cosmo chemistry	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
4	ESC-304	Remote Sensing	PCC	3	2	1	0	3	0	20-35	-	20-30	40-50	-	
5	ESC-306	Geohydrology	PCC	3	2	1	0	3	0	20-35	-	20-30	40-50	-	
6	ESC-308	Stratigraphy	PCC	3	2	1	0	3	0	20-35	-	20-30	40-50	-	
7	ESL-II	Program Elective Course-II	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
8	MSC-I	Minor Specialization Course-I	MSC	3/4											
		Total		24/27-28											

DEPARTMENT OF EARTH SCIENCES

Program Code : **410 –Int. M.Tech. (Geological Technology)**
 Department : **ES - Earth Sciences**
 Year : **IV**

		Teaching Scheme				Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub.Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	ESC-401	Engineering Geology	PCC	3	2	1	0	3	0	20-35	-	20-30	40-50	-	
2	ESC-403	Geographical Information System (GIS)	PCC	3	2	1	0	3	0	20-35	-	20-30	40-50	-	
3	ESC-405	Well Logging	PCC	3	2	1	0	3	0	20-35	-	20-30	40-50	-	
4	ESL-III	Program Elective Course-III	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
5	ESL-IV	Program Elective Course-IV	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
6	ESL-V	Program Elective Course-V	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
7	MSC-II	Minor Specialization Course-II	MSC	3/4											
		Total		21/24-25											
(Spring)															
1	ESC-402	Petroleum Geosciences	PCC	3	2	1	0	3	0	20-35	-	20-30	40-50	-	
2	ESL-VI	Program Elective Course-VI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	ESL-VII	Program Elective Course-VII	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
4	ESL-VIII	Program Elective Course-VIII	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
5	ESL-IX	Program Elective Course-IX	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
6	MSC-III	Minor Specialization Course-III	MSC	3/4											
		Total		19/22-23											

DEPARTMENT OF EARTH SCIENCES

Program Code : **410 –Int. M.Tech. (Geological Technology)**
 Department : **ES - Earth Sciences**
 Year : **V**

		Teaching Scheme				Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub. Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	ESP-501	Thesis Stage-I	PCC	8	0	0	0	0	0	-	-	-	100		
2	MSC-IV	Minor Specialization Course-IV	MSC	3/4											
		Total		8/11-12											
(Spring)															
1	ESP-502	Thesis Stage-II	PCC	8	0	0	0	0	0	-	-	-	100		
2	MSC-V	Minor Specialization Course-V	MSC	3/4											
		Total		8/11-12											

List of Program Elective Courses

Teaching Scheme							Contact Hours/Week		Exam. Duration		Relative Weight (%)			
S. No.	Sub Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Program Elective Course - I														
1.	ESL-301	Himalayan Geology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	ESL-303	Metamorphic Processes and Tectonic Regimes	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	ESL-304	Soil and Rock Mechanics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective Course - II														
4.	ESL-305	Basin Analysis	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	ESL-306	Indian Mineral Deposits	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	ESL-307	Advanced Structural Geology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective Course - III														
7.	ESL-401	Advanced Remote Sensing	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
8.	ESL-402	Precambrian Tectonics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
9.	ESL-403	Geodynamics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective Course - IV														
10.	ESL-405	Marine Geology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
11.	ESL-406	Paleoclimatology and Palaeoceanography	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
15.	ESL-407	Quaternary Geosciences	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective Course - V														
13.	ESL-409	Coal Geology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14.	ESL-410	Environmental Impact Assessment and Management	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
15.	ESL-411	Stress and Strain Analysis in Geology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

Program Elective Course - VI														
16.	ESL-412	Advanced Stratigraphy and Facies Modelling	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
17.	ESL-413	Global Environment	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
18.	ESL-414	Isotope Geology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
19.	ESL-415	Advanced GIS	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective Course - VII														
20.	ESL-416	Petroleum Geomechanics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
21.	ESL-417	Exploration Geophysics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
22.	ESL-418	Petrophysics and Seismic Rock Characterization	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective Course - VIII														
23.	ESL-419	Shear Zone Metasomatism	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
24.	ESL-420	Industrial Mineralogy	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
25.	ESL-421	Sequence Stratigraphy	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective Course - IX														
26.	ESL-422	Carbonate Sedimentology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
27.	ESL-423	Microtectonics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
28.	ESL-424	Vertebrate Palaeontology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

Basket of Talent Enhancement Course

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weight (%)				
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	C W S	P R S	MTE	E T E	PRE
TEB-A (Natural Hazards)														
1	EST-101	Natural hazards and mitigation	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-
2	EST-102	Engineering Geophysics	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-
TEB-B (Environmental Geosciences)														
3	EST-103	Environmental geology	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-
4	EST-104	Environmental geophysics	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-
TEB-C (Oil exploration)														
5	EST-105	Petroleum Geology	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-
6	EST-106	Geophysics for oil exploration	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-

Minor Specialisation Courses (20 credits)

S. No.	Course Code	Course Title	Credits	Semester
1.	ESC-102	Mineralogy and Petrology	4	Spring
2.	ESC-201	Structural Geology	3	Autumn
3.	ESC-202	Economic Geology	4	Spring
4.	ESC-301	Geomorphology	3	Autumn
5.	ESC-304	Remote Sensing	3	Spring
6.	ESC-306	Geohydrology	3	Spring
7.	ESC-402	Petroleum Geosciences	3	Spring

14-Department of Earth Sciences
5 year Integrated M.Tech. (Geophysical Technology)

Component wise distribution

Main Curriculum Components	Sub Components	Approved Credits for 5 year BSMS	Approved Credits Range	Proposed credits for 5 year BSMS by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		20	
	ESC	8-20		8	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
Program Core Course	CCCC	52-62	127-133	62	130
	AI/ML	2		2	
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4	
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC/Thesis	16		16	
	PEC	32-40		36	
	TEB	6-8		8	
	OEC	9-12		9-12	
	CORE	2		2	
	Total(+)	190-200		194/197	
	MSC/DHC	18/20		18/20	
	Grand Total			212-217	

DEPARTMENT OF EARTH SCIENCES
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
5 year Integrated M.Tech. (Geophysical Technology)

Program Code : 411 – Int. M.Tech. (Geophysical Technology)
 Department : ES - Earth Sciences

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year-wise)
1	23	23	46
2	22/23	23/24	45/47
3	23/24	23	46/47
4	19	22	41
5	8	8	16
Grand Total			194-197
Total with Minor Specialization Courses	with additional 18-20 credits (mentioned in the parentheses)		212-217

	Components	Maximum	Minimum	Comments
	Discipline (DIS)	20	10	To be evaluated by DoSW
Non-Credit Elements (NCE)	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	32	10	1 week internship= 1 unit (To be coordinated by departments/centres/school)
	Participation in professional development programs by Industry experts/ field experts (PPD-1, PPD-2 & PPD-3)	12	6	To be coordinated by departments/centres/school (2 nd , 3 rd and 4 th Years)
Minimum non-credit to be earned: 30				

DEPARTMENT OF EARTH SCIENCES

Program Code : 411 – Int. M.Tech. (Geophysical Technology)
 Department : ES - Earth Sciences
 Year : I

		Teaching Scheme				Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub.Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	HSI-101	Soft skills	HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-	
2	MAI-101	Mathematics-I	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	PHI-101	Physics-I	BSC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-	
4	ESC-101	Computer Programming	PCC	4	3	0	2	3	2	10-25	25	15-25	30-40	-	
5	TMI-101	Tinkering and Mentoring	TMI	4	T-2	-	-	-	-	70	30	-	-	-	
					M-2	2	0	0	2	-	50	-	50	-	
6	CHE-101	Energy Engineering	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
		Total		23											
(Spring)															
1	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	3	0	20-35	-	20-30	40-50	-	
2	MAI-102	Mathematics-II	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	ESS-101	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
4	ECE-103	Digital Electronics	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
5	ESB-101	Geological Processes	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
6	ESC-102	Mineralogy and Petrology	PCC	4	3	0	2	3	2	10-25	25	15-25	30-40	-	
7	ESC-191	Technical Communication	PCC	2	0	0	4	0	0	-	-	-	100	-	
		Total		23											

DEPARTMENT OF EARTH SCIENCES

Program Code : 411 – Int. M.Tech. (Geophysical Technology)
 Department : ES - Earth Sciences
 Year : II

		Teaching Scheme				Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub.Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	OEC-I	Open Elective Course-I	OEC	3/4											
2	DAI-101	Data Science	DSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
3	ESC-201	Structural Geology	PCC	3	2	0	2	3	0	10-25	25	15-25	30-40	-	
4	ESB-102	Global Geophysics	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
5	ESL-I	Program Elective Course-I	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
6	EST-I	Talent Enhancement Course-I	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
		Total		22/23											
(Spring)															
1	HSSEC-I	HSS Elective Course-I	HSSEC	3											
2	OEC-II	Open Elective Course-II	OEC	3/4											
3	MSI-101	Fundamentals of Management	MC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
4	ESC-202	Economic Geology	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
5	ESC-206	Sedimentology	PCC	3	2	0	2	3	0	10-25	25	15-25	30-40	-	
6	ESC-208	Field Training	PCC	3	0	0	6	0	0	-	-	-	100	-	
7	ESC-210	Geophysical Signal Processing	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
		Total		23/24											

DEPARTMENT OF EARTH SCIENCES

Program Code : 411 – Int. M.Tech. (Geophysical Technology)
 Department : ES - Earth Sciences
 Year : III

		Teaching Scheme				Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub. Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
		Semester-V (Autumn)													
1	OEC-III	Open Elective Course-III	OEC	3/4											
2	ESC-351	Fundamental of AI/ML	PCC	2	2	0	0	2	0	20-35	-	20-30	40-50	-	
3	ESC-311	Seismology	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
4	ESC-313	Electrical Prospecting	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
5	ESL-II	Program Elective Course-II	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
6	EST-II	Talent Enhancement Course-II	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
7	ESC-399	Community Outreach	CORE	2						100					
		Total		23/24											
		Semester-VI (Spring)													
1	HSSEC-II	HSS Elective Course-II	HSSEC	3											
2	ESC-300	Industry Oriented Field Training	PCC	4	-	-	8	0	0	-	-	-	100		
3	ESC-312	Electromagnetic Prospecting	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
4	ESC-314	Seismic Prospecting	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-	
5	ESL-III	Program Elective Course-III	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
6	ESL-IV	Program Elective Course-IV	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
7	MSC-I	Minor Specialization Course-I	MSC	3/4											
		Total		23/26-27											

DEPARTMENT OF EARTH SCIENCES

Program Code : 411 – Int. M.Tech. (Geophysical Technology)
 Department : ES - Earth Sciences
 Year : IV

		Teaching Scheme				Contact Hours/Week			Exam. Duration		Relative Weight (%)			
S. No.	Sub.Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	ESC-405	Well Logging	PCC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
2	ESC-411	Gravity and Magnetic Prospecting	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
3	ESC-413	Numerical Modeling in Geophysics	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	ESL-V	Program Elective Course-V	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	ESL-VI	Program Elective Course-VI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6	MSC-II	Minor Specialization Course-II	MSC	3/4										
		Total		19/22-23										
(Spring)														
1	ESC-402	Petroleum Geosciences	PCC	3	2	1	0	3	0	20-35	-	20-30	40-50	-
2	ESC-412	Geophysical Inversion	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	ESL-VII	Program Elective Course-VII	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	ESL-VIII	Program Elective Course-VIII	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	ESL-IX	Program Elective Course-IX	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6	ESP-400	Mini-Project	PCC	3	0	0	6	0	0	-	-	-	100	-
7	MSC-III	Minor Specialization Course-III	MSC	3/4										
		Total		22/25-26										

DEPARTMENT OF EARTH SCIENCES

Program Code : 411 – Int. M.Tech. (Geophysical Technology)
 Department : ES - Earth Sciences
 Year : V

		Teaching Scheme				Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub.Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1	ESP-501	Thesis Stage-I	PCC	8	0	0	0	0	0	-	-	-	100		
2	MSC-IV	Minor Specialization Course-IV	MSC	3/4											
		Total		8/11-12											
(Spring)															
1	ESP-502	Thesis Stage-II	PCC	8	0	0	0	0	0	-	-	-	100	-	
2	MSC-V	Minor Specialization Course-V	MSC	3/4											
		Total		8/11-12											

List of Program Elective Courses

Teaching Scheme				Contact Hours/Week			Exam. Duration		Relative Weight (%)					
S. No.	Sub Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Program Elective Course - I														
1.	ESL-201	Geotechnical Investigations	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	ESL-202	Application of Satellites in Geophysics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	ESL-203	Stratigraphy	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective Course - II														
4.	ESL-351	Digital Image Processing	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	ESL-352	Modelling of Hydrological Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	ESL-403	Geodynamics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective Course - III														
7.	ESL-353	Advanced Seismology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
8.	ESL-412	Advanced Stratigraphy and Facies Modelling	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
9.	ESL-354	Dynamic Systems in Earth Sciences	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective Course - IV														
10.	ESL-355	Reservoir Geophysics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
11.	ESL-356	Strong Motion Seismology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
12.	ESL-418	Petrophysics and Seismic Rock Characterization	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective Course - V														
13.	ESL-451	Seismic Imaging	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14.	ESL-452	Advanced Seismic Prospecting	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
15.	ESL-453	Integrated Geo-exploration	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective Course - VI														
16.	ESL-454	Magnetotellurics and Geomagnetic Depth Sounding	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

17.	ESL-455	High Performance Computing in Earth Sciences	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
18.	ESL-401	Advanced Remote Sensing	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective Course - VII														
19.	ESL-415	Advanced GIS	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	
20.	ESL-456	Synthetic Seismogram	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	
21.	ESL-457	Hydrogeophysics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	
Program Elective Course - VIII														
22.	ESL-458	Marine Geophysics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
23.	ESL-459	Advanced Electromagnetic Prospecting	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
24	ESL-416	Petroleum Geomechanics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Program Elective Course - IX														
25.	ESL-413	Global Environment	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
26	ESL-416	Petroleum Geomechanics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
27.	ESL-460	Carbonate Sedimentology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

Basket of Talent Enhancement Course

Teaching Scheme				Contact Hours/Week			Exam Duration		Relative Weight (%)					
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	C W S	P R S	MTE	E T E	P R E
TEB-A (Water Resources)														
1	EST-101	Hydrogeological Systems	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-
2	EST-102	Groundwater Management	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-
TEB-B (Geomodelling)														
3	EST-103	Computational Geophysics	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-
4	EST-104	Geophysical Modelling of Earth Processes	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-
TEB-C (Petroleum Geosciences)														
5	EST-105	Geology of Petroleum	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-
6	EST-106	Geophysics for Oil Exploration	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-

Minor Specialisation Courses (20 credits)

S. No.	Course Code	Course Title	Credits	Semester
1.	ESC-102	Mineralogy and Petrology	4	Spring
2.	ESC-201	Structural Geology	3	Autumn
3.	ESC-301	Geomorphology	3	Autumn
4.	ESC-311	Seismology	4	Autumn
5.	ESC-413	Numerical Modeling in Geophysics	3	Autumn
6.	ESC-304	Remote Sensing	3	Spring
7.	ESC-314	Seismic Prospecting	4	Spring
8.	ESC-402	Petroleum Geosciences	3	Spring

15-Department of Humanities and Social Science
5 year BSMS (Economics) with exit policy

Component wise distribution

Main Curriculum Components	Sub Components	Approved Credits for 5 year BSMS	Approved Credits Range	Proposed credits for 5 year BSMS by Department	Proposed Credits Range	Approved Credits for 4 year BSMS exit	Approved Credits Range	Proposed credits for 4 year BSMS exit by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53	5	52-58	5	53
	HSSEC	6		6		6		6	
	MC	3		3		3		3	
	BSC	12-20		20		12-20		20	
	ESC	8-20		8		8-20		8	
	DSC	4		4		4		4	
	ESSC	3		3		3		3	
	TM	4		4		4		4	
Program Core Course	CCCC	52-62	127-133	56	128	40-48	87-91	44	90
	AI/ML	2		2		2		2	
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4		4		4	
	Technical Communication	2		2		2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	16		16		6-10		6	
	PEC	32-40		40		22-26		24	
	TEB	6-8		8		6-8		8	
	OEC	9-12		9-12		9-12		9-12	
	CORE	2		2		2		2	
	Total	190-200		192-195		150-160		154-157	
	MSC/DHC	18/20		18/20		18/20		18/20	
	Grand Total			210-215				172-177	

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCE
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
5 year BSMS (Economics) with exit policy

Program Code : **322 - BS-MS (Economics)**
 Department : **HSS – Humanities and Social Science**

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year-wise)
1	23	21	44
2	23/24	21/22	44/46
3	21/22	23	44/45
4	24	20	44
5	6	10	16
Grand Total			192/195
Total with Minor Specialization Courses	with additional 18-20 credits (mentioned in the parentheses)		210/215

	Components	Maximum	Minimum	Comments
	Discipline (DIS)	20	10	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	32	10	1 week internship= 1 unit (To be coordinated by departments/centres/school)
Non-Credit Elements (NCE)	Participation in professional development programs by Industry experts/ field experts (PPD-1, PPD-2 & PPD-3)	12	6	To be coordinated by departments/centres/school (2 nd , 3 rd and 4 th Years)
Minimum non-credit to be earned: 30				

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCE
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
5 year BSMS (Economics) with exit policy

Program Code : **322 - BS-MS (Economics)**
 Department : **HSS – Humanities and Social Science**

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year-wise)
1	23	21	44
2	23/24	21/22	44/46
3	21/22	23	44/45
4	16	6	22
Grand Total			154/157
Total with Minor Specialization Courses	with additional 18-20 credits (mentioned in the parentheses)		172/177

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCE

Program Code : 322 - BS-MS (Economics)
 Department : HSS – Humanities and Social Science
 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
(Autumn)														
1.	HSI-101	Soft Skills	HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-
2.	MAI-101	Mathematics-I	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	PHI-101	Physics-I	BSC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
4.	HSC-101	Computer Programming for Economists	PCC	4	3	0	2	3	2	10-25	25	15-25	30-40	-
5.	TMI-101	Tinkering & Mentoring	TM	4	T-2	-	-	-	-	70	30	-	-	-
					M-2	2	0	0	2	-	-	50	-	50
6.	CSE-101	Data Structures and Algorithms	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
		Total		23										
(Spring)														
1.	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	0	20-35	-	20-30	40-50	-
2.	MAI-102	Mathematics-II	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	ESS-103	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4.	HSC-102	Introductory Microeconomics	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	HSC-104	Introductory Macroeconomics	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	PHB-103	Modern Physics	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
		Total		21										

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCE

Program Code : 322 - BS-MS (Economics)
 Department : HSS – Humanities and Social Science
 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
(Autumn)														
1.	DAI-101	Data Science	DSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	OEC-I	Open Elective Course-I	OEC	3/4										
3.	HSC-201	Advanced Microeconomics	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	HSC-203	Advanced Macroeconomics	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	HSC-205	Introduction to Econometric Theory	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
6.	MAB-104	Mathematical Methods	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
		Total		23/24										
(Spring)														
1.	HSSEC-I	HSS Elective Course-I	HSSEC	3										
2.	OEC-II	Open Elective Course-II	OEC	3/4										
3.	MSI-101	Fundamentals of Management	MC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4.	HSC-202	Elementary Development Economics	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	HSC-204	Advanced Econometric Theory	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
6.	CEE-106	Geospatial Techniques and Programming	ESC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
		Total		21/22										

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCE

Program Code : 322 - BS-MS (Economics)
 Department : HSS – Humanities and Social Science
 Year : III

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
(Autumn)														
1	OEC-III	Open Elective Course-III	OEC	3/4										
2	HSC-351	Fundamentals of AI/ML	PCC	2	2	0	0	2	0	20-35	-	20-30	40-50	-
3	HSC-301	Environmental Economics: Theory & Policy	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	HSC-391	Technical Communication	PCC	2	1	0	2					100		
5	HST-I	Talent Enhancement Course-I	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-
6	HSL-I	Program Elective Course-I	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7	HSC-399	Community Outreach	CORE	2								100		
		Total		21/22										
(Spring)														
1	HSSEC-II	HSS Elective Course-II	HSSEC	3										
2	HSC-302	Monetary Economics	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	HST-II	Talent Enhancement Course-II	TEB	4	3	0	2	3	0	10-25	25	15-25	30-40	-
4	HSL-II	Program Elective Course-II	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	HSL-III	Program Elective Course-III	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6	HSL-IV	Program Elective Course-IV	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7	MSC/DHC-I	Minor Specialization Course-I/ Departmental Honours Course-I	MSC/DHC	3/4										
		Total		23/ 26-27										
Note: Students willing to exit with BS Degree in Economics must inform to Dean (Academic Affairs) after completion of 6 th semester														

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCE

Program Code : 322 - BS-MS (Economics)
 Department : HSS – Humanities and Social Science
 Year : IV

Teaching Scheme															Relative Weight (%)				
S.No.	Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Exam Duration		CWS	PRS	MTE	ETE	PRE					
					L	T	P	Theory	Practical										
(Autumn)																			
1.	HSC-400	Eng. Anal & Design*—Industry Oriented Problems/Lab Based Projects/ Practical Problems/Case Study	PCC	4															
2.	HSC-403	Financial Economics: Theory & Applications	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-					
3.	HSC-405	Principles of International Economics	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
4.	HSL-V	Program Elective Course-V	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
5.	HSL-VI	Program Elective Course-VI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
6.	HSL-VII	Program Elective Course-VII	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
7.	MSC/DHC-II	Minor Specialization Course-II/ Departmental Honours Course-II	MSC/DHC	3/4															
		Total		24/27-28															
(Spring)																			
1.	HSC-402	Public Policy	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
2.	HSC-404	Growth Economics	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
3.	HSL-VIII	Program Elective Course-VIII	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
4.	HSL-IX	Program Elective Course-IX	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
5.	HSL-X	Program Elective Course-X	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-					
6.	MSC/DHC-III	Minor Specialization Course-III/ Departmental Honours Course-III	MSC/DHC	3/4															
		Total		20/23-24															

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCE

Program Code : 322 - BS-MS (Economics)
 Department : HSS – Humanities and Social Science
 Year : V

Teaching Scheme														
S.No.	Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Exam Duration		Relative Weight (%)				
					L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1.	HSP-501	Thesis (Stage-I)	PCC	6										100
2.	MSC/DHC-IV	Minor Specialization Course-IV/ Departmental Honours Course-IV	MSC/DHC	3/4										
3.	MSC/DHC-V	Minor Specialization Course-V / Departmental Honours Course-V	MSC/DHC	3/4										
		Total		6/ 12-14										
Semester-II (Spring)														
1.	HSP-502	Thesis (Stage-II)	PCC	10										100
		Total		10										

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCE

Program Code : 322 - BS-MS (Economics) Exit policy
 Department : HSS – Humanities and Social Science
 Year : IV

Teaching Scheme														
S.No.	Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Exam. Duration		Relative Weight (%)				
					L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1.	HSC-400	Eng. Anal & Design*/Industry Oriented Problems/Lab Based Projects/ Practical Problems/Case Study	PCC	4										
2.	HSC-403	Financial Economics: Theory & Applications	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
3.	HSL-V	Program Elective Course-V	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	HSL-VI	Program Elective Course-VI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	MSC/DHC-II	Minor Specialization Course-II/ Departmental Honours Course-II	MSC/DHC	3/4										
6.	MSC/DHC-III	Minor Specialization Course-III/ Departmental Honours Course-III	MSC/DHC	3/4										
		Total		16/22-24										
(Spring)														
1.	HSP-400/HSL	Project/Entrepreneurship/ Project-based Internship/PEC*	PCC/PEC*	6								100		
2.	MSC/DHC-IV	Minor Specialization Course-IV/ Departmental Honours Course-IV	MSC/DHC	3/4										
3.	MSC/DHC-V	Minor Specialization Course-V/ Departmental Honours Course-V	MSC/DHC	3/4										
		Total		6/12-14										

List of Program Elective Courses

Teaching Scheme						Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)			
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
1	HSL-301	Economics of Risk and Uncertainty	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2	HSL-302	Agricultural Economics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	HSL-303	Labour Economics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	HSL-501	Game Theory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	HSL-502	Indian Economy	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6	HSL-503	Advanced Development Economics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7	HSL-504	Behavioural Economics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
8	HSL-505	Industrial Organization	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
9	HSL-506	Energy Economics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
10	HSL-601	Research Methods	PEC	4	3	0	2	3	0	20-35	-	20-30	40-50	-
11	HSL-602	Economics of Services	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
12	HSL-603	Health Economics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
13	HSL-604	Public Finance	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14	HSL-605	Economics of Infrastructure	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
15	HSL-606	Ecological Economics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
16	HSL-607	Panel Data Analysis	PEC	4	3	0	2	3	0	20-35	-	20-30	40-50	-
17	HSL-651	Advanced International Economics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
18	HSL-652	Welfare Economics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
19	HSL-653	History of Economic Thought	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
20	HSL-654	Institutional Economics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
21	HSL-655	Innovation & Economic Policy	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
22	HSL-656	Resource Economics & Valuation	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
23	HSL-657	Household Economics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

List of Talent Enhancement Course

Teaching Scheme				Contact Hours/Week			Exam Duration		Relative Weight (%)									
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	C	W	S	PRS	MTE	E	T	E	PRE
TEB-A																		
1	HST-101	Economic Data Analysis	TEB	4	3	0	2	3	0	10-25	25	15-25	25	30-40				-
2	HST-102	Cross-sectional Data Analysis	TEB	4	3	0	2	3	0	10-25	25	15-25	25	30-40				-
3	HST-103	Time Series Data Analysis	TEB	4	3	0	2	3	0	10-25	25	15-25	25	30-40				-
TEB-B																		
1	HST-104	Applied Econometrics	TEB	4	3	0	2	3	0	10-25	25	15-25	25	30-40				-
2	HST-105	Applied Production Econometrics	TEB	4	3	0	2	3	0	10-25	25	15-25	25	30-40				-
3	HST-106	Optimization and Nonparametric Efficiency Analysis	TEB	4	3	0	2	3	0	10-25	25	15-25	25	30-40				-
TEB-C																		
1	HST-107	Business Analytics	TEB	4	3	0	2	3	0	10-25	25	15-25	25	30-40				-
2	HST-108	Analytics for Business and Society	TEB	4	3	0	2	3	0	10-25	25	15-25	25	30-40				-
3	HST-109	Social and Economic Networks	TEB	4	3	0	2	3	0	10-25	25	15-25	25	30-40				-

Minor Specialization Courses

SN	Course Code	Course Name	Credits	Semester
1.	HSC-201	Advanced Microeconomics	4	Autumn
2.	HSC-203	Advanced Macroeconomics	4	Autumn
3.	HSC-205	Introduction to Econometric Theory	4	Autumn
4.	HSC-102	Introductory Microeconomics	4	Spring
5.	HSC-104	Introductory Macroeconomics	4	Spring
6.	HSC-202	Elementary Development Economics	4	Spring

Departmental Honours Courses (20 credits)

SN	Course Code	Course Name	Credits
1.	HSL-503	Advance Development Economics	4
2.	HSL-651	Advance International Economics	4
3.	HSL-603	Public Finance	4
4.	HSL-606	Ecological Economics	4
5.	HSL-303	Labour Economics	4
6.	HSL-301	Economics of Risk and Uncertainty	4
7.	HSL-501	Game Theory	4
8.	HSL-653	History of Economic Thought	4
9.	HSL-655	Innovation & Economic Policy	4
10.	HSL-656	Resource Economics & Valuation	4

16-Department of Chemistry
5 year BSMS (Chemical Sciences) with exit policy

Component wise distribution

Main Curriculum Components	Sub Components	Approved Credits for 5 year BSMS	Approved Credits Range	Proposed credits for 5 year BSMS by Department	Proposed Credits Range	Approved Credits for 4 year BSMS exit	Approved Credits Range	Proposed credits for 4 year BSMS exit by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	52	5	52-58	5	52
	HSSEC	6		6		6		6	
	MC	3		3		3		3	
	BSC	12-20		16		12-20		16	
	ESC	8-20		11		8-20		11	
	DSE	4		4		4		4	
	ESSC	3		3		3		3	
	TM	4		4		4		4	
Program Core Course	CCCC	52-62	127-133	59	128	40-48	87-91	50	91
	AI/ML	2		2		2		2	
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4		4		4	
	Technical Communication	2		2		2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	16		16		6-10		6	
	PEC	32-40		39		22-26		21	
	TEB	6-8		6		6-8		6	
	OEC	9-12		9-12		9-12		9-12	
	CORE	2		2		2		2	
	Total	190-200		191-194		150-160		154-157	
	MSC/DHC	18/20		18/20		18/20		18/20	
	Grand Total			209-211				172-177	

DEPARTMENT OF CHEMISTRY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
5 Years BSMS (Chemical Sciences)

Program Code : 321 - BS-MS (Chemical Sciences)
 Department : CY - Chemistry

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year-wise)
1	23	23	46
2	23/24	23/24	46/48
3	24/25	19	43/45
4	18	22	40
5	6	10	16
Grand Total			191/194
Total with Minor Specialization Courses	with additional 18-20 credits (mentioned in the parentheses)		209/214

	Components	Maximum	Minimum	Comments
	Discipline (DIS)	20	10	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
Non-Credit Elements (NCE)	Internship (INT)	32	10	1 week internship= 1 unit (To be coordinated by departments/centres/school)
	Participation in professional development programs by Industry experts/ field experts (PPD-1, PPD-2 & PPD-3)	12	6	To be coordinated by departments/centres/school (2 nd , 3 rd and 4 th Years)
Minimum non-credit to be earned: 30				

DEPARTMENT OF CHEMISTRY
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
4 Years BSMS (Chemical Sciences) Exit

Program Code : 321 - BS-MS (Chemical Sciences)
Department : CY - Chemistry

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year-wise)
1	23	23	46
2	23/24	23/24	46/48
3	24/25	19	43/44
4	13	6	19
Grand Total			154/157
Total with Minor Specialization Courses	with additional 18-20 credits (mentioned in the parentheses)		172-177

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF CHEMISTRY

Program Code : 321 BS-MS (Chemical Sciences)
 Department : CY Chemistry
 Year : I

		Teaching Scheme			Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub. Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1.	HSI-101	Soft Skills-I	HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-
2.	MAI-101	Mathematics-I	BSC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
3.	PHI-101	Physics-I	BSC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	0
4.	CYC-101	Computer Programming	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	0
5.	TMI-101	Tinkering & Mentoring	TM	4	T-2	-	-	-	-	70	30	-	-	-
					M-2	2	0	2	-	50	-	50	-	-
6.	CHE-101	Energy Engineering	ESC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
		Total		23										
(Spring)														
1.	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	0	20-35	-	20-30	40-50	-
2.	MAI-102	Mathematics-II	BSC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
3.	ESS-103	Environmental Science and Sustainable	ESSC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	PHB-103	Modern Physics	BSC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
5.	CYC-102	Organic Chemistry-I	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
6.	BEE-102	Introduction to Computational Biology	ESC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
7.	BEE-105	Introduction to Biophotonics	ESC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
		Total		23										

DEPARTMENT OF CHEMISTRY

Program Code : 321 BS-MS (Chemical Sciences)
 Department : CY Chemistry
 Year : II

		Teaching Scheme			Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub. Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1.	HSSEC-I	HSS Elective Course	HSSEC	3										
2.	OEC-I	Open Elective Course	OEC	3/4										
3.	MSI-101	Fundamentals of Management	MC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	CYC-201	Thermodynamics and Electrochemistry	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
5.	CYC-203	Main Group and Cluster Chemistry	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
6.	CYC-205	Organic Chemistry-II	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	0
7.	CYC-207	Quantum Chemistry and Chemical Bonding	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
		Total		23/24										
(Spring)														
1.	DAI-101	Data Science	DSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	OEC-II	Open Elective Course	OEC	3/4										
3.	CYC-202	Coordination and Organometallic Chemistry	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	0
4.	CYC-204	Chemical Kinetics and Catalysis	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	0
5.	CYC-206	Organic Chemistry-III	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
6.	CYC-208	Molecular Symmetry, Group Theory and Spectroscopy	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
7.	CYC-291	Technical Communication	PCC	2	2	0	0	2	0	20-35	0	20-30	40-50	0
		Total		23/24										

DEPARTMENT OF CHEMISTRY

Program Code : 321 BS-MS (Chemical Sciences)
 Department : CY Chemistry
 Year : III

		Teaching Scheme			Contact Hours/Week			Exam. Duration		Relative Weight (%)					
S. No.	Sub. Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1.	HSSEC-II	HSS Elective Course	HSSEC	3											
2.	OEC-III	Open Elective Course	OEC	3/4											
3.	CYC-351	Artificial Intelligence in Chemistry	PCC	2	2	0	0	2	0	20-35	-	20-30	40-50	-	
4.	CYC-301	Advanced Coordination Chemistry	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
5.	CYC-303	Physical Laboratory	PCC	4	0	0	8	0	4	-	50	-	-	50	
6.	CYC-305	Inorganic Laboratory	PCC	4	0	0	8	0	4	-	50	-	-	50	
7.	CYT-I	Talent Enhancement-I	TEB	3	1	0	4	2	4	10-15	15-25	10-15	15-25	40-50	
8.	CYC-399	Community Outreach	CORE	2	0	0	4	0	4	100					
		Total		24/25											
(Spring)															
1.	CYC-302	Organic Laboratory	PCC	4	0	0	8	0	4	-	50	-	-	50	
2.	CYT-II	Talent Enhancement-II	TEB	3	0	0	6	0	4	-	50	-	-	50	
3.	CYL-I	Program Elective Course-I	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
4.	CYL-II	Program Elective Course-II	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
5.	CYL-III	Program Elective Course-III	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
6.	CYL-IV	Program Elective Course-IV	PEC	3	3	0	0	3	0	20-35	-	20-30	40-50	-	
7.	MSC/DHC-I	Minor Specialization Course-I/Departmental Honours Course-I	MSC/DHC	3/4											
		Total		19/											
				22-23											
Note: Students willing to exit with BS Degree in Chemical Sciences must inform to Dean (Academic Affairs) after completion of 6 th semester															

DEPARTMENT OF CHEMISTRY

Program Code : 321 BS-MS (Chemical Sciences)
 Department : CY Chemistry
 Year : IV

		Teaching Scheme			Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub. Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1.	CYC-401	Advanced Surface and Colloidal Chemistry	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
2.	CYL-V	Program Elective Course-V	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
3.	CYL-VI	Program Elective Course-VI	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	CYL-VII	Program Elective Course-VII	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
5.	CYL-VIII	Program Elective Course-VIII	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
6.	CYL-IX	Program Elective Course-IX	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
7.	MSC/DHC-II	Minor Specialization Course-II/Departmental Honours Course-II	MSC/DHC	3/4										
		Total		18/21-22										
(Spring)														
1.	CYC-400	Lab based Project	PCC	4	0	0	8	0	0	0	50	0	0	50
2.	CYC-402	Advanced Molecular Spectroscopy	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
3.	CYC-404	Heterocyclic Chemistry	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	CYL-X	Program Elective Course-X	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
5.	CYL-XI	Program Elective Course-XI	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
6.	CYL-XII	Program Elective Course-XII	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
7.	CYL-XIII	Program Elective Course-XIII	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
8.	MSC/DHC-III	Minor Specialization Course-III/Departmental Honours Course-III	MSC/DHC	3/4										
		Total		22/25-26										

DEPARTMENT OF CHEMISTRY

Program Code : 321 BS-MS (Chemical Sciences)
 Department : CY Chemistry
 Year : V

		Teaching Scheme				Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub. Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
(Autumn)															
1.	CYP-501	Thesis Stage I	PCC	6	0	0	12	0	0	0	0	0	100	0	
2.	MSC/DHC - IV	Minor Specialization Course-IV/ Departmental Honours Course-IV	MSC/DHC	3/4											
3.	MSC/DHC - V	Minor Specialization Course - V / Departmental Honours Course - V	MSC/DHC	3/4											
		Total		6/12-14											
(Spring)															
1.	CYP-502	Thesis Stage II	PCC	10	0	0	20	0	0	0	0	0	100	0	
		Total		10											

DEPARTMENT OF CHEMISTRY

Program Code : 321 BS-MS Exit Program (Chemical Sciences)
 Department : CY Chemistry
 Year : IV

	Teaching Scheme				Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub. Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1.	CYL-V	Program Elective Course-V	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
2.	CYL-VI	Program Elective Course-VI	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
3.	CYL-VII	Program Elective Course-VII	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	CYC-400	Lab based Project/Industry Oriented Problem	PCC	4	0	0	8	0	0	0	50	0	0	50
5.	MSC/DHC - II	Minor Specialization Course - II / Departmental Honours Course - II	MSC/DHC	3/4										
6.	MSC/DHC - III	Minor Specialization Course-III / Departmental Honours Course-III	MSC/DHC	3/4										
		Total		13/19-21										
(Spring)														
1.	CYP-400	Project	PCC	6	0	0	0	12	0	0	0	0	100	0
2.	MSC/DHC - IV	Minor Specialization Course-IV/ Departmental Honours Course-IV	MSC/DHC	3/4										
3.	MSC/DHC - V	Minor Specialization Course-V/ Departmental Honours Course-V	MSC/DHC	3/4										
		Total		6/12-14										

List of Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S. No.	Sub Code	Course Title	Sub. Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
1.	CYL-302	Bioinorganic and Biomimetic Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
2.	CYL-306	Analytical Methods in Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
3.	CYL-308	Chemistry of Industrial Processes	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
4.	CYL-310	Polymer Chemistry	PEC	3	2	0	2	3	0	10-25	25	15-25	30-40	0
5.	CYL-312	Programming in Quantum Chemistry	PEC	3	2	0	2	3	0	10-25	25	15-25	30-40	0
6.	CYL-314	Machine Learning in Catalysis	PEC	3	2	0	2	3	0	10-25	25	15-25	30-40	0
7.	CYL-512	Nuclear and Radiochemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
8.	CYL-518	Structure, Bonding and Properties of Solids	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
9.	CYL-520	Inorganic Rings and Polymers	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
10.	CYL-522	Synthesis and Properties of Materials	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
11.	CYL-524	Modern Organic Synthetic Methods	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
12.	CYL-526	Solid State Chemistry and Applications	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
13.	CYL-606	Total Synthesis	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
14.	CYL-607	Electroanalytical Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
15.	CYL-609	Inorganic Biochemistry and Reaction Mechanism	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
16.	CYL-610	Molecular Modelling and Simulations	PEC	3	2	0	2	2	0	10-25	25	15-25	30-40	0
17.	CYL-612	Carbon Nanomaterials and their Applications	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
18.	CYL-613	Frontiers in Inorganic Biochemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
19.	CYL-614	Asymmetric Synthesis	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0

20.	CYL-615	Crystal and Molecular Structure	PEC	3	2	0	2	2	0	10-25	25	15-25	30-40	0
21.	CYL-617	Supramolecular Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
22.	CYL-621	Organic Structure Determination	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
23.	CYL-623	Organic Semiconductors	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
24.	CYL-625	Proteins and Polypeptides	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
25.	CYL-627	Solid State Chemistry and Applications	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
26.	CYL-629	Advanced Topics in Statistical Mechanics, and Quantum Chemistry	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
27.	CYL-633	Nanoscale Materials: Properties and Applications	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
28.	CYL-635	Advanced Magnetic Resonance Spectroscopy	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
29.	CYL-638	Reactivity, Structure Determination, Devices and Electronic Structure of Solids	PEC	3	2	0	2	3	0	10-25	25	15-25	30-40	0
30.	CYL-640	Organic Materials	PEC	3	2	0	2	3	0	10-25	25	15-25	30-40	0
31.	CYL-642	Computational Methods in Material Science	PEC	3	2	0	2	3	0	10-25	25	15-25	30-40	0
32.	CYL-644	High Energy Density Materials	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
33.	CYL-646	Fluorescence and Ultrafast Spectroscopy	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
34.	CYL-648	Synthesis and Applications of Tetrapyrroles	PEC	3	3	0	0	3	0	20-35	0	20-30	40-50	0

List of Talent Enhancement Course

Teaching Scheme			Contact Hours/Week				Exam Duration		Relative Weight (%)					
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	C W S	P R S	MTE	E T E	P R E
Talent Enhancement Course - A														
1	CYT-101	Mathematical Methods in Chemistry	TEB	3	1	0	4	2	4	10-15	15-25	10-15	15-25	40-50
2	CYT-102	Computational Chemistry	TEB	3	0	0	6	-	-	-	50	-	-	50
Talent Enhancement Course - B														
1	CYT-103	Synthesis and Characterization of Functional Materials-I	TEB	3	1	0	4	2	4	10-15	15-25	10-15	15-25	40-50
2	CYT-104	Synthesis and Characterization of Functional Materials-II	TEB	3	0	0	6	-	-	-	50	-	-	50
Talent Enhancement Course - C														
1	CYT-105	Techniques for Analyzing (Inorganic) Molecules and Materials	TEB	3	1	0	4	2	4	10-15	15-25	10-15	15-25	40-50
2	CYT-106	Advanced Techniques for Analyzing (Inorganic) Molecules and Materials	TEB	3	0	0	6	-	-	-	50	-	-	50
Talent Enhancement Course - D														
1	CYT-107	Drug Design and Synthesis-I	TEB	3	1	0	4	2	4	10-15	15-25	10-15	15-25	40-50
2	CYT-108	Drug Design and Synthesis-II		3	0	0	6	-	-	-	50	-	-	50

Minor Specialization Courses

SN	Course Code	Course Name	Credits	Semester
1.	CYC-102	Organic Chemistry-I	3	Spring
2.	CYC-202	Coordination and Organometallic Chemistry	4	Spring
3.	CYC-203	Main Group and Cluster Chemistry	3	Autumn
4.	CYC-204	Chemical Kinetics and Catalysis	3	Spring
5.	CYC-206	Organic Chemistry-III	3	Spring
6.	CYC-207	Quantum Chemistry and Chemical Bonding	4	Autumn
7.	CYC-208	Molecular Symmetry, Group Theory and Spectroscopy	3	Spring

Departmental Honours Courses (20 credits)

SN	Course Code	Course Name	Credits
1.	CYL-608	Chemical Biology	3
2.	CYL-703	Advanced Material Characterization Techniques	4
3.	CYL-902	Advanced Inorganic Chemistry	3
4.	CYL-903	Advanced Organic Chemistry	3
5.	CYL-904	Advanced Physical Chemistry	3
6.	CYL-905	Spectroscopic Methods of Structural Elucidation	4

17-DEPARTMENT OF MATHEMATICS
5 year BSMS (Mathematics and Computing) with exit policy

Component wise distribution

Main Curriculum Components	Sub Components	Approved Credits for 5 year BSMS	Approved Credits Range	Proposed credits for 5 year BSMS by Department	Proposed Credits Range	Approved Credits for 4 year BSMS exit	Approved Credits Range	Proposed credits for 4 year BSMS exit by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53	5	45-65	5	53
	HSSEC	6		6		6		6	
	MC	3		3		3		3	
	BSC	12-20		20		12-20		20	
	ESC	8-20		8		8-20		8	
	DSC	4		4		4		4	
	ESSC	3		3		3		3	
	TM	4		4		4		4	
Program Core Course	CCCC	52-62	127-133	56	128	40-48	82-100	44	92
	AI/ML	2		2		2		2	
	Engg. Analysis and design (design thinking-based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4		4		4	
	Technical Communication	2		2		2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC/ Thesis	16		16		6-10		8	
	PEC	32-40		40		22-26		24	
	TEB	6-8		8		6-8		8	
	OEC	9-12		9-12		9-12		9-12	
	CORE	2		2		2		2	
	Total	190-200		192-195		138-179		156-159	
	MSC/DHC	18/20		18-20		18-20		18-20	
	Grand Total			210-215		156-199		174-179	

DEPARTMENT OF MATHEMATICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
5 year BSMS (Mathematics and Computing) with exit policy

Program Code : 323 - BS-MS (Mathematics and Computing)
 Department : MA – Mathematics

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year-wise)
1	23	21	44
2	23/24	19/20	42/44
3	19/20	19	38/39
4	20	20	40
5	18	10	28
Grand Total			192-195
Total with Minor Specialization Courses	with additional 18-20 credits (mentioned in the parentheses)		210-215

	Components	Maximum	Minimum	Comments
	Discipline (DIS)	20	10	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
Non-Credit Elements (NCE)	Internship (INT)	32	10	1 week internship= 1 unit (To be coordinated by departments/centres/school)
	Participation in professional development programs by Industry experts/ field experts (PPD-1, PPD-2 & PPD-3)	12	6	To be coordinated by departments/centres/school (2 nd , 3 rd and 4 th Years)
	Minimum non-credit to be earned: 30			

DEPARTMENT OF MATHEMATICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
4 year BSMS (Mathematics and Computing) with exit policy

Program Code : 323 - BS-MS (Mathematics and Computing)
 Department : MA – Mathematics

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year-wise)
1	23	21	44
2	23/24	19/20	42/44
3	19/20	19	38/39
4	16	16	32
Grand Total			156-159
Total with Minor Specialization Courses	with additional 18-20 credits (mentioned in the parentheses)		174-179

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF MATHEMATICS

Program Code : 323 - BS-MS (Mathematics and Computing)

Department : MA – Mathematics

Year : I

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
								(Autumn)						
1.	HSI-101	Soft Skills	HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-
2.	MAI-101	Mathematics-I	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	PHI-101	Physics-I	BSC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
4.	MAC-101	Computer Programming	PCC	4	3	0	2	3	0	10-25	25	15-25	30-40	-
5.	TMI-101	Tinkering and Mentoring	TMI	4	T-2	-	-	-	-	70	30	-	-	-
					M-2	2	0	0	2	-	50	-	50	-
6.	CSE-101	Data Structures and Algorithms	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Total				23										
(Spring)														
1.	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	0	20-35	-	20-30	40-50	-
2.	MAI-102	Mathematics-II	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	ESS-102	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4.	MAC-102	Discrete Mathematics	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	MAC-104	Elementary Real Analysis	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	MAC-106	Database Management Systems	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Total				21										

DEPARTMENT OF MATHEMATICS

Program Code : 323 - BS-MS (Mathematics and Computing)
 Department : MA – Mathematics
 Year : II

Teaching Scheme												
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Contact Hours/Week	Theory	Practical	CWS	Relative Weight (%)
(Autumn)												
1.	DAI-102	Data Science	DSC	4	3	1	0	3	3	0	20-35	20-30
2.	OEC-I	Open Elective Course-I	OEC	3/4								40-50
3.	MAB-104	Mathematical Methods	BSC	4	3	1	0	3	3	0	20-35	20-30
4.	MAB-103	Numerical Methods	BSC	4	3	1	0	3	3	0	20-35	40-50
5.	MAC-201	Operations Research	PCC	4	3	1	0	3	3	0	20-35	40-50
6.	MAC-203	Stochastic Calculus	PCC	4	3	1	0	3	3	0	20-35	40-50
Total				23/24								
(Spring)												
1.	HSSEC-I	HSS Elective Course-I	HSSEC	3								
2.	OEC-II	Open Elective Course-II	OEC	3/4								
3.	MSI-101	Fundamentals of Management	MC	3	3	0	0	3	3	0	20-35	20-30
4.	CSE-102	Introduction to Automata Theory	ESC	4	3	1	0	3	3	0	20-35	40-50
5.	MAC-202	Complex Analysis	PCC	4	3	1	0	3	3	0	20-35	40-50
6.	MAC-291	Technical Communication	PCC	2	2	0	0	3	3	0	100	
Total				19/20								

DEPARTMENT OF MATHEMATICS

Program Code : 323 - BS-MS (Mathematics and Computing)
 Department : MA – Mathematics
 Year : III

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1.	OEC-III	Open Elective Course-III	OEC	3/4										
2.	MAC-351	Fundamentals of AI/ML	PCC	2	2	0	0	2	0	20-35	-	20-30	40-50	-
3.	MAC-301	Basic Abstract Algebra	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	MAL-I	Program Elective Course-I	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	MAT-I	Talent Enhancement-I	TEB	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	MAC-399	Community Outreach	CORE	2	2	0	0	3				100		
Total				19-20										
(Spring)														
1.	HSSEC-II	HSS Elective Course-II	HSSEC	3										
2.	MAC-302	Theory of Differential Equations	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	MAL-II	Program Elective Course-II	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	MAT-II	Talent Enhancement-II	TEB	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	MAC-300	Lab/Industry Based Project	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	MSC-I	Minor Specialization Course-I	MSC	3/4										
Total				19/22-23										
Note: Students willing to exit with BS Degree in Mathematics and Computing must inform to Dean (Academic Affairs) after completion of 6 th semester														

DEPARTMENT OF MATHEMATICS

Program Code : 323 - BS-MS (Mathematics and Computing)

Department : MA – Mathematics

Year : IV

Teaching Scheme														
S. No.	Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)				
					L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1.	MAC-401	Abstract Algebra	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	MAC-403	Linear Algebra	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	MAC-405	Real Analysis	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	MAL-III	Program Elective Course-III	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	MAL-IV	Program Elective Course-IV	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	MSC-II	Minor Specialization Course-II	MSC	3/4										-
7.	MSC-III	Minor Specialization Course-IV	MSC	3/4										-
Total					20/26-28									
(Spring)														
1.	MAC-402	Topology	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	MAC-404	Functional Analysis	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	MAL-V	Program Elective Course-V	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	MAL-VI	Program Elective Course-VI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	MAL-VII	Program Elective Course-VII	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	MSC-IV	Minor Specialization Course-IV	MSC	3/4										-
7.	MSC-V	Minor Specialization Course-V	MSC	3/4										-
Total					20/26-28									

DEPARTMENT OF MATHEMATICS

Program Code : 323 - BS-MS (Mathematics and Computing)
 Department : MA – Mathematics
 Year : V

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1.	MSP-501	Thesis Stage-I	PCC	6	0	0	0	0	0	-	-	30	70	-
2.	MAL-VIII	Program Elective Course-VIII	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	MAL-IX	Program Elective Course-IX	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	MAL-X	Program Elective Course-X	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
Total				18										
(Spring)														
1.	MSP-502	Thesis Stage-II	PCC	10	0	0	0	0	0	-	-	30	70	-
Total				10										

DEPARTMENT OF MATHEMATICS

Program Code : 323 - BS-MS Exit Program (Mathematics and Computing)
 Department : MA – Mathematics
 Year : IV

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)				
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1.	MAC-401	Linear Algebra	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	MAC-403	Real and Functional Analysis	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	MAL-III	Program Elective Course-III	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	MAL-IV	Program Elective Course-IV	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	MSC-II	Minor Specialization Course-II	MSC	3/4										
6.	MSC-III	Minor Specialization Course-III	MSC	3/4										
Total				16/22-24										
(Spring)														
1.	MAP-400/MAL	BTP/Project-Internship/Entrepreneurship/ PEC*	PCC/PEC*	8								100		
2.	MAL-V	Program Elective Course-V	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	MAL-VI	Program Elective Course-VI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	MSC-IV	Minor Specialization Course-V	MSC	3/4	3	0/1								-
5.	MSC-V	Minor Specialization Course-VI	MSC	3/4	3	0/1								-
Total				16/22-24										

List of Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)				
Sl. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Exam Duration (Hrs.)		CWS	PRS	MTE	ETE	PRE
								Theory	Practical					
1	MAL-411	Analytic Number Theory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2	MAL-412	Combinatorial Mathematics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	MAL-413	Credit Risk Modeling	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	MAL-4xx	Design and Analysis of Algorithms	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	MAL-414	Differential Geometry	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6	MAL-416	Graph Theory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7	MAL-417	Mathematical Image Processing	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
8	MAL-4xx	Mathematical Modeling and Simulation	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
9	MAL-4xx	Number Theory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
10	MAL-4xx	Statistical Machine Learning	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
11	MAL-511	Abstract Harmonic Analysis	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
12	MAL-512	Advanced Complex Analysis	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
13	MAL-513	Advanced Matrix Theory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14	MAL-514	Advanced Numerical Analysis	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
15	MAL-515	Advanced Operations Research	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
16	MAL-516	Advanced Partial Differential Equations	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
17	MAL-517	Algebraic Number Theory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
18	MAL-518	Algebraic Topology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
19	MAL-519	Approximation Theory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
20	MAL-520	Coding Theory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
21	MAL-521	Commutative Algebra	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
22	MAL-522	Computational Fluid Dynamics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
23	MAL-523	Control Theory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
24	MAL-524	Dynamical Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

25	MAL-5xx	Fluid Dynamics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
26	MAL-xxx	Fourier Analysis and Applications	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
27	MA-527	Fuzzy Sets and Fuzzy Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
28	MAL-528	Hyperbolic Conservation Laws	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
29	MAL-529	Integral Equations and Calculus of Variations	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
30	MAL-531	Mathematical Biology	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
31	MAL-532	Mathematical Cryptography	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
32	MAL-533	Measure Theory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
33	MAL-534	Multivariate Techniques	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
34	MAL-535	Numerical Linear Algebra	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
35	MAL-536	Operator Theory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
36	MAL-537	Optimal Control Theory	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
37	MAL-538	Orthogonal Polynomials and Special Functions	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
38	MAL-539	Portfolio Optimization	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
39	MAL-540	Regularization Theory for Inverse Problems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
40	MAL-541	Representation Theory of Finite Groups	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
41	MAL-542	Semigroup Theory and Applications	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
42	MAL-543	Sobolev Spaces and Applications	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
43	MAL-544	Statistical Inference	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
44	MAL-545	Stochastic Differential Equations	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
45	MAL-546	Stochastic Partial Differential Equations	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
46	MAL-547	Wavelet Analysis	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

List of Talent Enhancement Course

Teaching Scheme				Contact Hours/Week			Exam Duration		Relative Weight (%)					
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	MTE	ETE	PRE
TEB-I (Optimization)														
1	MAT-101	Numerical Optimization	TEB	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2	MAT-102	Non linear Programming		4	3	1	0	3	0	20-35	-	20-30	40-50	-
TEB-II (Numerical Analysis)														
1	MAT-103	Numerical Analysis	TEB	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2	MAT-104	Finite Element Methods	TEB	4	3	1	0	3	0	20-35	-	20-30	40-50	-
TEB-III (Financial Mathematics)														
1	MAT-105	Financial Mathematics	TEB	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2	MAT-106	Financial Risk Management	TEB	4	3	1	0	3	0	20-35	-	20-30	40-50	-

Minor Specialisation Courses (20 credits)

Students of other departments can take any 5 courses from the following:

Sub. Code	Course Title	Credits	Prerequisite	Semester
MAC-102	Discrete Mathematics	4		Spring
MAC-104	Elementary Real Analysis	4		Spring
MAB-104	Mathematical Methods*	4		Autumn
MAB-103	Numerical Methods*	4		Autumn
MAC-201	Operations Research	4		Autumn
MAC-202	Complex Analysis	4	MAC-104	Spring
MAC-301	Basic Abstract Algebra	4		Autumn
MAC-302	Theory of Differential Equations	4	MAB-201	Spring
MAC-403	Linear Algebra	4		Autumn
MAC-405	Real Analysis	4	MAC-104	Autumn

*Not allowed if already studied in the BSC category

18-DEPARTMENT OF PHYSICS
5 year BSMS (Physics) with exit policy

Component wise distribution

Main Curriculum Components	Sub Components	Approved Credits for 5 year BSMS	Approved Credits Range	Proposed credits for 5 year BSMS by Department	Proposed Credits Range	Approved Credits for 4 year BSMS exit	Approved Credits Range	Proposed credits for 4 year BSMS exit by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53	5	45-65	5	53
	HSSEC	6		6		6		6	
	MC	3		3		3		3	
	BSC	12-20		16		12-20		16	
	ESC	8-20		12		8-20		12	
	DSC	4		4		4		4	
	ESSC	3		3		3		3	
	TM	4		4		4		4	
	CCCC	52-62		51		40-48		51	
Program Core Course	AI/ML	2	127-133	2	126	2	82-100	2	90
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4		4		4	
	Technical Communication	2		2		2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	16		16		6-10		6	
	PEC	32-40		45		22-26		19	
	TEB	6-8		6		6-8		6	
	OEC	9-12		9-12		9-12		9-12	
	CORE	2		2		2		2	
	Total	190-200		190-193		138-179		154-157	
	MSC/DHC	18/20		18/20		18/20		18/20	
	Grand Total			208-213		156-199		172-177	

DEPARTMENT OF PHYSICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
5 Years BSMS (Physics)

Program Code : 324 -BS-MS (Physics)
 Department : PH – Physics

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year-wise)
1	23	21	44
2	22/23	19/20	41/43
3	23/24	20	43/44
4	20	14	34
5	16	12	28
Grand Total			190/193
Total with Minor Specialization Courses	with additional 18-20 credits (mentioned in the parentheses)		208/213

	Components	Maximum	Minimum	Comments
	Discipline (DIS)	20	10	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
Non-Credit Elements (NCE)	Internship (INT)	32	10	1 week internship= 1 unit (To be coordinated by departments/centres/school)
	Participation in professional development programs by Industry experts/ field experts (PPD-1, PPD-2 & PPD-3)	12	6	To be coordinated by departments/centres/school (2 nd , 3 rd and 4 th Years)
	Minimum non-credit to be earned: 30			

DEPARTMENT OF PHYSICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
4 Years BSMS (Physics) Exit

Program Code : 324 -BS-MS (Physics)
 Department : PH – Physics

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year-wise)
1	23	21	44
2	22/23	19/20	41/43
3	23/24	20	43/44
4	20	6	26
Grand Total			154-157
Total with Minor Specialization Courses	with additional 18-20 credits (mentioned in the parentheses)		172-177

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF PHYSICS

Program Code : 324 -BS-MS (Physics)
 Department : PH – Physics
 Year : I

Teaching Scheme			Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)						
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Autumn Semester														
1.	HSI-101	Soft skills	HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-
2.	MAI-101	Mathematics - I	BSC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
3.	PHI-101	Physics - I	BSC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
4.	PHC-101	Computer Programming	PCC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
5.	TMI-101	Tinkering and Mentoring	TMI	T-2	-	-	-	-	-	70	30	-	-	-
				M-2	2	0	0	2	-	50	-	50	-	-
6.	ECE-101	Fundamentals of Electronics	ESC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
		TOTAL		23										
Spring Semester														
1.	HSI-102	Indian Knowledge System	HSSC	2	2	0	0	2	-	20-35	-	20-30	40-50	-
2.	MAI-102	Mathematics - II	BSC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
3.	ESS-102	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4.	CSE-101	Data Structure and Algorithm	ESC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
5.	PHC-102	Mechanics and Relativity	PCC	3	3	0	0	3	-	20-35	-	20-30	40-50	-
6.	PHC-112	Atomic and Nuclear Physics	PCC	3	3	0	0	3	-	20-35	-	20-30	40-50	-
7.	PHC-114	Physics Lab – I	PCC	2	0	0	4	-	4	-	50	-	-	50
		TOTAL		21										

DEPARTMENT OF PHYSICS

Program Code : 324 -BS-MS (Physics)
 Department : PH – Physics
 Year : II

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)				
S. No	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Autumn Semester														
1.	HSSEC-I	HSS Elective Course-I	HSSEC	3										
2.	OEC-I	Open Elective Course-I	OEC	3/4										
3.	MSI-101	Fundamentals of Management	MC	3	3	0	0	3	-	20-35	-	20-30	40-50	-
4.	ECE-103	Digital Electronics	ESC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
5.	MAB-104	Mathematical Methods	BSC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
6.	PHC-203	Thermal & Statistical Physics	PCC	3	3	0	0	3	-	20-35	-	20-30	40-50	-
7.	PHC-207	Physics Lab – II	PCC	2	0	0	4	-	4	-	50	-	-	50
		TOTAL		22/23										
Spring Semester														
1.	DAI-101	Data Science	DSC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
2.	OEC-II	Open Elective Course-II	OEC	3/4										
3.	PHC-204	Quantum Mechanics - I	PCC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
4.	PHC-214	Optics	PCC	3	3	0	0	3	-	20-35	-	20-30	40-50	-
5.	PHC-202	Mathematical Physics	PCC	3	3	0	0	3	-	20-35	-	20-30	40-50	-
6.	PHC-212	Physics Lab – III	PCC	2	0	0	4	-	4	-	50	-	-	50
		TOTAL		19/20										

DEPARTMENT OF PHYSICS

Program Code : 324 -BS-MS (Physics)
 Department : PH – Physics
 Year : III

Teaching Scheme			Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)						
S. No.	Subject Code	Course Title	Subject Area	Credits	Contact Hours/Week			Exam Duration (Hrs.)		CWS	PRS	MTE	ETE	PRE
					L	T	P	Theory	Practical					
Autumn Semester														
1.	HSSEC-II	HSS Elective Course	HSSEC	3										
2.	OEC-III	Open Elective Course-III	OEC	3/4										
3.	PHC-351	Fundamentals of AI/ML	PCC	2	2	0	0	2	0	20-35	-	20-30	40-50	-
4.	PHC-311	Classical Electrodynamics	PCC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
5.	PHC-313	Classical Mechanics	PCC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
6.	PHC-315	Physics Lab –IV	PCC	2	0	0	4	-	4	-	50	-	-	50
7.	PHC-399	Community Outreach	CORE	2								100		
8.	PHL-I	Program Elective Course-I	PEC	3	3	0	0	3	-	20-35	-	20-30	40-50	-
		Total		23/24										
Spring Semester														
1.	PHC-302	Condensed Matter Physics	PCC	3	3	0	0	3	-	20-35	-	20-30	40-50	-
2.	PHC-391	Technical Communication	PCC	2	0	0	4	0	-	-	50	-	-	50
3.	PHC-314	Statistical Mechanics	PCC	3	3	0	0	3	-	20-35	-	20-30	40-50	-
4.	PHC-316	Quantum Mechanics – II	PCC	3	3	0	0	3	-	20-35	-	20-30	40-50	-
5.	PHC-318	Physics Lab – V	PCC	3	0	0	6	-	3	-	50	-	-	50
6.	PHL-II	Program Elective Course-II	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-
7.	PHT-I	Talent Enhancement-I	TEB	2	0	1	3	-	-			100		
8.	MSC/DHC-I	Minor Specialization Course-I/Departmental Honours Course-I	MSC/DH C	3/4										
		Total		20/23-24										
Note: Students willing to exit with BS Degree in Physics must inform to Dean (Academic Affairs) after completion of 6 th semester														

DEPARTMENT OF PHYSICS

Program Code : 324 -BS-MS (Physics)
 Department : PH – Physics
 Year : IV

Teaching Scheme			Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)							
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
Autumn Semester															
1.	PHC-400	Engg. Analysis and Design/Lab Based Project/Practical Problems	PCC	4	-	-	-	0	0	20-35	-	20-40	60-80	0	
2.	PHT-II	Talent Enhancement-II	TEB	4	1	1	3	-	-	100					
3.	PHL-III	Program Elective Course-III	PEC	4	3	0	0	3	-	20-35	-	20-30	40-50	-	
4.	PHL-IV	Program Elective Course-IV	PEC	4	3	0	0	3	-	20-35	-	20-30	40-50	-	
5.	PHL-V	Program Elective Course-V	PEC	4	3	0	0	3	-	20-35	-	20-30	40-50	-	
6.	MSC/DHC -II	Minor Specialization Course-II/Departmental Honours Course-II	MSC/DHC	3/4											
		Total		20/23-24											
Spring Semester															
1.	PHL-VI	Program Elective Course-VI	PEC	3	3	0	-	3	-	20-35	-	20-30	40-50	-	
2.	PHL-VII	Program Elective Course-VII	PEC	3	3	0	-	3	-	20-35	-	20-30	40-50	-	
3.	PHC-402	Advanced Mathematical Physics	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
4.	PHC-404	Semiconductor Devices	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-	
5.	MSC/DHC -III	Minor Specialization Course-III/Departmental Honours Course-III	MSC/DHC	3/4											
		Total		14/17-18											

*Project only for 8 and above CGPA.

DEPARTMENT OF PHYSICS

Program Code : 324 -BS-MS (Physics)
 Department : PH – Physics
 Year : V

S. No.		Teaching Scheme			Contact Hours/Week				Exam Duration (Hrs.)		Relative Weight (%)				
		Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Autumn Semester															
1.	PHL-VIII	Program Elective Course-VIII	PEC		4	3	1	-	3	0	20-35	-	20-30	40-50	-
2.	PHL-IX	Program Elective Course-IX	PEC		4	3	1	-	3	0	20-35	-	20-30	40-50	-
3.	PHL-X	Program Elective Course-X	PEC		4	3	1	-	3	0	20-35	-	20-30	40-50	-
4.	PHP-501	Thesis stage - I	PCC		4	-	-	-	-	-	-	-	30	70	0
5.	MSC/DHC-IV	Minor Specialization Course-IV/Departmental Honours Course-IV	MSC/D HC		3/4										
		Total			16/19-20										
Spring Semester															
1.	PHP-502	Thesis stage - II	PCC		12	-	-	-	-	-	-	-	30	70	0
2.	MSC/DHC-V	Minor Specialization Course-IV/Departmental Honours Course-IV	MSC/D HC		3/4										
		Total			12/15-16										

DEPARTMENT OF PHYSICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code : 324 -BS-MS (Physics) with Exit Policy
Department : PH – Physics
Year : IV

Teaching Scheme		Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)								
S. No	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE	
Autumn Semester															
1.	PHC-400	Engg. Analysis and Design/Lab Based Project/Practical Problems	PCC	4	-	-	-	0	0	20-35	-	20-40	60-80	0	
2.	PHT-II	Talent Enhancement-II	TEB	4	1	1	3	-	-	100					
3.	PHL-III	Program Elective Course-III	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-	
4.	PHL-IV	Program Elective Course-IV	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-	
5.	PHL-V	Program Elective Course-V	PEC	4	3	1	0	3	-	20-35	-	20-30	40-50	-	
6.	MSC/DHC-II	Minor Specialization Course-II/Departmental Honours Course-II	MSC/DHC	3/4											
7.	MSC/DHC-III	Minor Specialization Course-III/Departmental Honours Course-III	MSC/DHC	3/4											
		Total		20/26-28											
Spring Semester															
1.	PHP-400/PHL	Project/Internship Based Project/Entrepreneurship/PEC*	PCC/PEC*	6						100					
2.	MSC/DHC-IV	Minor Specialization Course-IV/Departmental Honours Course-IV	MSC/DHC	3/4											
3.	MSC/DHC-V	Minor Specialization Course-IV/Departmental Honours Course-IV	MSC/DHC	3/4											
		Total		6/12-14											

*Project only for 8 and above CGPA.

List of Program Elective Courses

PECs (Programme Elective Courses) in 3rd year:

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)								
S. No.	Subject Code	Course Title	Subject Area	Credits	L			T		P		Theory	Practical	CWS	PRS	MTE	ETE	PRE
Autumn Semester																		
1.	PHC-301	Atomic and Molecular Spectroscopy	PEC	3	3	0	0	-	3	-	20-35	-	20-30	40-50	-	20-30	40-50	-
2.	PHC-303	Signals and systems	PEC	3	3	0	0	-	3	-	20-35	-	20-30	40-50	-	20-30	40-50	-
3.	PHC-304	Nuclear Physics & Applications	PEC	3	3	0	0	0	3	0	20-35	-	20-30	40-50	-	20-30	40-50	-
4.	PHC-306	Microprocessor and microcontroller	PEC	3	3	0	0	0	3	0	20-35	-	20-30	40-50	-	20-30	40-50	-
5.	PHC-308	Quantum Electronics and Devices	PEC	3	3	0	0	0	3	0	20-35	-	20-30	40-50	-	20-30	40-50	-
6.	PHL-306	Accelerator Physics	PEC	4	3	1	1	-	3	-	20-35	-	20-30	40-50	-	20-30	40-50	-
7.	PHL-307	Essential Mathematics for AI	PEC	4	3	1	1	-	3	-	20-35	-	20-30	40-50	-	20-30	40-50	-
8.	PHC-308	Computer Architecture for AI	PEC	3	3	0	0	0	3	0	20-35	-	20-30	40-50	-	20-30	40-50	-
9.	PHL-309	Machine Learning	PEC	3	3	1	1	0	3	0	20-35	-	20-30	40-50	-	20-30	40-50	-
10.	PHL-310	Money, Banking and Financial Markets	PEC	4	3	1	1	-	3	-	20-35	-	20-30	40-50	-	20-30	40-50	-
11.	PHL-311	Nuclear Instrumentation	PEC	4	3	1	1	-	3	-	20-35	-	20-30	40-50	-	20-30	40-50	-
12.	PHL-312	Numerical Techniques, including FEM, FDM, FDTD, FIM	PEC	3	3	0	0	0	3	0	20-35	-	20-30	40-50	-	20-30	40-50	-
13.	PHL-313	Solar Energy Materials and Devices	PEC															

PECs (Programme Elective Courses) in 4th and 5th years:

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Autumn Semester														
1	PHL-501	Nuclear Astrophysics	PCC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
2	PHL-502	Physics of Nanosystems	PCC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
3	PHL-503	Superfluidity and Superconductivity	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
4	PHL-504	Fiber and Nonlinear Optics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
5	PHL-505	Quantum Optics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
6	PHL-506	Advanced Quantum Computing	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
7	PHL-507	Advanced topics in Mathematical Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
8	PHL-508	Introduction to Superstring Theory	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
9	PHL-509	Advanced Electroceramics Technology	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
10	PHL-510	Advanced Characterization Techniques	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
11	PHL-511	Atomic and Molecular Collision Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
12	PHL-512	A Primer in Quantum Field Theory	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
13	PHL-513	Astrophysics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
14	PHL-514	Solar-Terrestrial Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
15	PHL-515	General Relativity	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
16	PHL-516	Computational Nuclear Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
17	PHL-517	Particle Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
18	PHL-518	Advanced Atomic and Molecular Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
19	PHL-520	Quantum Theory of Solids	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
20	PHL-521	Weather Forecasting	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
21	PHL-522	Nuclear Instrumentation	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
22	PHL-523	Physics and Technology of Thin Films	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-

23	PHL-524	Advanced Nuclear reactions	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
24	PHL-525	Semiconductor Photonics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
25	PHL-526	Advanced Light Sources	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
26	PHL-527	Superconducting Radio Frequency for particle accelerators	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-

List of Talent Enhancement Course

Teaching Scheme			Contact Hours/Week					Exam Duration		Relative Weight (%)				
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	MTE	ETE	PRE
(TEB-I)														
1	PHT-101	Experimental Techniques in Quantum Materials	TEB	2	0	1	3	-	-				100	
2	PHT-102	Ad. Experimental Techniques in Quantum Materials	TEB	4	1	1	3	-	-				100	
(TEB-II)														
1	PHT-103	Experimental Techniques in Laser Physics	TEB	2	0	1	3	-	-				100	
2	PHT-104	Ad. Experimental Techniques in Photonics	TEB	4	1	1	3	-	-				100	
(TEB-III)														
1	PHT-105	Experimental Techniques in Gamma Spectroscopy	TEB	2	0	1	3	-	-				100	
2	PHT-106	Experimental Techniques in Charged Particle Spectroscopy	TEB	4	1	1	3	-	-				100	
(TEB-IV)														
1	PHT-107	Methods and Experiments in Atmospheric and Space Physics	TEB	2	0	1	3	-	-				100	
2	PHT-108	Ad. Experimental Techniques in Atmospheric and Space Physics	TEB	4	1	1	3	-	-				100	
(TEB-V)														

1	PHT-109	Principles of Electroceramic Processing & Fabrication	TEB	2	0	1	3	-	-	100
2	PHT-110	Advanced Techniques of Electroceramic Characterization	TEB	4	1	1	3	-	-	100
(TEB-VI)										
1	PHT-111	Theoretical & Computational Techniques	TEB	2	0	1	3	-	-	100
2	PHT-112	Ad. Computational Techniques	TEB	4	1	1	3	-	-	100

Minor Specialisation Courses

S.No.	Code	Course title	Semester	Credits
1	PHC-102	Mechanics and Relativity	Spring	3
2	PHC-206	Applied Optics	Spring	4
3	PHC-311	Classical Electrodynamics	Autumn	4
4	PHC-313	Classical Mechanics	Autumn	4
5	PHC-204	Quantum Mechanics - I	Spring	4
6	PHC-316	Quantum Mechanics - II	Spring	3
7	PHC-302	Condensed Matter Physics	Spring	3
8	PHC-308	Quantum Electronics and Devices	Spring	3

Item No. 96.4: To consider the proposal for consideration of admission through sports quota in IITs/CFTIs.

The IAPC in its 129th meeting held on 22.03.2023 considered the proposal of IIT Madras, received through the Ministry of Education, dated Oct. 31, 2022, regarding provision of admission through sports quota in IITs and CFTIs. **Appendix-A.**

Currently, there no provision of Sports quota for admission into the IITs and CFTIs. Therefore, the proposal was sent to all Departments/ Centres/School vide e -mail dated Feb. 16, 2023 for their views. The comments received on the proposal are attached as **Appendix-B.**

The IAPC recommended the proposal with modification as under:

- Each **Institute may allot one supernumerary seat in each course/discipline** in which they admit undergraduate students. For example, IIT Roorkee has 18 UG programmes and hence shall have 18 supernumerary seats, one each per course/discipline.
- Candidates seeking admission under this quota for the IITs must **qualify JEE (Advanced) and have a rank in the Common Rank List and also satisfy a set of eligibility criteria.**
- Only the candidates who **participated at least in the National-Level events** be considered from the list of JEE Advanced qualified candidates and have a rank in the Common Rank List.
- The seat and the discipline/course will be allotted to such eligible candidates based on their JEE (Advanced) rank.

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

F. No. 5-18/2022-T.S.-I
Government of India
Ministry of Education
Department of Higher Education
Technical Section-I

Shastri Bhawan, New Delhi
Dated the 31st October, 2022

To,
Directors, All IITs (excluding IIT Madras)

Subject: Proposal for consideration of admission through sports quota in IITs/ CFTIs.

Sir,

I am directed to forward herewith a copy of letter no. DIR/2022 dated 21-10-22 on the above mentioned subject, received from Director, IIT Madras and to request that comments on the proposal may please be furnished to this Ministry at the earliest.

Yours faithfully,



(Kavita Chauhan)
Under Secretary to the Government of India
Ph No. 23381698

Encl: As above

Copy for information to: Director, IIT Madras

Indian Institute of Technology Madras
Chennai – 600 036

Phone : 0091-44-2257 0694 / 0091-44-2257 8001
Fax : 0091-44-2257 8003 / 0091-44-2257 0509



भारतीय प्रौद्योगिकी संस्थान मद्रास
चेन्नै – ६०० ०३६

Email : kama@cse.iitm.ac.in / director@iitm.ac.in
Web : http://www.iitm.ac.in

प्रो. वी. कामकोटि
Prof. V. Kamakoti
निदेशक
Director



DIR/2022
October 21, 2022

To
Shri Rakesh Ranjan
Additional Secretary
Department of Higher Education
Ministry of Human Resource Development, GoI
Shastri Bhawan,
NEW DELHI – 110 115.

Dear Sir,

Sub: Proposal for consideration of admission through sports quota
in IITs / CFTIs – reg.

Of late IITs are witnessing increased interest in the field of sports among our students. Given this, it will be nice if we could accommodate candidates well trained and accomplished in sports as part of our under-graduate programs.

I propose a sports quota for the B.Tech admissions :

- Each Institute may allot one supernumerary seat in each course/discipline in which they admit undergraduate students. For example, IIT Madras has 13 such courses/disciplines and hence shall have 13 supernumerary seats, one each per course/discipline.
- Candidates seeking admission under this quota for the IITs must qualify JEE (Advanced) and have a rank in the Common Rank List and also satisfy the eligibility criteria (guidelines followed by the Tamil Nadu Government is enclosed as an example).
- The courses will be allotted to such eligible candidates based on their JEE (Advanced) rank.
- The same process may be considered for admissions to other CFTIs using JEE (Mains) rank.

I believe this will be a solid first step towards the larger goal of "A CFTI-ian winning a Olympic Medal". As an immediate effect, this will also encourage parents to permit their children to play a bit along with their studies.

With warm regards,

Sincerely yours,

V. Kamakoti
(V Kamakoti)

Encl: as above

U.S. (H.T.)
28/10/22
50 (H.T.)
31/10/22
8hMG

ALLOTMENT OF SEATS FOR CANDIDATES UNDER QUOTA FOR EMINENT SPORTS PERSONS

1. The purpose of this quota is to recognise and give weightage to the sports eminence of the candidates and hence marks for sports achievements alone will be considered in ranking the candidates. The candidates are expected to continue their good performance in sports, even after admission.
2. The candidate shall submit **all the sports certificates along with participation certificates and relevant forms** issued by Association / Federation recognised, but only one highest achievement in a tournament (among the International, National, State, Divisional and District) in an academic year in the sports disciplines listed in Table VIII will be considered for awarding marks.
3. Selection of the candidate will be based on the marks obtained by the candidate strictly following the guidelines, given in the tables.

Table (I) - Marks for Recognised International Achievement

Sl. No	Competition	Gold	Silver	Bronze	Participation
1.	International (Representing India Category – I)	1000	850	650	300
2.	International (Representing India Category – II)	500	450	400	150

Table (II) – Marks for Recognised National Achievement

Sl. No.	Competitions	Allocation of Marks			
		Gold	Silver	Bronze	Participation
1.	National Championships / National Games – Organised by National Federations / IOA	190	160	130	50
2.	School Games Federation of India (SGFI) Meet (National Level)	190	160	130	50
3.	All India Rural Sports Meet/ PYKKA National Level Rural Competition /KHELO-India.	190	160	130	50
4.	National Sports Festival for Women / PYKKA National Level Women Competition/KHELO-India.	190	160	130	50
5.	National Inter School Competition (National Level)	190	160	130	50

Table (III) – Marks for Recognised State Championship

Sl. No.	Competitions	Allocation of Marks			
		Gold	Silver	Bronze	Participation
1.	State championship representing revenue district-organized by state associations	95	80	65	20

Table (IV) – Marks for Recognised State Level Achievements

Sl. No.	Competitions	Allocation of Marks			
		Gold	Silver	Bronze	Participation
1.	Bharathiar day Sports Meet (State Level)	80	65	50	15
2.	Republic days Sports Meet (State Level)	80	65	50	15
3.	State Inter School Competition (State Level)	80	65	50	15
4.	KVS/CBSE National Sports Meet (State Level)	80	65	50	15
5.	PYKKA (Panchayat Yuva Krida Aurkhel Abhiyan) State Rural Competition/ KHELO - India	80	65	50	15
6.	Chief Minister Trophy/ SDAT State Games (State Level)	80	65	50	15

Table (V) – Marks for Recognised Division Level Achievements

Sl. No.	Competitions	Allocation of Marks			
		Gold	Silver	Bronze	Participation
1.	Bharathiar day Sports Meet (Division Level)	60	45	30	10
2.	Republic days Sports Meet (Division Level)	60	45	30	10
3.	KVS/CBSE National Sports Meet (Division Level)	60	45	30	10

Table (VI) – Marks for Recognised District Level Achievements

Sl. No.	Competitions	Allocation of Marks			
		Gold	Silver	Bronze	Participation
1.	District Tournaments/ Sports Meet/ Championships conducted by District sports Associations (Recognized by SDAT/TNOA)	45	30	15	5
2.	District Inter School Competition/ SAI promotion Games (District Level)	45	30	15	5
3.	PYKKA - District level Rural Competition/ KHELO - India	45	30	15	5
4.	PYKKA - District level Women Competition/ KHELO - India	45	30	15	5
5.	Chief Minister Trophy/ SDAT State Games (District Level)	45	30	15	5

Gold (I Position)**Silver (II Position)****Bronze (III Position)****4. (a) For International Tournaments:**

Category – I	Olympics, World Cup, Commonwealth Games and Asian games (Games organised in 4 years frequency by the International Olympic Committee).
Category – II	A minimum of six countries must have participated for International tournaments which are not covered under Category I and such tournaments should have been approved by Indian Olympics Association (IOA), Sports Authority of India (SAI) and Ministry of Youth Affairs and Sports (MYAS), Government of India. Open or Invitational or Memorial or any indifferent nomenclature or title of tournaments or Championships at International level, not approved by any of the above authority will not be considered for marks.

- Participation or achievement in International tournaments will be considered only with earlier achievements at National and State level tournaments. Direct participation in any International or National tournaments will not be considered for award of marks.**
- The highest achievement in only one annual regular tournament, officially conducted in a regular manner by the member National Olympic Committee (NOCs) authorised by the International Olympic Committee (IOC) or International Sports Federations affiliated to the IOC will be considered for award of marks. The players/sports persons representing the Country in such tournaments through Indian Olympic Association (IOA) or respective National Sports Federations recognised by the Ministry of Youth Affairs and Sports, Government of India or IOA will be considered for award of marks in each year.
- Only tournaments officially recognised by the Indian Olympic Association / respective official National Federations will be considered for the award of marks (for each year) from **01.06.2018 to Last date of submission of application (01.06.2018 to 31.05.2019, 01.06.2019 to 31.05.2020, 01.06.2020 to 31.05.2021 and 01.06.2021 to Last date of submission of application).**
- Certificates of Participation or Achievements in tournaments, submitted along with Form I alone are eligible for marks indicated in Table (I) above (should be submitted before the last date for submission of application).
- Players who participated in any of the categories I and II, in Table(I) should produce the copies of the following:-
 - VISA, Immigration entry in passport, clearance from Ministry of Youth Affairs and Sports (Government of India), Indian Olympic Association and respective National Sports Federations including BCCI.
 - The fixture, draw, schedule of events, players' accreditation, National Medal, Merit, Diploma, Participation

certificate and Form-I issued by the respective National Sports Federation and certificates signed and issued in the prescribed format by the President or Secretary General of the National Olympic Committee of the Organising Country and International Federation.

4 (b). For National Tournaments

1. National tournaments should have been officially be recognised as the regular annual championship / tournament by MYAS or IOA or SAI or SDAT or respective official National Sports Federation will be considered (for each year) for the award of marks.
2. Marks will not be awarded for selection trials and coaching camps.
3. Tournaments conducted by the Federations which are not recognized by the IOA or MYAS, TNOA or SDAT at National level for a particular period will not be considered for award of marks.
4. Candidates must have participated at Zonal, District, Divisional, National, and International in a particular Game/Sport in the same hierarchical order as per the existing norms applicable for a particular Game/Sports.

4 (c) For State Tournaments

1. State level tournaments should officially be recognized as the regular annual championship or tournament by respective official State Association or SAI or SDAT will be considered (for each year) for the award of marks.
2. Marks will not be awarded for selection trials and coaching camps.
3. Any tournaments conducted by the Association which are de-recognised by the TNOA or SDAT at State level for a particular period will not be considered for award of marks.

4 (d) For CBSE/KV Schools Sports Achievements

1. The number of KV and CBSE Schools, when compared to State Board Schools in TamilNadu, is very less. Hence, the cluster level achievements are not considered.
2. The candidates participated in the tournament conducted by CBSE and KV Schools, at Regional / South Zone are equated to Divisional Level Achievements, and the National Level Achievements are equated to State Level of State Board Schools.

5. General Conditions

1. For consideration of candidates seeking admission under the category of eminent sports person, he/she should enclose all the attested photo copies of participation certificates and the relevant forms issued by the competent sports authorities. **The application along with all the sports certificates /relevant forms/documents as given in 4(a) 5 (page number 28), should be presented for certificate verification which will be done at Central Polytechnic College, Tharamani, Chennai.**
2. Participation / achievements in each academic year from 01.06.2018 to Last date of submission of application (01.06.2018 to 31.05.2019, 01.06.2019 to 31.05.2020, 01.06.2020 to 31.05.2021 and 01.06.2021 to Last date of submission of application). in sports / games shown in the list alone will be considered for the award of marks. National or State Level Championships or Tournaments conducted by Sports Federations or Associations recognized by MYAS or IOA or SDAT or TNOA alone will be considered for the award of marks. (Recognition of State Associations / National Federations should be relevant to the year concerned).
3. Relevant attested copies of certificates issued by the competent authorities as detailed below are to be submitted along with the application before the last date for receiving the applications.

TABLE (VII) – Competent authority to issue Forms / Certificates

Category	Competent Authority	Form / Certificates
International (Representing Nation)	President or Secretary of the National Sports Federation (recognised by Ministry of Youth Affairs and Sports or IOA)	Certificate and Form – I
	Participation certificate / Diploma should be signed by the President or Secretary General or Chairman of the organising Committee of the host Nation	
National (Representing State)	Member Secretary, SDAT or Secretary of the State Association (recognised both by SDAT and TNOA)	Certificate and Form – II
National Games (Representing the State)	President or Secretary of IOA and Chairman of the organising committee	Certificate and Form – II

National (Representing State)	Chief Inspector of Physical Education for National School Games competitions	Certificate and Form – IV
School Games Federation of India (SGFI) National Level	President / Hon. Gen. Secretary, SGFI	Certificates and Forms
National Inter School Competition (National Level)	Executive Director or Director-General, Sports Authority of India	Certificates and Forms
All India Rural Sports (National Level)	Executive Director or Director-General, Sports Authority of India	Certificates and Form – II
National Sports Festival for Women(National Level)	Executive Director or Director-General, Sports Authority of India	Certificates and Form – II
PYKKA(Panchayat Yuva Krida aur Khel Abhiyan) National Level Rural Tournament	Executive Director or Director-General, Sports Authority of India	Certificates
KVS Nationals (State Level)	Commissioner or Joint Commissioner of KVS	Certificates
CM Trophy (State Level)	Member Secretary, Sports Development Authority of Tamilnadu	Certificates
SDAT approved State Level Tournaments	Member Secretary, Sports Development Authority of Tamilnadu	Certificates
CBSE National Sports Meet (State Level)	A. E. O. – Sports or Secretary, CBSE	Certificates
Bharathiar Day Sports Meet (State Level)	Regional Inspector of Physical Education and Chief Inspector of Physical Education	Certificates
Republic Day Sports Meet (State Level)	Regional Inspector of Physical Education and Chief Inspector of Physical Education	Certificates
State Inter School Competitions (State Level)	Member Secretary, Sports Development Authority of Tamilnadu	Certificates
PYKKA State Rural Competition	Member Secretary, Sports Development Authority of Tamilnadu	Certificates
Bharathiar Day Sports Meet (Divisional Level)	Regional Inspector of Physical Education and Chief Education Officer	Certificates
Republic Day Sports Meet (Divisional Level)	Regional Inspector of Physical Education and Chief Education Officer	Certificates
KVS Regional Level (Divisional Level)	Assistant Commissioner of KVS	Certificates
CBSE South Zone Sports Meet (Divisional Level)	A.E.O. – Sports or Secretary, CBSE	Certificates
District Inter School Competitions (Divisional Level)	District Sports Officer	Certificates
PYKKA District Rural Competition	Member Secretary and District Sports	Certificates
District Level Competitions	Officer RIPE and District Education Officer	Certificates

- These Certificates are not valid unless signed personally in ink by the authorities mentioned above.
- Open or Invitational or Memorial or any indifferent nomenclature or title of tournaments or Championships at District or State or National or International level will not be considered for marks.
- District or Inter-District Championship means the championships conducted by the respective recognized District or State Sports Association for a Revenue District or Revenue Districts in the State of TamilNadu.
- Direct participation or achievement at any level without participating in the qualifying level competitions such as District or State or National or direct selection conducted by District or State Sports Association or National Sports Federation to represent the District or State or National or International tournaments or championships will not be considered for award of marks.
- For International achievements in Tennis, marks for Gold, Silver and Bronze will be awarded to players who are ranked first, second and third respectively in the ATP or WTA rankings of International Tennis Federation for awarding participation marks for the top **5 ranked** players will be considered from the ATP or WTA list published by the International Tennis Federation. Necessary document and proof should be enclosed by the candidate.

For National or State level achievement in Tennis, marks for Gold, Silver and Bronze will be awarded to players

who are ranked first, second and third respectively in the AITA or TANTA at National or State. For awarding participation mark the top 5 ranked players will be considered from the list published by AITA or TANTA at National or State level based on the ranking. Necessary document and proof should be enclosed by the candidate.

9. Certificates should be in printed form and necessary Form-I and II should be in prescribed format. (Certificates or forms issued in letter pads will be invalid).
10. All other sport disciplines in which ranking is the criteria for assessment of achievement, rules indicated in Item 8 above will be applicable for the award of marks.
11. For Cricket, the annual official Championships or tournaments conducted within the country under the auspices of TNCA or BCCI at District or State or National Level alone will be taken into consideration for that year.
12. Multiple events in a particular sport must be standardized events and in accordance with the events organized by the approved International Federations. Events newly created and not in accordance with the requirement will not be considered for award of marks.
13. **Participation or achievements of candidates with nativity of Tamil Nadu who represented Tamil Nadu alone are eligible for marks under National Category.**
14. Only Tamil Nadu candidates are eligible to apply for admission under Sports Quota and only the KVS and CBSE schools within Tamil Nadu are eligible for marks.
15. A Common Committee for Engineering and Medicine constituted for this purpose will rank the candidates based on the marks assigned to the certificates enclosed along with the application. Candidates with a minimum sports mark of 5 and above alone will be considered for ranking.
16. **All the achievement certificates are to be supported necessarily by the relevant participation certificates and appropriate forms.**
17. No further enclosures or certificates will be entertained after the last date for submission of completed application, in person.
18. Highest achievement or participation certificates obtained by candidate at different levels such as District or State or National or International in each year along with earlier achievements should be enclosed without fail. (A candidate shall enclose copy of all eligible certificates for scrutiny).
19. Candidates in proportion to the available seats will be called to appear before the Common Committee for Engineering or Medicine for verification of the Originals, followed by counseling after ranking.
20. If any candidate fails to produce the requisite Original Certificates or Forms, his/her place will be allotted to the candidate next in rank and so on. The consequential vacancy at the end of the rank list will be filled up from among the additional candidates according to their ranks.
21. All the highest level of participation or achievement should be supported by earlier achievements at all levels of competition.
22. Short listed candidates will be called for counselling based on their rank and branches and colleges will be allotted according to their choices from the number of seats reserved under sports quota based. Sports quota counselling will be held before the commencement of general counselling.
23. Candidates securing admissions under Eminent Sports Persons quota should sign an undertaking at the time of receiving allotment order assuring participation in sports activities in the college preferred by them.
24. Legal action would be taken on parents and candidates for furnishing bogus documents. They should ensure that the certificates obtained are from competent authorities.
25. A candidate can utilise the Sports Quota only once for Engineering or Medicine.

TABLE (VIII) – SPORTS QUOTA (2022 – 2023) LIST OF SPORTS DISCIPLINES

1.	Archery	31.	Korf Ball
2.	Athletics	32.	Mallakhamb
3.	AtyaPatya	33.	Motor Sports
4.	Badminton	34.	Netball
5.	Ball Badminton	35.	Polo
6.	Baseball	36.	Powerlifting
7.	Basketball	37.	Roll Ball
8.	Beach Volleyball	38.	Roller Skating
9.	Bridge	39.	Rowing
10.	Billiards and Snookers	40.	Rugby
11.	Body Building	41.	Sailing
12.	Boxing	42.	Sepak Takraw
13.	Canoeing & Kayaking	43.	Shooting
14.	Carom	44.	Silambam
15.	Chess	45.	Soft Ball
16.	Cricket	46.	Soft Tennis
17.	Cycle Polo	47.	Squash Rackets
18.	Cycling	48.	Swimming
19.	Deaf Sports	49.	Table Tennis
20.	Equestrian for Paraspports (sports discipline included in para-olympic and para Asian games)	50.	Taek-won-do
21.	Fencing	51.	Tennikoit
22.	Football	52.	Tennis
23.	Golf	53.	Throwball
24.	Gymnastics	54.	Triathlon
25.	Handball	55.	Volleyball
26.	Hockey	56.	Weightlifting
27.	Judo	57.	Wrestling
28.	Karate – Do	58.	Wushu
29.	Kabaddi	59.	Yachting
30.	Kho – Kho	60.	Yogasanas

Comments received on the proposal admission through sports quota in IITs/CFTIs

S.No.	Department/Centre/School	Comments received
1.	Physics	DFC discussed the circular from the Ministry of Education on the proposal for admission through Sports Quota in IITs/CFTIs. It was resolved that there should not be any sport quota in the admission.
2.	Hydro and Renewable Energy	This is a good proposal. All faculty members of the department agree to the proposal of admission in IITs/CFTIs through sports quota.
3.	WRD&M	DFC in its meeting held on 01.03.2023 discussed and welcomed the proposal for admission through Sports Quota in IITs/CFTIs.
4.	Applied Mathematics and Scientific Computing	As per the discussion with DAPC and CRC chairs, the AMSC department recommends in favor of the proposal.
5.	Management Studies	The letter of Director IIT Madras received through Ministry of Education regarding admission to CFTIs through sports quota was discussed. It was proposed to admit maximum 2 students in MBA as supernumerary under sports quota with following requirements: 1. Candidate has participated in Recognized National level/ International level sports events during graduation level study. 2. Candidate has qualified CAT. 3. Candidate has to appear in Interview process. 4. A separate merit list on the basis of sports achievement and interview marks will be prepared to decide the final admission.

6.	Design	The Departmental Academic Programme Committee (DAPC) of the Department of Design recommends that admission through Sports Quota in IITs/CFTIs will not add value to the academic Programmes of the institute.
7.	Chemical	Agreed
8.	Biosciences and Bioengineering	The Department's opinion is that the sports quota may be given but after qualifying JEE Advanced examination.
9.	Electronics and Communication Engineering	We should not have any sports quota in IITs. We should try to improve the physical education aspects of the existing pool of students.
10.	Polymer and Process Engineering	Yes, the limit of quota of 1 sports student may be included in each of the UG courses. However, this should not be taken from the existing numbers of other categories. Rather this number of 1 seat for sports quota per each UG course should be additionally added to avoid the shrinking of opportunities to students from other categories in the present situations.
11.	Earth Sciences	DFC agreed to the proposal and guidelines for admission through sports quota in IITs.
12.	Hydrology	DFC agreed to support admission through sports Quota in IITS/CFTIS in the undergraduate program.
13.	CTRANS	Agreed to allow students under sports quota in the existing M. Tech program of CTRANS.

Item No. 96.5: To consider the proposal of the IKS Committee to establish a new Centre – “Centre of Excellence in Indian Knowledge Systems (CoEIKS)”.

There has been a growing interest in the field of Indian Knowledge Systems (IKS) in India. The NEP 2020 states that the fundamental principles that will guide both the education system at large, as well as the individual institutions within it include- “a rootedness and pride in India, and its rich, diverse, ancient and modern culture and knowledge systems and traditions”. Leading academic institutions in India have recognized the importance for the same and have started teaching and research activities in different areas of IKS.

Several IITs including - IIT Kharagpur, IIT Bombay, IIT Madras, IIT Delhi, IIT Guwahati, IIT BHU, IIT Hyderabad – have already formal entities in either the form of an academic centre or other with similar objectives.

A few faculty members from different departments of the Institute have started working in some aspects of the IKS. Currently, an Open Elective Course encompassing the area and a series of courses in Sanskrit are being offered. A committee, known as the IKS Committee, was instituted to carry forward the activities related to the IKS. There are around twenty faculty members across the departments/centres/school of the Institute are involved in such activities.

The IKS Committee has proposed to establish a 'Centre of Excellence in Indian Knowledge Systems (CoEIKS)'. **(Appendix-A)** The major objective of the proposed centre is to bring together experts, researchers, students, and industry professionals working in the field of Indian Knowledge Systems to develop research, teaching and training ecosystems on various domains of IKS, especially techno-social themes.

The IAPC in its 130th meeting held on 18.05.2023 recommended the proposal with a suggestion that the name of the Centre to be modified.

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

To,
Dean, Academic Affairs.

Dear Prof. A. K. Sharma,

Considering the growing interest among students and faculty of IITR in the field of Indian Knowledge Systems (IKS), a few faculty members from different departments wish to join hands to advance research in the focused areas of IKS. The IKS committee has drafted a proposal for the establishment of an academic centre, namely the "Center of Excellence in Indian Knowledge Systems (CoEIKS)". Please find attached herewith the proposal for your kind perusal and further process.

With best regards,

Anil Kumar Gourishetty

Convener, IKS Committee

A proposal for the formation of

"Center of Excellence in Indian Knowledge Systems (CoEIKS)"

To bring together experts, researchers, students, and industry working in the field of Indian Knowledge Systems in line with the recommendations of NEP-2020. To develop research, teaching and training ecosystems on various domains of Indian Knowledge Systems, especially techno-social themes.

Background and Motivation

As mentioned in the introduction of NEP-2020, “The rich heritage of ancient and eternal Indian knowledge and thought has been a guiding light for this Policy. The pursuit of knowledge (Gyan), wisdom (Pragyaa), and truth (Satya) were always considered in Indian philosophy as the highest human goal”. One of the fundamental principles that guided NEP-2020 was “a rootedness and pride in India, and its rich, diverse, ancient and modern culture and knowledge systems and traditions.”

In the NEP-2020 recommendations 4.15, 4.27, 4.29, 10.2, 11.1, 11.8, the importance of designing the curriculum and pedagogy from the foundational stage onwards, firmly rooted in the Indian and local context and ethos in terms of culture, traditions, heritage, customs, language, philosophy, geography, ancient and contemporary knowledge, societal and scientific needs, indigenous and traditional ways of learning etc. – to ensure that education is maximally relatable, relevant, engaging, and effective for our students

In addition to NEP-2020, a few other policies that promote the IKS (as core/peripheral activities), such as:

Science, Technology, and Innovation Policy (STIP 2020) of Government of India

Chapter five: Strengthening the innovation ecosystem to attain sustainable economic progress and global competitiveness. Integrating Traditional Knowledge Systems (TKS) and grassroots innovations into the education, research and innovation system.

National Design Policy of Government of India

- According to the National Design Policy given by the Press Information Bureau (PIB), Government of India in 2007, there is a vision to:
- Prepare a platform for creative design development, design promotion and partnerships across many sectors, states, and regions for integrating design with traditional and technological resources - this will give a boost to the traditional arts and crafts, and enhance the existing designs by the symphony of tradition and continuity. As a result, it will generate better employment opportunities, and improve the standards of living of the crafts persons and artisans.

- Creation of original Indian designs in products and services drawing upon India's rich art and craft traditions and cultural heritage – this will ensure that the innovation is embedded in the ethos of the communities, and it is more about value addition rather than snatching away the essence of these art-craft-cultural forms.
- Making India a major hub for exports and outsourcing of designs and creative process - for achieving a design enabled innovation economy.
- Creation of awareness among manufacturers and service providers, particularly SMEs and cottage industries, about the competitive advantage of original designs – revival of arts and crafts but maintaining the originality and purity.
- Sustaining and strengthening India's traditional knowledge, skills and capabilities while being sensitive to global heritage - so that our shop floor workers, crafts persons and artisans could be engaged in manufacture of innovative products and contemporization of traditional crafts for broad spectrum of uses and niche markets.

Motivation based on a recent development at IIT Roorkee

The institute has recently made two-credit course on IKS as mandatory for first year UG students. It will be taught to about 1300 students in every spring semester.

National Status

- Cell for Indian Science and Technology in Sanskrit (CISTS) at IIT Bombay was established in the year 2003. Since then, the CISTS has been carrying out research and teaching courses in the fields of Indian mathematics, Indian astronomy, Sanskrit language, Paninian Grammar, and Philosophy of Language. Two full-time faculty members and their research group have contributed to development of many course modules and research material which has been adopted by various institutions in the country.
- The Centre of Excellence for Indian Knowledge Systems (CoE-IKS) at IIT Kharagpur is involved in research in the fields of Cognitive Psychology, the History of Science & Technology in Ancient India, Language Communication, and Language in Society & Culture. The centre has five full-time faculty members.
- National Resource Centre for Value Education in Engineering at IIT Delhi has undertaken systematic and robust research, mainly based on the Indian philosophical and knowledge system, to understand human potential and well-being and render evidence-based findings with micro-level (individual and community) and macro-level (policy and societal) implications. The center is also working to identify, develop and disseminate techniques by which engineering students and practicing engineers can be motivated to imbibe human values and appreciate their impact on technology development, professional ethics and human welfare.
- The Centre for Indian Knowledge Systems at IIT Guwahati is an academic center involving multi-disciplinary research for preserving, documenting, and building upon a philosophic and scientific understanding of Indian Traditional Knowledge Systems.

- The Centre for Indian Knowledge Systems at IIT Madras is a multidisciplinary hub for research into India's scientific, technological and cultural heritage. The Centre comprises seven faculty members from the Departments of Humanities and Social Sciences and Civil Engineering. The Centre was established in 2022 based on a grant from the IKS Division of the Ministry of Education. The thematic areas are Mathematics and Astronomy in India, Vyakaranam and Natya Sastra, Architectural Engineering, Vasstu, and Shilpa Satra, IKS-based approaches to political and economic systems.
- The Department of Heritage Science and Technology (HST) at IIT Hyderabad is dedicated to applying Science and Technology for the conservation and development of tangible and intangible Heritage assets, specifically focusing on the Indian context. Heritage includes tangible heritage like monuments, archaeological sites and intangible ones like knowledge systems, cuisine, medicine, dress, art, language, symbols, stories, and much more. DST - SHRI has awarded IITH a grant for setting up the Takshashila - Center for multi-disciplinary Heritage Science and Technology under the Department of HST. In addition, IIT Hyderabad is offering a 1-credit course on learning Sanskrit.
- IKS centres, funded by IKS division in the Ministry of Education, were also set up at several other IITs. (Ex: IKS center at IIT BHU is working in the field of chemistry)

Existing resources

- The HSS department is coordinating a 3 credit open elective course on Introduction to Sanskrit based Knowledge Systems being taught by eight faculty members from different departments.
- 13 faculty members of IIT Roorkee are involved in teaching and research related to the IKS.
- Sanskrit club, IIT Roorkee has a library with about 100 books on Sanskrit and IKS. 15 UG student volunteers run the club. The club has a database of about 15000 Sanskrit learners from about 40 countries. The database comprises persons from almost all sections of society.
- As part of NFSE course, IIT Roorkee has an active collaboration with the Central Sanskrit University, New Delhi.
- Samskrita Bharati is a non-profit organization that has been promoting the Sanskrit language for the last 40 years. The institute has active collaboration with Samskrita Bharati in promoting the Sanskrit language and Sanskrit knowledge systems.

Need for establishing the Center

- Research and development activities in IKS are an essential component of the education system since it creates new knowledge and insight and imparts excitement and dynamism in NEP2020, as well as making them need-based in view of the national requirements. The response from the students to the 3-credit open elective course IHS-325 (Introduction to Sanskrit knowledge systems) which is being coordinated by the Dept. of Humanities and

Social Sciences clearly indicates the need to set up a center for designing course and for carrying out research in the areas related to Indian Knowledge Systems.

- Several IITs have already established IKS centers and started offering courses to the students and also carrying doctoral works related to the IKS.
- IITR young researchers are already motivated and engaged in topics related to IKS, which are also receiving recognition and support. For instance, one research scholar in the Design Department has received the PMRF scholarship for his work that explores the 'Asana-based sitting in education'. Around 20 IITR students (mostly UG) are involved in internships as part of a IKS project with 8 investigators.
- IIT Roorkee has taken the lead in teaching IKS courses. The 3-credit open elective course is coordinated by HSS department. The first-year core course on IKS is coordinated by a separate committee comprising of experts from different departments. An effective coordination of courses that has components from diverse disciplines such as bio-sciences, mathematics, astronomy, philosophy and psychology requires a center to coordinate the research and teaching activities
- The institute is in Uttarakhand state which has made Sanskrit as official second language. In addition, the Uttarakhand state is well known for Yoga, Ayurveda and spirituality. The proposed centre can play a pivotal role in bringing out the knowledge embedded in these fields to the students and staff members.
- IIT Roorkee has been pivotal in nation-building since its inception in the year 1847. In the process of rebuilding the nation, IIT Roorkee has also been recreating new knowledge in the form of both fundamental knowledge and in the form of practices-oriented knowledge like codes, norms, and guidelines during the post-independence period. However, with the initiative of IKS, it is also an opportunity to rediscover our indigenous practices of nation-building that have been superimposed by historical layers of centuries of invasive practices in the pre-independence era. Also, with the discovery of forgotten practices, comes a great responsibility of validation and reinstatement in the current practices of nation-building so that IKS becomes usable for societal needs. IIT Roorkee should lead this initiative, being the oldest technical institution in modern India.

Vision

To promote interdisciplinary research on all aspects of IKS and disseminate IKS knowledge for further innovations and societal applications.

Mission

Celebrating and disseminating Indian knowledge Systems Globally, in different domains of Science, Technology, Art, Architecture, Heritage, Design and Management.

Development Plan

Phase-1

- Designing IKS courses for students of IIT Roorkee
- Recruitment of professors of practice and visiting professors.

- Setting up a secretariat for the IKS centre to coordinate the IKS activities.
- Applying for funding from different sponsoring agencies (IKS division, ICCR, ICSSR, DST, UNESCO etc.)
- Acting as hub for integrating IKS related activities in the Himalayan region in association with the Government of Uttarakhand
- Systematic documentation of IKS knowledge preferably to the unattended domains
- Admitting research scholars
- IIT Roorkee will take the lead in the networking of IKS centres across the country.

Phase-2

- Developing a study centre of Ayurveda and Yoga in collaboration with the Ministry of Ayush
- Setting up a building space for the IKS center, with offices, scholar rooms, seminar halls, etc.
- Recruitment of full-time faculty members to promote research and teaching.
- Organizing Faculty Development Programs to create awareness in IKS areas.
- Designing IKS courses in NPTEL.
- Identifying original Sanskrit texts in life sciences, physical sciences, engineering sciences, and social sciences and developing course content in collaboration with Sanskrit scholars at Central Sanskrit University, New Delhi.
- Curating and disseminating the findings, at IIT Roorkee as well as other platforms, through reports, exhibitions, and films.

List of contributing faculty members

The following faculty members are enthusiastic about joining hands to form the Center. We expect that more colleagues will join the center after its establishment.

1. **Prof. Anil Kumar Gourishetty (Physics):** Specialization: Sanskrit language promotion and Indian astronomy (Significant contributions: PI of 3 IKS projects (one completed, one ongoing and one submitted); member of a committee constituted by Central Sanskrit University to prepare a 5-year roadmap for Sanskrit in technical institutes; 8 years' experience as Sanskrit club coordinator; one of 8 faculty members teaching open elective course on Introduction on Sanskrit Knowledge Systems).
2. **Prof. Rajat Agrawal (Management Studies):** Specialization: Indic perspective of management (Significant contributions: IPR manager of scientific validation of traditional knowledge; one of 8 faculty members teaching open elective course on Introduction on Sanskrit Knowledge Systems).
3. **Prof. Avlokita Agrawal (Architecture and Planning):** Specialization: Vaastu shastra (Significant contributions: PI of one IKS project (ongoing) and Co-PI of two IKS projects)

- (one completed and another submitted); one of 8 faculty members teaching open elective course on Introduction on Sanskrit Knowledge Systems)
4. **Prof. Ram Manohar Singh (Humanities and Social Sciences):** Specializations: Indian psychology - triguna (theory of personality), Rasa and Bhava (emotions), anasakti (detachment) mentioned in traditional Indian texts. (Significant contributions: Co-PI of two IKS projects (one completed, and another submitted); overall coordinator of open elective course on Introduction on Sanskrit Knowledge Systems).
 5. **Prof. Vishvendra S. Poonia (Electronics and Communication Engineering):** Specialization: Basics of Bharatiya Shāstra Tradition with elaboration on Śhad Darshanas, comparative study of the theories of consciousness. (Significant contributions: Co-PI of two IKS projects (one completed, and another submitted); one of 8 faculty members teaching an open elective course on Introduction on Sanskrit Knowledge Systems).
 6. **Prof. Sohom Chakrabarty (Electrical Engineering);** Specializations: Principles of Indian Spirituality and Yoga, Sankhya and the Model of Existence, Universal and Individual Intelligence (Significant contributions: Co-PI of two IKS projects (one completed, and another submitted); one of 8 faculty members teaching an open elective course on Introduction on Sanskrit Knowledge Systems).
 7. **Prof. Partha Roy (Biosciences and Bioengineering);** Specialization: Ayurveda, Traditional medicines, and health care systems (Significant contributions: One of 8 faculty members teaching an open elective course on Introduction on Sanskrit Knowledge Systems; Co-PI one IKS project (submitted)).
 8. **Prof. D. N. Pandey (Mathematics);** Specialization: Indian mathematics. (Significant contribution: One of 8 faculty members teaching an open elective course on Introduction on Sanskrit Knowledge Systems)
 9. **Prof. Mahendra Kumar Verma (Mathematics);** Specialization: Indian mathematics (Significant contribution: One of 8 faculty members teaching an open elective course on Introduction on Sanskrit Knowledge Systems).
 10. **Prof. Anand Bulusu (Electronics and Communication Engineering);** Specialization: Community-based traditional technologies (Significant contribution: 20 years' experience in field visits involving students in the domain of traditional technologies)
 11. **Prof. Falguni Pattanaik (Humanities and Social Sciences);** Specialization: Indian economy
 12. **Prof. M. V. Suneel Krishna (Physics);** Specialization: Indian Astronomy
 13. **Prof. Ashwani Kumar Sharma (Biosciences and Bioengineering);** Specialization: Promotion of Bharatiya shastras and culture.
 14. **Prof. Shailly Tomar (Biosciences and Bioengineering);** Specialization: Traditional Indian medicine. (Significant contributions: Research on new antivirals/bio-therapeutics from ayurvedic natural medicinal sources against emerging pathogens).
 15. **Prof. Pravindra Kumar (Biosciences and Bioengineering);** Specialization: Traditional Indian medicine. (Significant contributions: Research on identification and

characterization of active compounds, their mode of action, and potential applications in modern medicine).

16. **Prof. Uttam Kumar Roy (Architecture and Planning)**; Specialization: Indic perspective on town planning. (Significant contribution: Research on exploring the traditional principles and practices related to town planning, urban design, and architecture).
17. **Prof. Smriti Saraswat (Architecture and Planning)**; Specialization: Architectural Heritage, Tangible and Intangible Cultural Heritage, Traditional Building Practices. (Significant contributions: Co-PI of two IKS projects (one ongoing and another one submitted), research on preservation and promotion of India's architectural heritage, tangible and intangible cultural heritage).
18. **Prof. Jitin Singla (Biosciences and Bioengineering)**; Specialization: Yoga. (Significant contributions: Co-PI of one IKS project (submitted)).
19. **Prof. Bibhuti Ranjan Bhattacharjya (Design)**; Specialization: design thinking intervention in traditional tools/ production methods; Grassroot innovation.
20. **Prof. Saugata Hazra (Biosciences and Bioengineering)**; Specialization: Ayurveda (Significant contributions: Research on ayurveda's application towards solving modern day problem of antimicrobial resistance).
21. **Prof. Sonal Atreya (Design)** Specialization: Traditional design methods. (Significant contributions: Co-PI of one IKS project (submitted)).
22. **Prof. Manish Asthana (Humanities and Social Sciences)**; Specialization: Indic perspective of Cognitive Psychology

Conclusion

IIT Roorkee has a 175-year legacy of creating leading engineers, scientists, technocrats, as well as top-ranked startups and entrepreneurs, with alumni across the World. The proposed center would be supported not only by the distinguished faculty and brilliant young minds existing on campus but also by an enormous number of institute alumni who are already established in their respective fields. With the fast advancements in the field of IKS and Govt. of India's initiatives in this direction, other sister academic institutes embraced the opportunities by establishing dedicated Centers. Moreover, as Uttarakhand state is well known for Ayurveda, Yoga, spirituality, traditional medicine, etc., there is an immediate need for IIT Roorkee to make focused efforts in this direction. To take a necessary step, the establishment of the CoEIKS at IIT Roorkee is proposed.

Item No. 96.6: To consider the request of Ms. Shalini Kaushik, Full-time Ph. D. student, Department of Biosciences and Bioengineering, to change her status from Full-time to Part-time on medical grounds.

Ms. Shalini Kaushik (En.No.: 18903015) was registered as Full-time Ph. D. student in the Department of Biosciences and Bioengineering on 06.07.2018 under project category. After completion of project, her scheme was converted into Institute Assistantship on 27.06.2020. Now, Ms. Shalini has requested dated 07.03.2023, to convert her status from Full-time to Part-time due to medical reasons (supporting medical treatment documents and reports are attached as **Appendix-A**).

The Department did not recommend her request with the remark that she is on unauthorized leave since 27th January (~3 months). She, despite several requests/reminders, failed to appear in front of the Medical Board.

Considering the recommendation of the department, the IRC in its 62nd meeting held on 26.04.2023, did not recommend her request to change her status from Full-time to Part-time.

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

DEPARTMENT OF BIOSCIENCES AND BIOENGINEERING
IIT ROORKEE

BSBE/2023-24/197

20-04-2023

To

Dean of Academic Affairs
IIT Roorkee

Dear Sir,

Numerous meetings of SRC and Medical Board have been conducted over the past 2-3 months for follow up action on Ms. Shalini's request.

In the best interest of the student, SRC dated 15th Feb 2023 had recommended her to either (i) take Semester break on medical grounds or (ii) work for six months to complete the maximum work and then request for part-time conversion (Annexure 1).

Further, on SRC's recommendation, Ms. Shalini requested CMO for semester break. However, despite several requests/reminders, she failed to appear in the Medical Board (Annexures 2,3,4).

In addition, Ms. Shalini has been on an unapproved leave since 27th Jan (~3 months).

In the opinion of SRC, it is not possible to convert her PhD into part-time and this has been already communicated to Ms. Shalini on 21st March (Annexure 5).


PhD Supervisor


SRC Chairman


DRC Chairman


Head of the Department

Official Seal
देवविमान
Department of Biosciences and Bioengineering
भारतीय प्रौद्योगिकी संस्थान
Indian Institute of Technology
Roorkee, India

Zimbra

ramasare.prasad@bt.iitr.ac.in

Re: Application regarding conversion of my PhD status on medical grounds

From : Pravindra Kumar <pravindra.kumar@bt.iitr.ac.in> Wed, Apr 19, 2023 07:04 PM
Subject : Re: Application regarding conversion of my PhD status on medical grounds
To : Assit RegistrarEvaluation <arevaluation@iitr.ac.in>, Prasad Ramasare <ramasare.prasad@bt.iitr.ac.in>
Cc : Head Biotechnology <head@bt.iitr.ac.in>, DRC BT <drc@bt.iitr.ac.in>, Assoc DeanofAcademicAffairs <adaa-evaluation@iitr.ac.in>, Dean AcademicAffairs <daa@iitr.ac.in>

Dear Prof. Prasad,
For necessary action please.
Kind regards,
Pravindra

*By Deepak Sharma
do prepare I do needful
in SRS.
20.4.23*

On 19 Apr 2023 18:23, Assit RegistrarEvaluation <arevaluation@iitr.ac.in> wrote:

REMINDER

HoD / Chairperson-DRC
Dept. of BSBE

With reference to the trailing email and the supporting documents attached, I am directed to provide the department's recommendation / comments on the request of Ms. Shalini Kaushik w.r.t. the conversion of her Ph.D. from full time to part time. Kindly arrange to send the recommendations at the earliest possible or latest by 21.04.2023 so that the same may be placed before the IRC scheduled on 26.04.2023.
A.R.(E)

From: "Assit RegistrarEvaluation" <arevaluation@iitr.ac.in>
To: "Head Biotechnology" <head@bt.iitr.ac.in>
Cc: "Assoc DeanofAcademicAffairs" <adaa-evaluation@iitr.ac.in>, "DRC BT" <drc@bt.iitr.ac.in>
Sent: Saturday, March 11, 2023 11:24:27 AM
Subject: Re: Application regarding conversion of my PhD status on medical grounds

Sir,

Ref: Trailing email.

I am directed to request you to kindly arrange to send the recommendations/comments of the department, on the request of Ms. Shalini Kaushik (Enr. No. 18903015), Ph.D. Student, Deptt. of BSBE.

--
A.R.(E)

From: "Dean AcademicAffairs" <daa@iitr.ac.in>
To: "Assit RegistrarEvaluation" <arevaluation@iitr.ac.in>
Sent: Friday, March 10, 2023 4:18:09 PM
Subject: Fwd: Application regarding conversion of my PhD status on medical grounds

Please get the comments from the Dept.
May place in IRC.

-Apurbba

Prof. Apurbba Kumar Sharma, Ph D, FIE / प्रो. अपूर्ब कुमार शर्मा, पीएचडी, एफआईई
Dean of Academic Affairs / कुलशासक शैक्षणिक अफेयर्स
Indian Institute of Technology Roorkee / भारतीय प्रौद्योगिकी संस्थान रुड़की
ROORKEE - 247 667, Uttarakhand, India / रुड़की -247667, उत्तराखण्ड, भारत
Phone - (+91 / 01332) 28 5255 / 5421 (O), 5479 (R), 9411100286 (M)
E-mail / ई-मेल : daa@iitr.ac.in, aks@me.iitr.ac.in

Webpage / वेबपेज

Office Webpage / ऑफिस वेबपेज



From: Director <director@iitr.ac.in>
To: Dean <daa@iitr.ac.in>
Cc: skaushik <skaushik@bt.iitr.ac.in>
Date: Tuesday, 7 March 2023 11:54 AM IST
Subject: Fwd: Application regarding conversion of my PhD status on medical grounds

From: "SHALINI KAUSHIK" <skaushik@bt.iitr.ac.in>
To: "Director IIT Roorkee" <director@iitr.ac.in>
Cc: "Dean AcademicAffairs" <daa@iitr.ac.in>, "Head Biotechnology" <head@bt.iitr.ac.in>
Sent: Monday, March 6, 2023 5:46:19 PM
Subject: Application regarding conversion of my PhD status on medical grounds

Respected Sir,

I am Shalini Kaushik, a Fifth year Research Scholar in the department of Biosciences and Bioengineering of IITR. I have been carrying out my PhD thesis under the supervision of Prof Deepak Sharma since July 2018 (in project, since Jan 2018). I have published a research article, book chapter and co-authored a high impact factor journal with my supervisor. I am a member of the research group that developed the most important SwasthGarbh App in collaboration with Doctors/Scientists in AIIMS, New Delhi. All my objectives are related to the same project.

I wish to bring it to your kind notice that I have been facing health problems for the past 1 and 1/2 years. I am a patient of allergic asthma and often I get severe attacks. I am married and have a 1 year 9 months old baby girl and have been staying at the married research scholar hostel since Dec, 2019. My mother is alone and staying with my brother who is studying and looking for a job and my in-laws are also unable to

stay with me to support my research activities. In Spite of all these problems, I continued to work to fulfil the objectives of my Research proposal.

My health became so bad during December of 2022 and I had to leave Roorkee (at the end of January) to stay with my husband who is working in Gurgaon. Considering my health conditions, I requested my Supervisor to convert the Full Time status of my PhD to Part Time PhD. This will enable me to continue with my research work and submit the PhD thesis with the support of the Research Supervisor.

As per the advice of the SRC Committee, I did appear for an online meeting and expressed my desire to convert my PhD to Part Time. The SRC committee gave me an option of Semester break (application to SRC with Medical Certificate of CMO, IIT Roorkee).

Sir, my health is in such bad condition that I am unable to come to Roorkee. I am having breathing issues and I had medical records of the past 1 year (from IITR hospital), I had also consulted Patel chest hospital, Delhi and recently consulted a doctor in Jaipur (Kindly see the attachments). Based on this, I requested the CMO of IITR to recommend my case for a Semester Break.

Sir, I am submitting to you all medical records of the past 1 year (of IITR and also Delhi and Jaipur). I had an eye surgery last year and the Doctors advised me not to use a computer screen for a week. I still was doing a dedicated job to complete research work assigned by the Supervisor.

Sir, I do not want my sincere 5 years of Research Work to go waste without submitting my PhD Thesis. I assure you that I will complete all the remaining work in Part Time mode. I will continuously be in touch with my Supervisor to complete the rest of the work including the clinical trial of SwasthGarbh App. Hence, I request you to consider my application to convert the status of Full Time PhD to Part Time PhD.

Thanking you and looking forward to your kind consideration.

Yours sincerely
Shalini

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

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

From: "PM KrishnaMohan" <krishna.poluri@bt.iitr.ac.in>
To: "Prasad Ramasare" <ramasare.prasad@bt.iitr.ac.in>
Cc: "deepak sharma" <deepak.sharma@bt.iitr.ac.in>, "Harsh Chauhan" <harsh.chauhan@bt.iitr.ac.in>, "Gaurav Dixit" <gaurav.dixit@ms.iitr.ac.in>, "SHALINI KAUSHIK" <skaushik@bt.iitr.ac.in>
Sent: Wednesday, February 15, 2023 6:31:45 PM
Subject: Re: Requesting for converting my full-time PhD to part-time

Dear Prof. Prasad,

Today an Online SRC meeting was conducted and the views of the student and supervisor has been noted. The following are the observations and suggestions:

Ms. Shalini is having health issues of asthma/allergy, and she is not willing to continue the PhD on full time basis staying at IIT-Roorkee campus anymore.

At the same time considering the project meetings/clinical results and deadlines, Prof. Deepak is not willing to supervise the student on part-time basis.

The SRC also observed that the work completed till now by Ms. Shalini (will complete 5 years by June) is not enough to submit a first author publication as needed for PhD degree (The same has been mentioned during her recent 5th year extension presentation). It is also noted that even under full time PhD program, she may need more than an year to complete her work. Moreover, the SRC committee also observed a huge extent of disagreement/dissent between them related to project/phd deadlines,

In such as case, for the best interest of the student, the following suggestions have been made.

1. Ms. Shalini can take a semester break on medical grounds by submitting the reports of CMO and start back her work as a regular student from next semester.
2. Ms. Shalini can stay at IIT-Roorkee with the help of her family for next six months, complete the maximum work, submit a first author paper, present in front of SRC, prepare a detailed work plan of future with the help of supervisor, and then re-request for a part-time (if applicable as per IIT-guidelines).

At this point of time, no modalities and time-frame have been worked by the student and supervisor to arrive for a mutual consent on part-time PhD program. Moreover, Considering the department's/Institute's interest it should be clearly noted that working on computational biology/bioinformatics subjects does not mean the projects should be handled in part-time mode/work from home.

Kindly do the needful

Best regards

~Krishna

(SRC Chairman)

Time is the wisest counselor

Krishna Mohan Poluri

Associate Professor

Ashok Soota Institute Research Fellow

Department of Biosciences and Bioengineering

Joint Faculty: Centre for Nanotechnology

Indian Institute of Technology Roorkee

Roorkee - 247667, Uttarakhand, India

Ph: +91-1332-284779(off)

Email:krishna.poluri@bt.iitr.ac.in

Website: https://www.iitr.ac.in/~BT/___Dr_Krishna_Mohan_Poluri

On Tue, 28 Feb 2023, 5:14 pm CMO IITRoorkee, <cmo@iitr.ac.in> wrote:

- > Your attachment is related to symptoms /diseases treated at OPD of IITR
- > hospital that we had seen & we had called you to appear in the medical
- > board of IITR Hospital on 23/02/2023 at 4.30 pm and you were absent .
- >
- > It is our request to appear in next medical board of IITR hospital(for
- > the thorough clinical examination by our medical board doctors /members)
- > whenever notified to you by our office through email. Without that we can
- > not reach into conclusions.
- >
- > Further ,you are requested to bring latest treating doctors
- > prescriptions/investigation in support of your request.
- >
- > DR.M.K.JHA
- > CMO
- >

----- Original Message -----

From: "CMO IITRoorkee" <cmo@iitr.ac.in>

To: "SHALINI KAUSHIK" <skaushik@bt.iitr.ac.in>

Cc: "Head Biotechnology" <head@bt.iitr.ac.in>, "deepak sharma" <deepak.sharma@bt.iitr.ac.in>, "Department of Biotechnology" <biotech@iitr.ac.in>, "PM KrishnaMohan" <krishna.poluri@bt.iitr.ac.in>, "Prasad Ramasare" <ramasare.prasad@bt.iitr.ac.in>, "HOSPITAL IITRoorkee" <hospital@iitr.ac.in>

Sent: Wednesday, March 1, 2023 4:57:16 PM

Subject: Regarding leaves

YOUR request is major one and such cases we are putting in the medical board of the hospital and our medical board will not reach into conclusion without clinical examination of patient/applicant plus having proof of supportive lab investigations x-ray etc.

Your attached IITR different dates OPD prescriptions, we have discussed in the medical Board but board members said that these are OPD prescriptions and patients already treated on OPD Basis and are insufficient for the reaching into conclusion further all board member agreed that you should come and physically present in the medical board of the hospital for the clinical examination and come with latest prescriptions /investigations of treating specialist doctor at higher centre .

For kind information.

DR.M.K.JHA

Chief Medical Officer.

**Institute Hospital
Indian Institute of Technology Roorkee
Roorkee**

No./IITRH/

/ (Med. Board) /

March 16, 2023

Proceedings of the medical board for candidates/employees requesting accommodation at married hostel / change of hostel / change of house/ etc. on medical grounds

The Medical Board consisting of Dr. M.K. Jha, CMO, Dr. Anjula Roy, MO, Dr. Jeetinder Singh, Sr. MO, Dr. Praveen Gothi, Part time Physician, Dr. Harish Kumar and Part time Orthopaedician was constituted for Physical Checkup of the candidates at 4:30 PM on 16.03.2023 (Thursday).

The findings of the Medical board are noted below:

Sr. No.	Name of the Candidate	Recommendations	Recommended for a Period
1.	Smt. Paras Mani Jain W/o Late Dr. P.C. Jain	As per Disability certificate issued on 14.3.23, she is suffering (Kiran Jain) is suffering from schizophrenia & 70% disability self declaration by patient depend upon the mental condition of the patient during remission period.	01 year
2.	Dr. Ashish Yadav Asstt. Sports Officer	Recommended for change of accommodation & suggested to avoid humid living condition on the basis of medical ground of his wife.	01 year
3.	Mr. Mohd. Yusuf Enrolment No. 20915018 Deptt. of ECE	Recommended for extension of same accommodation on the basis of medical suffering self	01 year
4.	Mr. Rinku Kumar Enrolment No. 17905003 Institute Instrumentation Centre	Recommended for extension of same accommodation on the medical ground	01 year
5.	Ms. Shweta Choudhary Enrolment No. 22909034 Chemistry Deptt.	Not recommended for change of shawan due to insufficient ground.	—
6.	Mr. Abirlal Mukherjee Enrolment no. 18903027	Absent	—
7.	Ms. Monika Singh Enrolment no. 20920005	Lack of Dermatologist recommended advised to consult our dermatologist opinion & come in next Board	—
8.	Mr. Pankaj Kumar Chaudhary Enrolment No.	Absent	—
9.	Ms. Shalini Kaushik Enrolment No. 18903015 Biosci. and Bioengg.	Absent. Medical Board members seen the attached medical documents. As per attached medical documents Board is unable to give any recommendation without clinical examination of patient.	HOD Biosci. to be informed

(Dr. Harish Kumar)
Member

(Dr. Praveen Gothi)
Member

(Dr. Jeetinder Singh)
Member

(Dr. Anjula Roy)
Member

(Dr. M. K. Jha)
CMO & Convener

16.3.2023

From: "PM KrishnaMohan" <krishna.poluri@bt.iitr.ac.in>
To: "SHALINI KAUSHIK" <skaushik@bt.iitr.ac.in>, "deepak sharma" <deepak.sharma@bt.iitr.ac.in>
Cc: "Prasad Ramasare" <ramasare.prasad@bt.iitr.ac.in>, "Head Biotechnology" <head@bt.iitr.ac.in>, "Department of Biotechnology" <biotech@iitr.ac.in>, "Harsh Chauhan" <harsh.chauhan@bt.iitr.ac.in>, "Gaurav Dixit" <gaurav.dixit@ms.iitr.ac.in>
Sent: Tuesday, March 21, 2023 9:03:58 PM
Subject: Re: SwasthGarbh modifications

Dear Shalini,

This is to inform that, we have received the CMO decision on your medical appeal. The board of Doctors have confirmed that without your physical presence, your case cannot be considered further, and is not possible to arrive at a conclusion without clinical data. As you are aware that SRC/DRC will not be able to forward any of your PhD related application/appeal (if submitted) to Dean academic affairs on medical basis without a comprehensive report from CMO, IITR. This is for your information. Kindly take needful steps asap from your side to save time of your PhD duration.

Best wishes

~Krishna

(SRC Chairman)

Time is the wisest counselor

Krishna Mohan Poluri
Associate Professor
Ashok Soota Institute Research Fellow
Department of Biosciences and Bioengineering
Joint Faculty: Centre for Nanotechnology
Indian Institute of Technology Roorkee
Roorkee - 247667, Uttarakhand, India
Ph: +91-1332-284779(off)
Email:krishna.poluri@bt.iitr.ac.in
Website: https://www.iitr.ac.in/~BT/___Dr___Krishna_Mohan_Poluri

(251) BT

Subject: Application regarding conversion of my PhD status on medical grounds

From: Director IIT Roorkee <director@iitr.ac.in>

To: Dean AcademicAffairs <daa@iitr.ac.in>

Cc: skaushik@bt.iitr.ac.in <skaushik@bt.iitr.ac.in>

Date: Tuesday March 7, 2023 11:54:49 AM

AR(E)

- Please get the
comments from The Dept.

[Signature]
07/03

- May place in IRE

[Signature]
07/03

From: "SHALINI KAUSHIK" <skaushik@bt.iitr.ac.in>

To: "Director IIT Roorkee" <director@iitr.ac.in>

Cc: "Dean AcademicAffairs" <daa@iitr.ac.in>, "Head Biotechnology" <head@bt.iitr.ac.in>

Sent: Monday, March 6, 2023 5:46:19 PM

Subject: Application regarding conversion of my PhD status on medical grounds

Respected Sir,

I am Shalini Kaushik, a Fifth year Research Scholar in the department of Biosciences and Bioengineering of IITR. I have been carrying out my PhD thesis under the supervision of Prof Deepak Sharma since July 2018 (in project, since Jan 2018). I have published a research article, book chapter and co-authored a high impact factor journal with my supervisor. I am a member of the research group that developed the most important SwasthGarbh App in collaboration with Doctors/Scientists in AIIMS, New Delhi. All my objectives are related to the same project.

I wish to bring it to your kind notice that I have been facing health problems for the past 1 and 1/2 years. I am a patient of allergic asthma and often I get severe attacks. I am married and have a 1 year 9 months old baby girl and have been staying at the married research scholar hostel since Dec, 2019. My mother is alone and staying with my brother who is studying and looking for a job and my in-laws are also unable to stay with me to support my research activities. In Spite of all these problems, I continued to work to fulfil the objectives of my Research proposal.

My health became so bad during December of 2022 and I had to leave Roorkee (at the end of January) to stay with my husband who is working in Gurgaon. Considering my health conditions, I requested my Supervisor to convert the Full Time status of my PhD to Part Time PhD. This will enable me to continue with my research work and submit the PhD thesis with the support of the Research Supervisor.

As per the advice of the SRC Committee, I did appear for an online meeting and expressed my desire to convert my PhD to Part Time. The SRC committee gave me an option of Semester break (application to SRC with Medical Certificate of CMO, IIT Roorkee).

Sir, my health is in such bad condition that I am unable to come to Roorkee. I am having breathing issues and I had medical records of the past 1 year (from IITR hospital), I had also consulted Patel chest hospital, Delhi and recently consulted a doctor in Jaipur (Kindly see the attachments). Based on this, I requested the CMO of IITR to recommend my case for a Semester Break.

NEL OF CONSULTANTS

Hemlata Goel MBBS, MS

Sonu Goel

Consultant

MB, MNAMS, Phaco-Refractive Laser/Cornea Surgeon

Itra Sitaraman

Glaucoma Surgeon

idharth Bhardwaj

Surgeon

nesh Sharma

Cornea Surgeon

/S Chouhan MBBS, MS

pendra Jain MBBS, MD

du Goel MBBS, MS

ishali Mathur MBBS, MS

ishish Kumar MBBS, MS

mai Mukherjee MBBS, DNB

ihul Pandya MBBS, DNB

ikita Shashtri MBBS, DO

irish Patel MBBS

ikur Kumar MBBS

ushree Sharma MBBS

sha Verma MBBS

soja MBBS

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FDA Approved, C-Lasik, E-Lasik, Lasek,

biopic Laser

efront Customized Treatment

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High Myopes

COMA

ioscopy, Humphrey field analyser from

any, Ganglion Cell mapping by OCT

(Selective Laser Trabeculoplasty) द्वारा

से कालापानी का उपचार

RETINA

OCT • Fundus Photography

EGF Therapy for Retina

nal Surgeries

CRNEA

AEK, DMAEK, DALK, Lamellar Keratoplasty

LASER DCR

nasal लेजर DCR लेजर द्वारा नामूर चिकित्सा

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0772097720

H.R. No. 2022

--17824

Name : Shalini Kaushik

Age 29 Sex f

Date 3/10/22

BE-FEMTO/FEMTO ASP/SBK/ASP/LASIK/LASEK

Rx

1. Vysoft E/D / I-Soft

(8 Time / 1 Month)
(6 Time / 1 Month)
(4 Time / 1 Month)

2. Moxitil E/D

(4 Times / 15 Days)

3. Lot / Lotesilk E/D

(4 Time / 7 Days)
(3 Time / 7 Days)
(2 Time / 7 Days)
(1 Time / 7 Days)

4. ~~BELO-BM~~

(4 Time / 1 Month)
(2 Time / 1 Month)
(1 Time / 1 Month)

5. Glaucomotol E/D

(2 Time / 3 Month)

6. Tab. Zifi 200mg / Ziprax 200 g

1-1 (1 BD X 3 days)

7. Tab. Ibugesic Plus

1-1 (1 BD X 3 days) SOS

8. Tab. Trica 0.25 mg

(1 BD X 3 days)

Follow Up -

A Day 1

B Day 7

C 1 Month

D 3 Month

E 1 Year

1st Follow Up

2nd Follow Up

3rd Follow Up

4th Follow Up

5th Follow Up

v Please get Fundus / Retina Test Yearly or as advised.

V < RE
LE

N.C.T. < RE 16.0 mm Hg
LE 13.0 mm Hg

K1/K2 < RE
LE

BCVA < 6/6
6/6

04/10

VA < 6/6
6/6

Sahs

Review 11/10/22

N,

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• RSBCL • RMFDCC • CSWRI • CIL • NFL • RSFCSC • Keratoplasty Under HOTA (Govt. of Raj.) Raj. State Govt. Servants / Pensioners

CASHLESS MEDICLAIM • Alankit • Anyuta • bajajallianz • Bharti Axa Gen. Insu • Cholamandalam • DHS • East West
• E-Meditek • Ericson • FHPL • FOCUS • Future Generali Ins. • Genins • GHPL • HCX • Health & Life Style • Heritage Health • Health India
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• Raksha • Reliance • Religare • Royal Sundram Ins. • SBI Gen. Ins. • Safeway • Spurti • Sri Gokulam Health • Star Health • TTK • Vipul

राजस्थान सरकार के सेवारत कर्मचारियों एवं पेंशनर्स के लिए अधिकृत व पुनर्भरण की सुविधा

केन्द्राध्य सरकार के सेवारत कर्मचारियों एवं पेंशनर्स के लिए अधिकृत

Operational Timings : 8 am to 8 pm SUNDAY : 8 am to 2 pm

Patient Name: SHALINI KAUSHIK

Booklet No: 18903015

Phone:

Age: 0-YEAR

Address:

Diagnosis and Remarks: HEADACHE

History (if any) :

Medicine	Type	Dossage	Remark	Quantity
1 NAPROSYN 500MG				5
2 WALAPAN-40 TAB	TAB			5

Registration No.: 8530

OPD ID.: 10247602

Date: 04-Dec-2021

Shift: Morning (Winter)

Fee: 0.00 Rs.

Doctor: MUKUL

Complaints:

Examinations:

Diagnosis and Remarks: COUGH AND LOOSE MOTION

History (if any) :

Medicine	Type	Dossage	Remark	Quantity
1 IBUGESIC PLUS SYRUP	SYR			1
2 OFLOMACIN+ORNIDAZOL-SUS P				1
3 MONTELUKAST+LEVOCETRIZINE SYP	SYR			1
4 ORS-POWDER/WALYTE	EI			5
5 WALIMONT FX	TAB	BD		6
6 ALEX COUGH SYRUP				1

Registration No.: 3835

OPD ID.: 10266845

Date: 20-Jan-2022

Shift: Morning (Winter)

Fee: 0.00 Rs.

Doctor: JEETINDER

Complaints:

Examinations:

Diagnosis and Remarks: URTI. RTPCR advised

History (if any) :

Medicine	Type	Dossage	Remark	Quantity
1 ALGINA 650	TAB	SOS (FEVER)		10
2 ZITHROX-500	TAB	OD		3
3 WALIMONT FX	TAB	HS---1		5
4 WALLREX- DX SYRUP/CUFFWALL-D	SYR	BD		1
5 LIMCEE TAB	TAB	BD		10

Page 5 of 18

Patient Name: SHALINI KAUSHIK**Booklet No:** 18903015**Phone:****Age:** 0-YEAR**Address:****Registration No.:** 8742 **OPD ID.:** 10277135 **Date:** 18-Feb-2022 **Shift:** Morning (Winter) **Fee:** 0.00 Rs.**Doctor:** PKSINGH**Complaints:****Examinations:****Diagnosis and Remarks:** SD**History (if any) :**

Medicine	Type	Dossage	Remark	Quantity
1 ZITHROX 250	TAB	BD		10
2 ZINCONIA 50 MG TAB	TAB	BD		10
3 LEVOCETIRIZINE-5MG TABS	TAB	BD		10
4 CALOSOFT AF LOTION	LOT	BD		1
5 PERSOL FORTE CREAM		AS ADVISED		1
6 MOMETASONE & TERBINAFINE CREAM	CRM	AS ADVISED		1

Registration No.: 3722 **OPD ID.:** 10277372 **Date:** 18-Feb-2022 **Shift:** Evening (Winter) **Fee:** 0.00 Rs.**Doctor:** G.CHANDANA**Complaints:****Examinations:****Diagnosis and Remarks:** as advised by pulmonologist**History (if any) :**

Medicine	Type	Dossage	Remark	Quantity
1 LEVOCETIRIZINE-5MG TABS	TAB	OD ---- 1 MORNING		5
2 LUPITUSS CPM SYRUP		AS ADV		1
3 ZOSTUM O		BD:TWO TIMES A DAY		10
4 PREDNISOLONE-TABS	TAB	OD ---- 1 MORNING		15
5 DIRAB-D	CAP	OD ---- 1 MORNING		5

Registration No.: 9734 **OPD ID.:** 10279266 **Date:** 23-Feb-2022 **Shift:** Evening (Winter) **Fee:** 0.00 Rs.**Doctor:** G.CHANDANA**Complaints:****Examinations:****Diagnosis and Remarks:** as advised by pulmonologist

Patient Name: SHALINI KAUSHIK

Booklet No: 18903015

Phone:

Age: 0-YEAR

Address:

Diagnosis and Remarks:**History (if any) :**

Medicine	Type	Dossage	Remark	Quantity
1 DIRAB-D	CAP	BD		20
2 MUCAINE GEL		10 ML BD		1
3 OFLOMAC OZ	TAB	BD		10
4 ACECLO SERA	TAB	BD		10
5 CREMCO/CREMAWAL SYP	I	15 ML HS		1
6 ANO METROGYL GEL		HS		1

Registration No.: 5143 OPD ID.: 10284874 Date: 09-Mar-2022 Shift: Morning (Summer) Fee: 0.00 Rs.

Doctor: PKSINGH

Complaints:**Examinations:****Diagnosis and Remarks:** SD**History (if any) :**

Medicine	Type	Dossage	Remark	Quantity
1 NIXIDOX 100		BD		14
2 ZINCONIA 50 MG TAB	TAB	BD		14
3 BTN- TAB	TAB	BD		14
4 PERSOL FORTECREAM		BD		1
5 ERYTOP N GEL		BD		1
6 ZYDIP LOT		BD		1

Registration No.: 6079 OPD ID.: 10287079 Date: 12-Mar-2022 Shift: Evening (Summer) Fee: 0.00 Rs.

Doctor: JOGRAJ

Complaints:**Examinations:****Diagnosis and Remarks:** LE SUB CONJ HAGE**History (if any) :**

Medicine	Type	Dossage	Remark	Quantity
1 OCFLUR EYE DROP		TDS:THREE TIMES A I		1
2 PIXELUB EYE DROP	EYED	TDS:THREE TIMES A I		1
3 LIMCEE TAB	TAB	OD ONCE DAILY		15

Patient Name: SHALINI KAUSHIK**Booklet No:** 18903015**Phone:****Age:** 0-YEAR**Address:****Registration No.:** 8044 **OPD ID.:** 10313784 **Date:** 04-May-2022 **Shift:** Morning (Summer) **Fee:** 0.00 Rs.**Doctor:** G.CHANDANA**Complaints:** COLD,COUGH,WEAKNESS ,FEVERISH**Examinations:****Diagnosis and Remarks:****History (if any) :**

Medicine	Type	Dossage	Remark	Quantity
1 SINAREST TAB/FLUCOLD TAB	TAB	BD:TWO TIMES A DAY		10
2 RESPIRA LIQUID	I	BD:TWO TIMES A DAY		1
3 MUCOTAB 600 ET	TAB	BD:TWO TIMES A DAY		10
4 ZITHROX-500	TAB	OD ---- 1 MORNING		5
5 B-COMLEX +LACTOBASILEX-CAP	CAP	OD ---- 1 MORNING		5

Registration No.: 9975 **OPD ID.:** 10318696 **Date:** 13-May-2022 **Shift:** Morning (Summer) **Fee:** 0.00 Rs.**Doctor:** G.CHANDANA**Complaints:** k/c/o allergic asthma
c/o cough**Examinations:****Diagnosis and Remarks:****History (if any) :**

Medicine	Type	Dossage	Remark	Quantity
1 MACBERY SYRUP		BD:TWO TIMES A DAY		1

Registration No.: 9979 **OPD ID.:** 10319235 **Date:** 14-May-2022 **Shift:** Morning (Summer) **Fee:** 0.00 Rs.**Doctor:** SHYAMASRI**Complaints:****Examinations:****Diagnosis and Remarks:** K/C/O ALLERGIC BRONCHITIS
NEBULISATION BD FOR 3 DAYS
TO REVIEW AFTER 3 DAYS
CHEST - B/L VBS**History (if any) :**

Medicine	Type	Dossage	Remark	Quantity
1 RHICET-M	TAB	OD 9PM	AT BED TIME	10

Patient Name: SHALINI KAUSHIK**Booklet No:** 18903015**Phone:****Age:** 0-YEAR**Address:****History (if any) :**

Medicine	Type	Dossage	Remark	Quantity
1 TAB ALLERGRA 120MG		HS---1 DINNER		7
2 AZEFLO NASAL SPRAY		AS ADVISED		1
3 ZEROSTAT VT SPACER		AS ADVISED		1
4 MDI BUDAMATE 200/6		AS ADVISED		1

Registration No.: 1587 **OPD ID.:** 10348029 **Date:** 13-Jul-2022 **Shift:** Morning (Summer) **Fee:** 0.00 Rs.**Doctor:** G.CHANDANA**Complaints:****Examinations:****Diagnosis and Remarks:** proxy for child**History (if any) :**

Medicine	Type	Dossage	Remark	Quantity
1 OFLOMACIN+ORNIDAZOL-SUS P		BD:TWO TIMES A DAY		1

Registration No.: 6426 **OPD ID.:** 10348439 **Date:** 14-Jul-2022 **Shift:** Morning (Summer) **Fee:** 0.00 Rs.**Doctor:** G.CHANDANA**Complaints:** c/o loose stools * 2 episodes...vomiting * 1 episode .. weakness**Examinations:****Diagnosis and Remarks:** admission**History (if any) :**

Medicine	Type	Dossage	Remark	Quantity
1 ONDANSETRON SYRUP		15 MIN B/BF B/DIN		1
2 VIZYLAC		BD:TWO TIMES A DAY		10
3 BUSCOGEST		BD:TWO TIMES A DAY		10
4 ORS-POWDER/WALYTE	EI	BD:TWO TIMES A DAY		10
5 ZINC 50 MG	TAB	BD:TWO TIMES A DAY		10
6 TAB GALOXIN OZ	TAB	BD:TWO TIMES A DAY		10
7 RABEPRAZOLE 20MG +DOMPERIDONE30 CAP	CAP	15 MIN B/BF B/DIN		10

Patient Name: SHALINI KAUSHIK

Booklet No: 18903015

Phone:

Age: -YEAR

Address:

Examinations:

Diagnosis and Remarks: URI.,PRESCRIBED MED FOR BABY.,KINDLY UPDATE BABY BOOKLET.

History (if any) :

Medicine	Type	Dossage	Remark	Quantity
1 SYP SINAREST		5 ML TDS		1
2 ZAKTER DRY SYP 50 MG	SYR	5 ML BD		1
3 IBUGESIC PLUS SYRUP	SYR	5 ML SOS		1

Registration No.: 3078

OPD ID.: 10360808

Date: 06-Aug-2022

Shift: Morning (Summer)

Fee: 0.00 Rs.

Doctor: RAVI

Complaints:

Examinations:

Diagnosis and Remarks: stop cefixime syp .,?hand foot mouth disease,,refer to pediatrician in roorkee.,inv advised .,isolation advised .

History (if any) :

Medicine	Type	Dossage	Remark	Quantity
1 SYP ZINCOVIT		5 ML BD		1
2 DOLOGEL		as adv		1
3 TAB ZIFI CV 100		1/2 BD		5

Registration No.: 7448

OPD ID.: 10363244

Date: 11-Aug-2022

Shift: Morning (Summer)

Fee: 0.00 Rs.

Doctor: FARMANKHAN

Complaints:

Examinations:

Diagnosis and Remarks: AS ADV

History (if any) :

Medicine	Type	Dossage	Remark	Quantity
1 DYNAPAR QPS SOLUTION	SOLUTI			1

Registration No.: 7164

OPD ID.: 10374814

Date: 01-Sep-2022

Shift: Evening (Summer)

Fee: 0.00 Rs.

Doctor: SANJEEV

Complaints:

Examinations:

Patient Name: SHALINI KAUSHIK**Booklet No:** 18903015**Phone:****Age:** -YEAR**Address:****History (if any) :**

Medicine	Type	Dossage	Remark	Quantity
1 FORMOTEROL + BUDESONIDE 200 INHALER	INHR	AS ADVISED		1

Registration No.: 8881 **OPD ID.:** 10436093 **Date:** 29-Dec-2022 **Shift:** Evening (Winter) **Fee:** 0.00 Rs.**Doctor:** RAVI**Complaints:****Examinations:****Diagnosis and Remarks:** URI.**History (if any) :**

Medicine	Type	Dossage	Remark	Quantity
1 CEFOLAC-200MG	TAB	1 BD		10
2 FIXAR TAB	TAB	1 BD		10
3 VALDYACE- P	TAB	1 SOS		5
4 RESPIRA LIQUID	I	5 ML TDS		1

Registration No.: 6773 **OPD ID.:** 10446926 **Date:** 20-Jan-2023 **Shift:** Evening (Winter) **Fee:** 0.00 Rs.**Doctor:** SHYAMASRI**Complaints:****Examinations:****Diagnosis and Remarks:** MALAISE/ KCO-MIGRAINE**History (if any) :**

Medicine	Type	Dossage	Remark	Quantity
1 ALGINA 650	TAB	TDS:THREE TIMES A I	SOS	10
2 FIXAR TAB	TAB	OD ---- 1 EVENING	EVENING 8PM	5
3 TAB VASOGRain		TDS:THREE TIMES A I	SOS (HEADACHE)	10
4 ORS-POWDER/WALYTE	EI	BD 1---1	DISSOLVED IN 200 ML WATER	5

Registration No.: 2074 **OPD ID.:** 10447693 **Date:** 23-Jan-2023 **Shift:** Morning (Winter) **Fee:** 0.00 Rs.**Doctor:** ANANT**Complaints:** FUC FEVER / WIDAL POSITIVE / C/O LOSS MOTIONS AND NAUSEA**Examinations:**



IIT HOSPITAL ROORKEE

भा. प्रौ. सं. अस्पताल रुड़की

O.P.D. MEDICINE SLIP

बा.रो.वि. औषधि पर्चा

O.P.D. No.

Date: 18/2/2022

Rx Name: Shalini Kausik

Eno-18903015

Ref to usay usay
Hospital 11/10 Chest
Physician

Medical Officer
Institute Hospital
IIT Roorkee

ISHAL HEALTHCARE

शिशाल हेल्थकेयर

Multi Specialty Hospital



PEH-2021-1548

NAAC ACCREDITED HOSPITAL

70785-99991

70785-99992

मुविधार

@gmail.com

ishalhealthcare.com

ni Kausik

2015

फोन नं: 8126258665

दिनांक 18/2/2022

19/10 फेब्रुअरी 1 month
Cough since then

डा० कनिका जैन
Dr. Kanika Jain

MBBS, DGO, DNB

Gynaecology & Obstetrics

डा० अजय अग्रवाल
Dr. Ajay Agarwal

MBBS, MS

Gen Surgeon

डा० रमणीक मंगलिक
Dr. Ramneek Manglik

MBBS, MS, FMA

Gen / Laparoscopic Surgeon

डा० अंकुर सैनी
Dr. Ankur Saini

MBBS, MD

Pulmonologist, Bronchoscopist & Intensivist

डा० शिवम गुप्ता
Dr. Shivam Gupta

MBBS, MD, Neuropsychiatry

डा० राशिद अली
Dr. Rashid Ali

MBBS, DCH

बाल रोग विशेषज्ञ

डा० अंकित अग्रवाल
Dr. Ankit Agarwal

MBBS, DNB, Radiodiagnosis

डा० नेहा सैनी
Dr. Neha Saini

MBBS, M.D., Pathology

Tab.

Montek BC 100

1-1/2

Syp Dupitum 100 250

1-1/2

Tab 2000 01300

Tab Prednis 30 100

Cup Sinu 30 401 000000

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डायग्नोसिस, एम्बुलेंस सेवा और स्टेट डायग्नोसिस (एम्बुलेंस सेवा) की सुविधा उपलब्ध

इमरजेंसी / I.C.U. • रेडियोलोजी • पैथोलोजी • ENDOSCOPY • BRONCHOSCOPY • COLONOSCOPY • दवाईयाँ

• E.C.G. • T.M.T. • E.E.G. • HOLTER • ANGIOGRAPHY • ANGIOPLASTY • PHYSIOTHERAPY

एम्बुलेंस सेवा उपलब्ध कृपया मरीज़ दिखाने से पहले समय ले लें।

पर्चा 7 दिन तक मान्य।



UHID: 20220006364

University of Delhi (North Campus)
VALLABHBHAI PATEL CHEST INSTITUTE
Delhi

CONSULTING ROOM NO : 2, TOKEN NO : 82
Clinic Pulmonary Clinic
Days: MON, TUE, WED, THU, FRI

EHR ID : 22000270028303451

OUT PATIENT RECORD

Name : MRS. SHALINI KAUSHIK

Department : Pulmonary Medicine

Dept No. : 2022/072/0005461

Date of Registration : 07-06-2022 09:39:14 AM

Unit : UNIT 3

Age : 29Y

Billing Type : General

Mobile No : *****665

Address : 293 HEERA NAGAR A HEERAPURA 200 FEET BYPASS, Jaipur,
RAJASTHAN, PIN:302012, INDIA

Patient Type: NON MLC

DR. NITIN GOEL

(डॉक्टर नितिन गोयल)

MON/TUE/WED/THUR

सोम/मंगल/बुध/गुरुवार

Fee : 10.00

Sex : Female

W/O AMANT VASHISTHA

Island Id :

Occupation : OTHER

Prepared by: Mrs. BHARTI RAWAT

Date and Time of initial assessment :

A: 7AR/ (BA)

Clinical History :

Co. cough x 10y → ↑ 6 months
disseminated cases

Examination Findings :

OT: Conscious oriented O/A: N/V/B/D
SPO₂ - 92% O₂A
no added sounds

Investigation :

Pt - 82 bpm

RR - 18/min

Diagnosis :

Treatment :

Adv. RVE CR in OPD (enclosed)

Follow-up advice :

Adv: ① MDI Budesonide (200/6) 2 puffs BID in spacer after mouth wash
(145+145A)
21-2 puffs SOS
② Zerostat vs spacer
③ steam inhalation BID
④ N/S Azelastine spray QID
↓ 10 mins
OTV 130

Doctor's Name
Signature / Date

OD=Once Daily BD=Twice Daily TDS=Thrice Daily QID=Four Times Daily HS=Bedtime SOS=If Needed
ABF=After Breakfast BBF=Before Breakfast LA=Local Application R/A=Review After

Item No. 96.7: To report the approval accorded by the Chairman, Senate.

A. Recommendations of various SRCs regarding extension to the Ph.D. students for Thesis submission.

1. **Ms. Lipi Mishra, (Er.No. 13914014), Ph.D. student, Civil Engg. Dept. (Full Time)**
2. **Mr. Ramjee Lal Meena, (Er.No. 13909006), Ph.D. student, Dept. of Hydro and Renewable Energy. (Part Time)**
3. **Mr. Luxman Kumar, (Er.No. 13917011) Ph.D. student, Dept. of Earthquake Engineering. (Part Time)**
4. **Mr. Deepak Maurya, (Er.No. 13928010), Ph.D. student, Dept. of WRD&M. (Part Time)**
(Item No.: 61.2.1, 61st IRC dt: 08.02.2023).

Considering the recommendations of respective SRCs, the 61st IRC in its meeting held on 08.02.2023 recommended the time extension requests of all the above students. On the recommendations of IRC, the Chairman Senate, on behalf of the Senate, approved the requests for time extension for thesis submission upto 30.6.2023.

B. Mercy appeals of the following ex.-Ph.D. students, whose academic registrations were terminated due to non-submission of mandatory documents /progress reports/fees etc. in time.

1. **Mr. Rohan Bose, Ph.D. student, Physics Deptt., (En. No. 22925018).**
2. **Mr. Vaibhav Pachalee, Ph.D. student, Physics Deptt., (En.No. 22925021).**
3. **Mr. Ajay Kumar Chhabra, Ph.D. student, Centre of Nanotechnology (Enrolment number 20906001).**
4. **Mr. M. Venkateshwar Rao, full time Ph.D. student of Mechanical & Industrial Engineering Department (Project Category). (E. No. 20920013).**
5. **Mr. Ankit Gupta, Full Time Ph.D. student of Earth Sciences Deptt. (CSIR) (E.No.14912023)**
6. **Mr. Kamlesh Kumar Meena, Full Time Ph.D. student of Earth Sciences Deptt.(MHRD) (E.No.14912025)**
7. **Ms. Somya Sucharita Behera, Part-time Ph.D. student of Civil Engg. Deptt. (E.No. 17910030)**
8. **Mr. Ankush Kumar Ruhela, full time Ph.D. student, Earthquake Engineering Department (E. No. 16913002).**

9. **Mr. Anil Kumar, part time Ph.D. student, C-Trans (En. No. 16907001).**
10. **Mr. Swarga Mandal, part-time Ph.D. student, Electronics & Communication Engineering Department (En. No. 15915031).**
11. **Mr. Tewele Gerlase Haile, full-time Ph.D. student, Humanities & Social Sciences Department (En. No. 17916014).**

(Item No.: 62.2.1, 62nd IRC dt: 26.04.2023).

Considered the requests of the above students as well as the recommendations of respective Departments/Centres, the 62nd IRC in its meeting held on 26.04.2023 recommended reinstatement of their academic registration and allowed registration, with late fine, in the current semester i.e. Spring Semester 2022-2023. On the recommendations of IRC, the Chairman Senate, on behalf of the Senate, approved the mercy appeals for reinstatement of academic registration.

C. The following MoUs between IIT Roorkee and Universities Abroad.

1. **The Cotutelle agreement with the University of Waterloo (UW), Canada.**
2. **Dual Doctoral Degree Program (DDP) with Loughborough University (LU).**
3. **Joint Doctoral Degree Program with RIKEN, Japan.**

(Item No.: 62.2.3, 62nd IRC dt: 26.04.2023).

The IRC in its 62nd meeting held on 26.04.2023 approved the MoUs with the above mentioned Institutes.

D. Recommendations of 129th and 130th meetings of the IAPC held on 22.03.2023 and 03/24.05.2023.

1. Requests of the following students regarding name restoration and continuation of program (Item No.: 129.2.2, 129th IAPC dt: 22.03.2023)
 - a) Habtamu Temesgen (Enr. No. 22571005), M.Tech. (WR), I Yr **(Not approved)**
 - b) Shiv Prakash Yadav (Enr. No. 20110029), B.Arch. (AR), III Yr (Approved)

2. 2nd mercy of the following students regarding name restoration and continuation of program (Item No.: 130.2.2, 130th IAPC dt: 03.05.2023)
 - a) Mr. Abhishek Jatav (Enr. No. 22526001), M.Tech. (EQ), I Yr **(Not approved)**
 - b) Mr. C. Chakradhar (Enr. No. 20311008), Int. M.Sc. (PH), III Yr **(Not approved)**
3. Requests of the following students regarding course drop after the last date (Item No.: 130.3.1, 130th IAPC dt: 03.05.2023)
 - a) Aman Kumar Meena (Enr. No. 19117012), B.Tech. (ME), IV Yr (Approved)
 - b) Soham Dasgupta (Enr. No. 19117109), B.Tech. (ME), IV Yr (Approved)
4. Syllabus of following courses was approved by the IAPC with modifications: (Item No. 130.3.6, 130th IAPC dt: 24.05.2023)
 - a) HSI-101: Soft Skills
 - b) MSI-101: Fundamentals of Management
 - c) PHI-101: Physics-I
 - d) MAI-101: Mathematics-I
 - e) MAI-102: Mathematics-II

Considering the difficulties in conducting examinations and evaluation of a large group of students in the PHI-101: Physics-I, the IAPC also approved the proposal of the Department of Physics to conduct the MTE in an online mode and ETE (Objective and Subjective questions) in online/offline mode.

5. Academic Calendars for all (other than MBA) Autumn Semester (2023-24) and MBA (Term 1,5 and 2,6). (Notification dated May 13, 2023)

E. 1. Scholarships/awards/prizes.

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

2. Institution of new scholarships/awards/prizes.

- i. HORIBA Talent Hunt Scholarship:** HORIBA India Pvt. Ltd., New Delhi has created a corpus to support eighteen (18) partial tuition fee waiver of Rs. 66,000/- each to financially constrained undergraduate students under corporate social responsibility. This is a one-time financial support with the following details:

Eligibility: All General and OBC category students of B. Tech., B.Arch. or Integrated or Dual degree programmes taking 2/3 Tuition Fee Waiver, but not availing Merit Cum Means (MCM) scholarship.

Selection Process: The selection process will be based on inviting applications from the students at the individual level. The list of eligible students will be sorted in ascending order of their family income and the top 18 applicants will be selected for the award of scholarship.

- ii. Shri Suresh Chandra Kapoor Gold Medal:** Mrs. Krishna Kumari Kapoor w/o Late Shri Suresh Chandra Kapoor, has established a corpus to create one (01) Gold medal every year. This medal will be awarded as Shri Suresh Chandra Kapoor Department Gold Medal to the graduating student of M.Tech. (Civil Engineering) with the highest CGPA. The minimum CGPA requirement is 9.0.

- iii. Amba Prasad Kalawati Memorial Cash Prize:** Prof. Ambalika Sharma, an alumnus of 1983 batch of B.E. (Electronics & Communication Engineering) and Faculty Member of the Department of Electrical Engineering of the Institute, has revised the existing MoU to support one (01) cash prize of Rs. 10,000/- every year to the graduating student of M.Tech. (Civil Engineering) with specialization in Geomatics/Geospatial Engineering for obtaining the highest CGPA.

- iv. Alphaverse Award:** AlphaGrep Securities Pvt. Ltd., Mumbai has established a corpus to support ten (10) cash prizes under corporate social responsibility. This is a one-time financial support. The students will be selected based on online competition and awarded the following cash prizes:

1. Rs. 50,000/- to 1st Place Winner,
2. Rs. 30,000/- to 2nd Place Winner,
3. Rs. 20,000/- to 3rd to 6th Place Winner,
4. Rs. 10,000/- to 7th to 10th Place Winner.

- v. Prabha Nayyar Award for Excellence in Time Management:** Mr. Mohinder Nayyar, an alumnus of 1966 batch of B.E. (Mechanical Engg.), has revised his existing MoU to limit the number of recipients from five to three.

3. New MCM Scholarships:

- i. Sarojinites for Sarojinites MCM Scholarship:** Prof. Tashi Nautiyal, an alumnus of 1980 batch of M. Sc. (Physics) and representative of lady alumni, has established a corpus to create one (01) MCM scholarship of Rs. 14,000/- per year for the financially constrained female student. This scholarship will be awarded to the female student of I year of B.Tech/B.Arch./BS-MS/Int. M.Sc./M.Sc. programmes. The student must secure a minimum CGPA of 7.0 in I semester of her I year and should be resident of Sarojini Bhawan/Kasturba Bhawan/Vigyan Kunj Bhawan of IIT Roorkee. The selected recipient will continue to get this scholarship for the remaining period of study, provided she fulfils the eligibility criteria for MCM scholarship.
- ii. Arvind Kumar Jain MCM Scholarship:** Mr. Arvind Kumar Jain, an alumnus of 1971 batch of B.E. (Electrical Engineering), has enhanced his existing corpus to support one (01) more MCM scholarship of Rs. 10,000/- per year. This scholarship will be given to a deserving student of B.Tech. (Electrical Engineering).
- iii. Sampath and Ayengar Scholarship:** Mr. Lakshmi Sampath, an alumnus of 1961 batch of B.E. (Electrical Engineering) and his spouse Shree Ayengar, have revised their existing MoU to support one (01) MCM scholarship of Rs. 10,000/- every year to disadvantaged UG female student pursuing an engineering education.

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

The above are reported to the Senate.

Details of various awards/prizes to other than graduating students, Academic Year 2022-23

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					Year
				Enroll. No.	Name	CGPA	Gender	Programme	
1.	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/-	21116034	DAVE VAISHNAVI VIRATBHAI	9.556	Female	B.Tech. (Electronics & Communication Engineering)	2
2.	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 & Engineering). Two awards are to be given to two deserving students (one male & one female).	Rs. 10,000/-	20113018	AKSHAT AGARWAL	9.798	Male	B.Tech. (Computer Science & Engineering)	3
3.	B.K. Agrawal Award for Academic Excellence	For obtaining the highest CGPA amongst III-year students of B.Tech. (Chemical Engineering).	Rs. 10,000/-	20114081	RICHA	9.181	Female	B.Tech. (Computer Science & Engineering)	3
4.	Prem Prakash Gupta Scholarship	For obtaining the highest CGPA amongst III-year students of B.Tech. (Chemical Engineering).	Rs. 40,000/-	19410020	NAITIK JAIN	9.45	Male	B.Tech. (Chemical Engineering)	4
5.	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/-	21113122	RAHUL BAJIYA	9.311	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. 20,000/-	21113148	SHRUTI AGGARWAL	9.4	Female	B.Tech. (Civil Engineering)	2
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	9.495	Male	B.Tech. (Civil Engineering)	3
8.	Gauri Shanker-Malti Prize	For obtaining the highest CGPA amongst III-year students of B.Tech. (Civil Engineering).	Rs. 10,000/-	19113023	ANURAJ SAXENA	9.644	Male	B.Tech. (Civil Engineering)	4
9.	Lt. Gen. Ram Adhar Loomba Cash Prize	For obtaining the highest CGPA amongst III-year girl students of B.Tech. (Civil Engineering).	Rs. 10,000/-	19113024	APOORVA KAUSHIK	9.126	Female	B.Tech. (Civil Engineering)	4
10.	Air Cmdr S.C. Mehra Scholarship	For obtaining the highest CGPA amongst I-year girl students of B.Tech. (Electrical Engineering).	Rs. 10,000/-	21117086	OJASWI CHOPRA	8.756	Female	B.Tech. (Electrical Engineering)	2
		For obtaining the highest CGPA amongst II-year students of B.Tech. (Electrical Engineering).	Rs. 10,000/-	20115008	AKRITI JAIN	9.37	Female	B.Tech. (Electrical Engineering)	3

S. No.	Award/Prize	Criteria	Amount of Award/Prize	Details of Recipient					
				Enroll. No.	Name	CGPA	Gender	Programme	Year
		year girl student of B.Tech. (Electrical Engineering).						Engineering)	
		For obtaining the highest CGPA amongst III-year girl student of B.Tech. (Electrical Engineering).	Rs. 15,000/-	19115053	DHRITI GUPTA	8.976	Female	B.Tech. (Electrical Engineering)	4
11.	Kailash Chand Goyal Merit Scholarship	For obtaining the highest CGPA amongst III-year students of B.Tech. (Electronics & Communication Engineering).	Rs. 25,000/-	19116066	SANJANA NARAYAN	9.373	Female	B.Tech. (Electronics & Communication Engineering)	4
12.	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/-	20117135	VAIBHAV SHARMA	9.213	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/-	19117102	SAKET SHARMA	9.333	Male	B.Tech. (Mechanical Engineering)	4
13.	Kaustubh Roy Memorial Cash Prize	For obtaining the highest CGPA amongst III-year students of B.Tech. (Mechanical Engineering).	Rs. 10,000/-	19117023	ATHARVA KARANJGAOKAR	9.421	Male	B.Tech. (Mechanical Engineering)	4
14.	BSHPC Cash Prize	For securing the highest CGPA amongst I-year students of M.Tech. (Alternate Hydro Energy Systems).	Rs. 10,000/-	21512012	SUKHANTH BABU PAGADALA	8.684	Male	M.Tech. (Alternate Hydro Energy Systems)	2
15	Ashwani Kumar Goel, ALEO Manali Hydropower Award	For securing the second highest CGPA amongst I-year students of M.Tech. (Alternate Hydro Energy Systems).	Rs. 10,000/-	21512010	SACHIN AGGARWAL	8.526	Male	M.Tech. (Alternate Hydro Energy Systems)	2
16.	Dwarka Dass Balwant Kaur Thapar Cash Prize	For securing the second highest CGPA amongst I-year students of M.Tech. (Alternate Hydro Energy Systems). The student should not receive any award of similar or higher amount.	Rs. 5,000/-	21512005	ARNAB BARUAH	8.316	Male	M.Tech. (Alternate Hydro Energy Systems)	2
17.	Chhattisgarh State Power Generation Corporation Hydro Award	For securing the highest CGPA amongst I-year students of M.Tech. (Alternate Hydro Energy Systems). The student should not receive any award of similar or higher amount. 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	Rs. 10,000/-	21512002	AHZAM SHAKEEL	8.421	Male	M.Tech. (Alternate Hydro Energy Systems)	2
			Rs. 10,000/-	21513003	IRAM NAAZ	7.944	Female	M.Tech. (Environmental Management of Rivers and Lakes)	2

S. No.	Award/Prize	Criteria	Amount of Award/Prize	Details of Recipient					
				Enroll. No.	Name	CGPA	Gender	Programme	Year
18.	Shyam S Biyani Cash Award	similar or higher amount. For securing the highest CGPA amongst I-year students of M.Tech. (Polymer Science and Engineering).	Rs. 10,000/-	21562008	MAYANK GAUTAM	9.026	Male	M.Tech. (Polymer Science and Engineering)	2
19.	Maneesha Gupta Award of Excellence	For securing the highest CGPA amongst I-year students of M.Tech. (Packaging Technology).	Rs. 10,000/-	21555004	KAUSTUBH SHARMA	9.868	Male	M.Tech. (Packaging Technology)	2
20.	B K Chaturvedi Award	For obtaining the highest CGPA amongst I-year students of MBA.	Rs. 10,000/-	21810074	SPARSH WADHWA	8.966	Male	MBA	2

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.	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/- Rs. 15,000/-	19410020 19112026	NAITIK JAIN DHRUV GROVER	Male Male	B.Tech. (Chemical Engineering) B.Tech. (Chemical Engineering)	4 4
2.	1940 Batch Alumni Scholarship	For having the highest rank in JEE (Advanced) amongst I-year students of B.Tech. (Civil Engineering) admitted at the Institute.	Rs. 10,000/-	22113133	SANJAY PATHAK	Male	B.Tech. (Civil Engineering)	1
3.	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/-	19113087	NEETU KUMARI VERMA	Female	B.Tech. (Civil Engineering)	4
4.	Chhattisgarh State Power Generation Corporation Hydro Award	For securing the highest marks in the subject "Small Hydro Power Development" amongst the UG students. For securing the highest marks in the seminar amongst I-year students of M.Tech. (Alternate Hydro Energy Systems). For securing the highest marks in the seminar amongst I-year students of M.Tech. (Environment Management of Rivers and Lakes).	Rs. 10,000/- Rs. 10,000/- Rs. 10,000/-	19117080 21512010 21513002	PABBATHI SOWMYA SACHIN AGGARWAL ANKUR SINGHAL	Female Male Male	B.Tech. (Mechanical Engineering) M.Tech. (Alternate Hydro Energy Systems) Ph.D. (Hydro and Renewable Energy)	4 2 2
5.	Ajit Singh Yadav Memorial	For the best academic performance amongst III-	Rs. 20,000/-	20113029	ANSH SAINI	Male	B.Tech. (Mechanical)	3

S. No.	Award/Prize	Criteria	Amount of Award/Prize	Details of Recipient			
				Enroll. No.	Name	Gender	Programme
	Proficiency Prize	year UG students of Department of Mechanical and Industrial Engineering. The academic performance will be assessed using 75% weightage of CGPA upto II-year and 25% weightage in the subjects, (1) Introduction to Environmental Studies (CE), (2) Ethics and Self Awareness (HSS), and (3) Engineering Analysis and Design (ME). For the second-best academic performance amongst III-year UG students of Department of Mechanical and Industrial Engineering. The academic performance will be assessed using 75% weightage of CGPA upto II-year and 25% weightage in the subjects, (1) Introduction to Environmental Studies (CE), (2) Ethics and Self Awareness (HSS), and (3) Engineering Analysis and Design (ME). For the best academic performance amongst IV-year UG students of Department of Mechanical and Industrial Engineering. The academic performance will be assessed using 75% weightage of CGPA upto III-year and 25% weightage in the subjects, (1). Introduction to Environmental Studies (CE), (2). Ethics and Self Awareness (HSS), and (3). Engineering Analysis and Design (ME), and (4). Principles of Industrial Engineering (ME). For the second-best academic performance amongst IV-year UG students of Department of Mechanical and Industrial Engineering. The academic performance will be assessed using 75% weightage of CGPA upto III-year and 25% weightage in the subjects, (1). Introduction to Environmental Studies (CE), (2). Ethics and Self Awareness (HSS), and (3). Engineering Analysis and Design (ME), and (4). Principles of Industrial Engineering (ME).					Engineering)
			Rs. 10,000/-	20119022	HARSH PANDEY	Male	B.Tech. (PRODUCTION & INDUSTRIAL)
			Rs. 25,000/-	19117023	ATHARVA KARANJGA OKAR	Male	B.Tech. (Mechanical Engineering)
			Rs. 15,000/-	19117029	BHAVESH CHANDRAK UMAR SHAMNANI	Male	B.Tech. (Mechanical Engineering)
6.	Usha Annual Award	For securing the highest marks in the subject "Small Hydro Power Planning and Management" amongst I-year students of M.Tech. (Alternate Hydro Energy Systems).	Rs. 10,000/-	21512010	SACHIN AGGARWAL	Male	M.Tech. (Alternate Hydro Energy Systems)
7.	Ar. Rishi Tiwari Memorial	For obtaining the highest SGPA in the Professional	Rs. 10,000/-	17110005	ASHISH	Male	B.Arch.

S. No.	Award/Prize	Criteria	Amount of Award/Prize	Details of Recipient			
				Enroll. No.	Name	Gender	Programme
	Scholarship	Training Semester amongst the students of B.Arch. programme. In case of a tie, the student with the highest CGPA will get this award.			BUNGLA		
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/-	18909007	ANUPAM DAS	Male	Ph.D. Chemistry
							5

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
1.	KCPL Award for Best Player in Football in the year	To the best players of football	Rs. 10,000/-	19119001	AARJAVIY	Male	B.Tech. (Production & Industrial Engineering)
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)
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)
		To the runner of the squash tournament for boys	Rs. 20,000/-	21902016	VINAY GAUTAM	Male	Ph.D. (Architecture & Planning)
4.	Jaikamal Award for Best Athlete of the Year	To the best two athletes, one each in male and female category.	Rs. 10,000/-	20114055	MAYANK KUMAR	Male	B.Tech. (Computer Science & Engineering)
			Rs. 10,000/-	20112114	VANDNA	Female	B.Tech. (Chemical Engineering)
5.	1968 Batch Donation Best Female Athlete	To the best female athlete.	Rs. 10,000/-	20112114	VANDNA	Female	B.Tech. (Chemical Engineering)
6.	Dr. K. V. Mital Memorial Award	To the best male player of Lawn Tennis	Rs. 5,000/-	21524015	PRAKUL DIXIT	Male	M.Tech. (Transportation Engineering)
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)

**ANY OTHER
ITEMS**

Item No. 96.8 : To consider the following proposals for Collaborative Masters' Degree Programmes with Foreign Universities.

Degree models under collaborative Masters' Degree Programmes:

(a) Joint Degree

- (i) Students must meet the eligibility requirements for admission to the home institution.
- (ii) Upon successful completion of the program, the students will receive the degree from the home institution with a remark in the degree certificate that the program has been completed jointly with the host institution.

(b) Double Degree

- (i) Students must meet the eligibility requirements for admission to both institutions.
- (ii) Upon successful completion of the program, the students will receive the degree from both institutions.

Conditions applicable for both programs:

- (i) Students must have a supervisor at each institution.
- (ii) The students must spend minimum 6 (six) months at the host institution during the entire program.
- (iii) They shall pay tuition fee at the home or host institution only.
- (iv) The candidates, who could not join the other Institution due to any reason, may be allowed to continue as per guidelines of the host institution.

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

Item No. 96.9 : To consider the Joint M.Tech. programmes in 'Semiconductor Technology' in collaboration with three universities from Taiwan.

The Senate in its 94th meeting held on 22 .02.2023 approved the Joint M.Tech. programmes in 'Semiconductor Technology' in collaboration with three universities from Taiwan:

- National Tsing Hua University (NTHU)
- National Yang Ming Chiao Tung University (NYCU)
- National Taiwan Normal University (NTNU)
(Confirmation from the University is yet to be received)

“As per clause 12.1 of the MoU with NTHU “The students who are admitted for the Joint Program will have to pay the required program fees to the Home Institution and Host Institution. However, the students who are admitted for the Dual Degree Program have to pay the tuition fee at the Home Institution and shall be exempted from paying any kind of enrolment fee to the Host Institution.”

The students may intend to opt for the Dual Degree program with NTHU owing to the above clause.

In view of the above, the following is proposed for consideration:

1. The program is considered for both Joint-Masters or Double Masters' Degree Program.
2. For Double degree who could not join the other Institution due to any reason, may be allowed to continue as per guidelines of the host institution.

The IAPC, in its 130th meeting held on 24.05.2023 considered and recommended the above proposals with minor modification.

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

Item No. 96.10: To re-consider the existing provision on Moderation of Grades of the Courses.

The 78th Senate in its meeting held on 10.04.2019, vide Item No. 78.6 approved the following: “The grade moderation will be optional and can be exercised at the discretion of the DFC.” **(Appendix-A)**

Consequently, different departments follow different practices to submit the Grades to the AAO. In many Departments/Centres/School, faculty members directly submit the Grades to the AAO; the concerned Chairperson of the DAPC/CAPC/ScAPC receives a copy of the submitted grades. However, several departments/centres/school collectively analyse the grades before submitting to the AAO.

While the course coordinator is the most conversant person in deciding the grading policy for a given course, possibility of error in preparation and submission of Grades is reduced if they are checked by and/or analysed by multiple persons. Requests have also been received to make the Grade Moderation mandatory.

The IAPC in its 130th meeting held on 24.05.2023 considered the proposal and no change in the current policy is suggested.

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

Item No. 78.5: To consider the Academic Calendar for the session 2019-20.

The Senate approved the Academic Calendar for the Session 2019-20 as given in **Appendix C.**

Item No. 78.6: To consider the Revised Report of Grading Rules Review Committee.

The Senate approved the Grading Rules as given in **Appendix D.**

Item No. 78.7: To consider the modified minimum eligibility criteria for admission in Ph.D. programme as proposed by Department of Metallurgical and Materials Engineering and Department of Architecture and Planning.

The Senate approved the minimum eligibility criteria for admission in Ph.D. programme as under:

Department of Metallurgical & Materials Engineering:

Candidates with Bachelors or Masters Degree (B.E./B.Tech./M.E./M.Tech./equivalent) in Metallurgical Engineering, Metallurgical and Materials Engineering, Materials Science and Engineering, Ceramic Engineering, Polymer Engineering.

Department of Architecture & Planning:

1. Bachelors Degree in Architecture or Planning followed by Masters Degree in any specialization.
2. Bachelors Degree in Civil Engineering followed by Masters Degree in any specialization of Planning.

Item No. 78.8: To consider the requests of two students regarding extension in time for the submission of thesis.

The Senate accepted the recommendations of IRC. Mr. Rajavel Muthaiah V.M., Enrolment No. 12924005 was allowed to submit the Ph.D. thesis by April 30, 2019 and Mr. Ararso Beyene Woyessa, Enrolment No.12910001 was allowed to submit the Ph.D. thesis before the date of semester registration for Autumn 2019-2020.

Item No. 78.9: To consider the recommendations of IRC and DRC, Deptt. of Earth Sciences, to give one time exception to Research Scholars who took UG level courses in

REPORT OF THE GRADE REGULATION REVIEW COMMITTEE

A committee was constituted vide letter no. Acd/5242/Misc-2017 dated June 12, 2017 to review the whole grading system regulations comprising the following members:

1. Prof. Himanshu Joshi, Hydrology - Chairman
2. Prof. N.K. Samadhiya, CED – member
3. Prof. Apurbba Kumar Sharma, MIED – member
4. Prof. Sugata Gangopadhyay, CSE – member
5. Prof. Vipul Rastogi, Physics and ADOAA (Curriculum) – member

Following actions were taken by the committee members:

1. Study of the grade regulation systems of few premier national/international institutes
2. Considering opinion of students and faculty members obtained through mails/personally
3. Considering few cases reported with anomalies

Further, the committee took into account the suggestions from an “Open House” and the “IAPC meeting” and finally resolved to propose the following recommendations:

1. The current grading system should be replaced with the new grading system as presented in Table 1.
2. There should be no limit on the number of students that can be awarded the highest grade A+.
3. Statistical system of grading is preferred for a class size of ≥ 30 students (Table-2). Absolute grading system is preferred for a class size of < 30 students (Table-3). However, a faculty member has a choice of employing the more suitable of the two judiciously. The ranges suggested in Tables 2-3 can be adjusted depending on the natural gaps.
4. In the case when a course is being offered with more than one teacher teaching different batches, a committee chaired by the course coordinator and all the other faculty members teaching the course as members will finalize the grades before submission. If needed, marks given across different batches may be normalized before the final awarding of grades.
5. The grade moderation will be optional and can be exercised at the discretion of the DFC.
6. The explanation of different grades, as done now, be discontinued henceforth.
7. In Audit courses, the grades should remain as either “AP (Audit Pass)” or “AF (Audit Fail)”.



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8. No student having 35% or more marks should be awarded the failing grade "F". However, for a student to get a grade D or above in any course, he/she would have to appear in the ETE.
9. A student, who is detained in any course due to short attendance, would be awarded failing grade "FS".
10. If a need is felt, the Chairman Senate may constitute a committee chaired by Dean Academic Affairs to examine the grades awarded in a course.



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TABLE 1: STRUCTURE FOR GRADING OF ACADEMIC PERFORMANCE

Grades	Grade Point
A+	10
A	9
B+	8
B	7
C+	6
C	5
D	4
F	0
FS (Fail due to short attendance)	0
AP (Audit Pass)	-
AF (Audit Fail)	-
I (interim grade)	-
X (continued project)	-
S (satisfactory)	-
U (unsatisfactory)	-

TABLE 2: SUGGESTED RANGES FOR GRADES USING STATISTICAL METHOD

Lower Range of Marks	Grade	Upper Range of Marks
	A+	$> \bar{X} + 1.5 \sigma$
$\bar{X} + 1.0 \sigma <$	A	$\leq \bar{X} + 1.5 \sigma$
$\bar{X} + 0.5 \sigma <$	B+	$\leq \bar{X} + 1.0 \sigma$
$\bar{X}$	B	$\leq \bar{X} + 0.5 \sigma$
$\bar{X} - 0.5 \sigma <$	C+	$\leq \bar{X}$
$\bar{X} - 1.0 \sigma <$	C	$\leq \bar{X} - 0.5 \sigma$
$\bar{X} - 1.5 \sigma <$	D	$\leq \bar{X} - 1.0 \sigma$
	F	$\leq \bar{X} - 1.5 \sigma$

TABLE 3: SUGGESTED RANGES FOR GRADES BASED ON ABSOLUTE MARK SYSTEM

The award of grades on absolute marks out of 100 may be made as follows:

Marks	Grade	Marks
$91 \leq$	A+	≤ 100
$82 \leq$	A	≤ 90
$73 \leq$	B+	≤ 81
$64 \leq$	B	≤ 72
$55 \leq$	C+	≤ 63
$46 \leq$	C	≤ 54
$35 \leq$	D	≤ 45
-	F	≤ 34

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Item No. 96.11: To consider the Hindi names of the PG programmes.

In the academic year 2021-22, several PG programmes were introduced, and the degrees for these programmes are scheduled to be awarded in Convocation-2023. The names of the programmes in English have been approved by the 86th meeting of Senate and are listed alongside these names, the corresponding translations in Hindi are provided:

Name of Programme in English	Name of Programme in Hindi
Master of Technology in Dam Safety and Rehabilitation	बाँध संरक्षा एवं पुनर्वास में प्रौद्योगिकी निष्णात
Master of Technology in Artificial Intelligence	आभासी समझ में प्रौद्योगिकी निष्णात
Master of Technology in Data Science	डेटा विज्ञान में प्रौद्योगिकी निष्णात
M. Des. (Industrial Design)	एम. डेस. (औद्योगिक अभिकल्प)
MIM (Master in Innovation Management)	एमआईएम (नवाचार प्रबंधन में निष्णात)

It is stated the hindi names of the programmes have been vetted by the Hindi Cell.

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

Item No. 96.12: To consider the Mercy Appeals of Mr. Akshay Kumar Yadav (En. No.: 1799016), ex-Ph.D. students Department of Mathematics for reinstatement of his academic registration.

Mr. Akshay Kumar Yadav was registered in Ph.D. programme on 28/12/2017 with Institute Assistantship in the Department of Mathematics. His academic registration was cancelled on 20.09.2022 due accumulation of 12 unsatisfactory units under Ph.D Rules and Regulations No. R-5.

The Senate in its 94th meeting considered his mercy appeals and did not recommend for reinstatement of academic registration.

Now, he has submitted his second mercy appeal vide email dated 17th May 2023 to the Director, copied to the DoAA. **(Appendix –A)**. His second appeal was considered by the Committee chaired by DoAA, DRC Chairpersons, Institute Student Counsellor and others. The minutes of the committee is placed at **Appendix-B**.

The committee observed the following:

- His supervisor, Prof. Madhu Jain denied to supervise him. However, she has no objection if he continues his research work with other supervisor.
- The Counselor and CMO informed that Mr. Akshay attended a session in Wellness Centre although no mental issues was found with him.
- Prof. Milli Pant, Department of Applied Mathematics and Scientific computing, Saharanpur Campus has agreed to supervise him.

The Committee recommends that registration of Mr. Akshay Kumar Yadav can be reinstated, by transferring the same to the Department of AM&SC, Saharanpur Campus from the Department of Mathematics.

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

Zimbra

aao-phd@iitr.ac.in

2nd mercy appeal for reinstatement of academic registration.

From : AKSHAY KUMAR YADAV <ayadav@ma.iitr.ac.in>

Wed, May 17, 2023 08:03 PM

Subject : 2nd mercy appeal for reinstatement of academic registration.

2 attachments

To : Director IIT Roorkee <director@iitr.ac.in>, Dean AcademicAffairs <daa@iitr.ac.in>

Cc : Assit RegistrarEvaluation <arevaluation@iitr.ac.in>

Respected Sir;

I Akshay Kumar Yadav (Enroll. No. 17919016) was a research scholar in the department of mathematics, IIT Roorkee under the supervision of Prof. Madhu Jain. My initial Ph.D. registration was done on 28 december, 2017.

I have write-up of three research papers. One research paper has also been published in the 'Global Journal of Computer and Engineering Technology (GJCET)', in which I am also an author.

From August 2021 to February 2022, I was disturbed and under depression due to some family problems and could not focus on my research work. My supervisor Prof. Madhu Jain denied to act as supervisor. Prof. Madhu Jain has no objection if I do my research work under supervision of any other faculty member (Kindly see the attached file-2 for screen shot of her message sent on 24 Sep, 2022).

Due to cancellation of my Ph.D. programme, I am getting depressed again and my health is severely affected. I had applied for a mercy appeal for reinstatement of my Ph.D. programme on 27 October, 2022; but I was intimated on 13 March, 2023 (Letter No. Acd./ Evl. /1259/Senate-94) that my mercy appeal has not been accepted.

Prof. Millie Pant has kindly agreed to act as my research supervisor.

So, I request you to kindly reinstate my academic registration. So that I could complete my Ph.D. programme. I shall be highly obliged to you for your necessary action. I hope for a favorable decision and safe my career.

Thanking you.

Yours sincerely;

AKSHAY KUMAR YADAV

Ex. Ph.D, Student

Department of Mathematics,

IIT Roorkee

Mobile No.: 8171387970

Enclosure(s):

1. 1st mercy appeal (submitted on 27 Oct., 2022).

ACADEMIC AFFAIRS OFFICE
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Minutes of the Meeting of the Extended Second Mercy Appeal Committee held on 05.06.2023 at 05:00 P.M. in the office of Dean of Academic Affairs regarding admissibility of 2nd Mercy Appeal of Mr. Akshay Kumar Yadav (E.No. 17919016).

The following were present in the meeting:

1.	Prof. Apurbba Kumar Sharma, DoAA	-	Chairman
2.	Prof. C.N. Ramachandran, ADoAA (Curriculum)	-	Member
3.	Prof. Maheshanand, Chairperson, DAPC (MA)	-	Member
4.	Dr.M.K. Jha, Chief Medical Officer	-	Member
5.	Prof. Bhavesh Bhalja, ADoAA (Evaluation)	-	Special Invitee
6.	Prof. P. Bera, Head, Deptt. of Mathematics	-	Special Invitee
7.	Prof. Millie Pant, Head, Deptt. of AM&SC	-	Special Invitee
8.	The Chairperson, DRC (MA)	-	Special Invitee
9.	Mr. Ashfak Ahamed PC, Institute Student Counsellor	-	Representative
10.	Mr. Raj Kumar Sharma, AR (Evaluation)	-	Secretary

The committee considered the 2nd Mercy appeal of Mr. Akshay Kumar Yadav (E.No. 17919016), Ex-Ph.D. student, Department of Mathematics for name restoration. In this regard, the committee observed the following:

- (i) The Institute Student Counselor informed that Mr. Akshay Kumar Yadav attended one session in wellness centre on 21.10.2022 after termination his academic registration on 20.09.2022. The wellness centre did not find any mental issue with him.
- (ii) The Chief Medical Officer of the Institute Hospital informed that Mr. Akshay Kumar Yadav never consulted in the Psychiatric section of IITR Hospital in the last three years.
- (iii) Prof. Milli Pant, Department of Applied Mathematics and Scientific Computing, Saharanpur Campus has agreed to supervise Mr. Akshay Kumar Yadav, if his academic registration is reinstated.

Considering the above facts, the Extended Mercy Appeal Committee deliberated and observed that the academic registration of Mr. Akshay Kumar Yadav can be reinstated. His academic registration may be transferred to the Department of AM&SC, Saharanpur Campus from the Department of Mathematics.

The said observations be placed to the Chairman, Senate for his kind consideration.

The meeting ended with vote of thanks.


Prof. Bhavesh Bhalja,
ADoAA (Evaluation)
Special Invitee

Mr. Ashfak Ahamed PC
Institute Student Counsellor
Representative

Chairperson, DRC, Deptt. of Maths.
Special Invitee

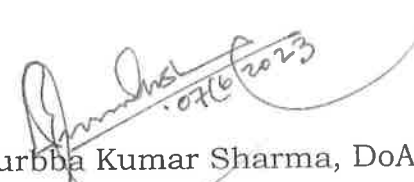
Prof. P. Bera, Head, Deptt. of Maths.
Special Invitee

Prof. Millie Pant, Head-Dept.-AM&C
Special Invitee

Dr.M.K. Jha, Chief Medical Officer
Member


Prof. C.N. Ramachandran,
ADoAA (Curriculum), Member

Prof. Maheshanand, Chairperson
DAPC (Maths.), Member


Prof. Apurba Kumar Sharma, DoAA
Chairman

Item No. 96.13: To report the approval accorded by the Chairman, Senate on the recommendations of 130th meetings of the IAPC.

1. Requests of Mr. Siddhant Yadav (Enr. No. 18122022), B.Tech. (EPH) to allow registration of course PHN-400B: B.Tech. Project (Item No.: 130.3.3, 130th IAPC dt: 24.05.2023)
2. A one-time exception as listed below regarding the course XX-399: Industrial Tour. (Item No.: 130.3.5, 130th IAPC dt: 24.05.2023)
 - (i) The 3rd year students who are registered in the Spring Semester 2022-23 but could not complete the Industrial Tour be deregistered from the course. They will be required to complete the course in the 4th year.
 - (ii) The 4th year students who completed the Industrial Tour to be registered in the Spring 2022-23.
 - (iii) The requirement of the said course for degree completion be waived off for the final year students who could not complete the tour in the current semester as one-time exception.
3. Approval of the syllabus of the course 'Tinkering and Mentoring' with modifications. (Item No.: 130.3.7(1), 130th IAPC dt: 31.05.2023)

The above are reported to the Senate.