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

सीनेट की उन्नासीवीं बैठक हेतु कार्य सूची
AGENDA FOR THE
79th MEETING OF THE SENATE

बैठक सं0	: उन्नासीवीं
MEETING NO.	**: 79th**
स्थान	: सीनेट हॉल, भा0प्रौ0सं0 रूड़की
VENUE	**: Senate Hall, IIT Roorkee**
दिनांक	: 19 जुलाई 2019
DATE	**: 19th July 2019**
समय	: 4.00 बजे अपरान्ह
TIME	**: 4.00 P.M.**

भारतीय प्रौद्योगिकी संस्थान रूड़की

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

रूड़की 247 667

ROORKEE – 247 667

कार्यसूची/A G E N D A

मुद्दा सं0/ **Item No.**	विवरण/**Particulars**	पृष्ठ/ **Page(s)**
79.1	सीनेट की 77वी (विशेष) और 78वी बैठकों क्रमशः दिनांक 01.03.2019 और 10.04.2019 को आयोजित कार्यवृत्त की पुष्टि करना। To confirm the minutes of the 77th (Special) and 78th meetings of the Senate held on 01.03.2019 and 10.04.2019, respectively.	1
79.2	सीनेट की 77वी (विशेष) और 78वी बैठकों क्रमशः दिनांक 01.03.2019 और 10.04.2019 में लिए गए निर्णयों के कियान्वयन हेतु की गई कार्रवाई को रिपोर्ट करना। To report on the actions taken to implement the decisions of the Senate taken in its 77th (Special) and 78th meetings held on 01.03.2019 and 10.04.2019, respectively.	2-8
79.3	बीटेक छात्र जो एमटेक के उस ब्रांच के लिए पात्र है, डयूल डिग्री प्रोग्राम में प्रवेश के प्रस्ताव पर विचार करना। To consider the proposal of admission in Dual Degree programme of B.Tech. students who are eligible for M.Tech. in that branch.	9
79.4	भौतिकी विभाग में एमटेक (एसएसईएम) और एमटेक (फोटोनिक्स) के कार्यक्रम संरचनाओं में कुछ मामूली पुनर्गठन और एमटेक (फोटोनिक्स) के दो पाठ्यक्रम के प्रस्ताव पर विचार करना। To consider the proposal of Department of Physics for some minor restructuring in the programme structures of M.Tech. (SSEM) and M.Tech. (Photonics) and syllabus of two courses of M.Tech. (Photonics).	10-19

79.5	इलेक्ट्रोनिक्स और संचार इंजीनियरिंग विभाग में एमटेक (माइक्रोइलेक्ट्रोनिक/ वीएलएसआई) कार्यक्रम ढांचें कें पुनर्गठन और एक नया पीसीसी प्रोग्राम शुरू करने के प्रस्ताव पर विचार करना। To consider the proposal of Department of Electronics and Communication Engineering for restructuring in the programme structure of M.Tech. (Microelectronics/VLSI) and to introduce a new PCC Course.	20-26
79.6	धातुकर्म एवं पदार्थ इंजीनियरिंग विभाग में पीएचडी कार्यक्रम में पुनः सम्मिलित होने के लिए श्री श्रेय अग्रवाल के अनुरोध पर विचार करना। To consider the request of Mr. Shrey Agrawal to rejoin the Ph.D. programme in Department of Metallurgical and Materials Engineering.	27
79.7	न्यूनतम सीजीपीए/ न्यूनतम अर्जित केडिट सीमा को पूरा नही करने के बावजूद कार्यक्रम की निरंतरता के संबंध में कुछ छात्रों के अनुरोधों पर विचार करना। To consider the requests of some students regarding continuation of programme in spite of not fulfilling minimum CGPA/ extension beyond permissible limit/continuation of programme in spite of not fulfilling minimum earned credit requirement.	28-35
79.8	डिप्लोमा प्रदान करने के लिए श्री एल्विन रेड्डी (अनुक्रमाकं सं0 18537020) पीजी डिप्लोमा (हाइड्रोलोजी) के अनुरोध पर विचार करना। To consider the request of Mr. Alvin Reddy (Enr. No. 18537020), P.G.Diploma (Hydrology) for awarding Diploma.	36
अन्य मद अध्यक्ष की अनुमति से/Under any item with the permission of the Chair.		

Item No. 79.1: To confirm the minutes of the 77th (Special) and 78th meetings of the Senate held on 01.03.2019 and 10.04.2019, respectively.

The minutes of the 77th (Special) and 78th meetings of the Senate held on 01.03.2019 and 10.04.2019, respectively were circulated to the members vide e-mail dated 11.06.2019. Comments received will be placed before the Senate.

The Senate may consider confirming the said minutes.

Item No.79.2: To report on the actions taken to implement the decisions of the Senate taken in its 77th (Special) and 78th Senate meetings held on 01.03.2019 and 10.04.2019, respectively.

The minutes of the 77th (Special) and 78th Senate meetings held on 01.03.2019 and 10.04.2019, respectively were circulated to the members vide e-mail dated 11.06.2019. The status of actions taken is as under:

Item No.	Reference to the Senate minutes	Abstract of the Minutes	Status of action taken
Meeting dated 01.03.2019			
77.0	Report of Prof. Manish Shrikhande Committee on Ph.D. Rules & Regulations.	The Senate considered the report in its 77th (Special) meeting and the deliberations continued under item No. 78.11 in the 78th meeting.	Concluded at item No. 78.11 & informed to Academic Section.
Meeting dated 10.04.2019			
78.3	Proposal to introduce following new courses: (i) UG Research Course (UGRC001) - 3 Credits, Department specific (ii) Interdisciplinary UGRC (IUGRC001) - 3 Credits, applicable for all Departments interdisciplinary projects.	The Senate approved the proposal with the following provisions: (a) Both the courses be accommodated in one new course UG Research (UGR001) of 3 credits. These credits will be treated as extra credits earned. (b) Interested students may register for the course just like any other course. (c) Evaluation will be carried out by a committee constituted by the DAPC of the Department in which the course has been carried out.	Notified.

78.4	Revised guidelines for evaluation of UG and PG project/dissertation.	The Senate decided the following: (a) For M.Tech./IMT/IDD thesis, the constitution of evaluation board will be as follows: (i) DAPC Chair's nominee from the same specialization - Chairperson. (ii) Two experts from a related field selected by the DAPC Chair from a panel proposed by the supervisor(s). The experts can be from outside the Department/Institute. (iii) Supervisor(s) The Chairman Senate was authorized to constitute a committee to review the current thesis evaluation process. The report of the committee will be placed before the Senate. (b) For M.Sc./Int.M.Sc. projects/dissertation, the proposal was approved. In future, the word "project" will be used for all the disciplines/programs. (c) The proposal for B.Tech. projects was approved. The Senate also decided that the existing guidelines, if any, for thesis/report format be found out and the changes required, if any, be placed before the Senate in a subsequent meeting	Notified.

78.5	Academic Calendar for the session 2019-20.	The Senate approved the Academic Calendar for the Session 2019-20	Notified.
78.6	Revised Report of Grading Rules Review Committee.	The Senate approved the Grading Rules	Notified.
78.7	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.	Notified.
78.8	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.	Informed to all concerned.

<table>
<tr><td>78.9</td><td>Recommendations of IRC and DRC, Deptt. of Earth Sciences, to give one time exception to Research Scholars who took UG level courses in Autumn / Spring semester 2018-19 to complete course credit requirement for Ph.D. programme.</td><td>The Senate approved the recommendation as a one-time exception. Further, the Senate advised the Earth Sciences Department to propose Pre-Ph.D. and PG level courses at the earliest.</td><td>Informed to Head, Department of Earth Sciences.</td></tr>
<tr><td>78.10</td><td>Cut-off rank for James Thomason Scholarship (JTS) for 2019-2020.</td><td>The Senate approved the proposal.</td><td>Informed to Chairman, SCSP.</td></tr>
<tr><td>78.11</td><td>Remaining clauses of Part-II: Ph.D. Procedures as proposed by Prof. Manish Shrikhande Committee on Ph.D. Rules & Regulations.</td><td>The Senate approved Part-II of Ph.D. Manual.</td><td>Informed to Academic Section.</td></tr>
<tr><td>78.13</td><td>Modification in the eligibility criteria and selection process for admission of a Project staff in Ph.D. programme.</td><td>The Senate approved the modification in the eligibility criteria and selection process for admission of a Project staff in Ph.D. programme.

Further, the Senate decided to re-examine the scholarship issue of existing students for which an agenda be brought in the next meeting.</td><td>Informed to ADOAA (Admission)</td></tr>
<tr><td>78.14</td><td>Course credit requirements for candidacy in Ph.D. programme as directed by the 77th Senate.</td><td>The Senate deliberated the item and approved below:
<table>
<tr><th>S. No.</th><th>Qualification</th><th>Credit Requirements</th><th>Remarks</th></tr>
<tr><td>1</td><td>M.Tech, M.Arch./MURP, or equivalent</td><td>Minimum 9 credits or 3 courses</td><td>a. All courses shall be PG level theory courses.</td></tr>
</table></td><td>Informed to Academic Section.</td></tr>
</table>

		2	M.Sc/M.A./M. B.A.or equivalent, admitted to Science/ HSS/ Management department	Minimum 12 credits or 4 courses	b. In addition to minimum credits requirements a student shall take one seminar of 2 credits. c. Student can take one self-study theory course or an Online course.	
		3	B.Tech. or equivalent, or M.Sc. or equivalent, admitted to any one of the engineering departments/ centres	Minimum 24 credits		
78.15	Seat Matrix for UG and all Masters' Programmes including Ph.D. for the academic year 2019-20.	The Senate approved the Seat Matrix				Informed to ADOAA (Admission)
78.16	Proposal of Department of Civil Engineering regarding modification in the structure of M. Tech. (Transportation).	The Senate approved the structure of M.Tech. (Transportation)				Notified.
78.17	Following proposals of Department of Hydro and Renewable Energy: (a) Addition of "Instrumentation Engineering" as eligibility criteria for the admission in M. Tech.	The Senate approved the proposal				Notified.

	(AHES). (b) Introduction of a new Open Elective Course (OEC) for B. Tech. students- (IAH-303 :Solar Photovoltaic Technology and Applications)		
78.18	Recommendations of award committees for various awards.	The Senate approved the proposal.	Informed to Chairman, SCSP.
78.19	Awardees for various non-convocation awards.	The Senate approved the awardees.	
78.20	Award for Time Management.	The Senate approved the proposal.	
78.21	Requests of students regarding (A)continuation of program in spite of not fulfilling minimum SGPA, (B) semester withdrawal on medical ground, (C) extension beyond permissible limit and (D) second mercy appeal.	The Senate decided as under: **(A) Continuation of program in spite of not fulfilling minimum SGPA:** The Senate accepted the requests of the students except the one at S. No. 3, Mr. Prakriti Sarkar (Enrl. No. 18537020). His request has been referred back to the IAPC and the Chairman, Senate has been authorised to take a decision on the recommendation of IAPC. **(B) Semester withdrawal on medical ground:** The Senate accepted the recommendations of the IAPC.	Notified.

		(C) Extension beyond permissible limit The Senate did not accept the request of the student. **(D) Second mercy appeal: Appeal at Sl. Nos. 1 to 4:** The Senate accepted the requests of the students. Further, the Chairman Senate was authorized to constitute a committee to assist him in assessing the admissibility of 2nd mercy appeals/requests for consideration after the first one has not been accepted by the Senate.	
78.22	Proposal for provision of admission of foreign nationals in M.Sc. programmes and eligibility criteria.	The Senate approved the proposal. Further, the Senate advised that departments may conduct interviews over video conferencing before recommending foreign nationals for admission.	Informed to ADOAA (Admission)
Items Nos. 78.12, 78.23 to 78.28 were only for reporting to the Senate.			

Item No. 79.3: To consider the proposal of admission in Dual Degree programme of B.Tech. students who are eligible for M.Tech. in that branch.

At present, students are eligible to convert from B.Tech. to Dual degree programme offered by the parent department only. Whereas, for admission in some M.Tech. programmes, the B.Tech. students of other branches are also eligible. Therefore, it was proposed to allow admission of all the Bachelor students of the Institute who are eligible for the M.Tech. programme in that particular branch to the Dual Degree Programme.

The IAPC in its 71st meeting held on 27.06.2019 recommended the proposal.

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

Item No. 79.4: **To consider the proposal of Department of Physics for some minor restructuring in the programme structures of M.Tech. (SSEM) and M.Tech. (Photonics) and syllabus of two courses of M.Tech. (Photonics).**

Department of Physics proposed the following changes in the programme structure and syllabi of M.Tech. (SSEM) and M.Tech. (Photonics) programmes .

I. M. Tech. (SSEM) Programme Structure

1. PHN-704 Advance Characterization Techniques (previously PHN-710 a PEC from Group-B) has been introduced as a PCC [Revised Syllabus of PHN-704 Advance Characterization Techniques (with lab component) will be communicated shortly].

2. PHN-700A Industrial/Lab training has been shifted from II semester to III semester.

II. M Tech.(Photonics)

1. Programme Structure

(a) PHN-702 Guided Wave Optical Components & Devices (previously PHN-730 a PEC from Group-B) has been introduced as a PCC.

(b) PHN-700A Industrial/Lab training has been shifted from II Semester to III Semester.

2. Syllabi

(a) Minor changes in the course contents of PHN-713 Optical Electronics at Sl. No. 3 and redistribution of contact hours.

(b) Minor changes in the course contents of PHN-730 (Now PHN-702) Guided Wave Optical Components & Devices at Sl. No. 1 and 3, and redistribution of contact hours.

The IAPC in its 71st meeting held on 27.06.2019 considered and recommended the proposal **(Appendix-A)**.

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

PROGRAM : M.Tech. (**Solid State Electronic Materials**)
DEPARTMENT : Department of Physics

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
1st Year			I Semester (Autumn)											
1.	PHN-701	Numerical Analysis and Computational Techniques	PCC	3	2	0	2	3	3	10-25	25	15-25	30-40	0
2.	PHN-703	Fabrication and Characterization Techniques	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
3.	PHN-707	Laboratory Work in Solid State Electronic Materials	PCC	3	0	0	6	0	6	0	50	0	0	50
4.	PHN-709	Semiconductor Device Physics	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
5.	PHN-xxx	Programme Elective –I (Group A)	PEC	4	-	-	-	-	-	-	-	-	-	-
		Sub Total		**17**										
			II Semester (Spring)											
1.	PHN-704	Advance Characterization Techniques	PCC	4	3	0	3	3	0	10-25	25	15-25	30-40	0
2.	PHN-xxx	Programme Elective-II (Group B)	PEC	-	-	-	-	-	-	-	-	-	-	-
3.	PHN-xxx	Programme Elective-III (Group B)	PEC	-	-	-	-	-	-	-	-	-	-	-
4.	PHN-xxx	Programme Elective-IV (Group B)	PEC	-	-	-	-	-	-	-	-	-	-	-
5.	PHN-700	Seminar	SEM	2	-	-	-	-	-	-	-	-	-	-
		Sub Total		**18**										
2nd Year			III Semester (Autumn)											
1.	PHN-701A	Dissertation Stage-I	DIS	12	-	-	-	-	-	-	-	-	100	-
2.	PHN-700A	Industrial/Lab Training	ILT	2	-	-	-	-	-	-	-	-	-	-
		Sub Total		**14**										
			IV Semester (Spring)											
1.	PHN-701B	Dissertation Stage-II	DIS	18	-	-	-	-	-	-	-	-	100	-
		Sub Total		**18**										
		TOTAL CREDITS		**67**										

PROGRAM : M.Tech. (**Solid State Electronic Materials**)
DEPARTMENT : Department of Physics

List of PECs

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
Group-A														
1.	PHN-715	Analog Integrated Circuit Design	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
2.	PHN-717	Digital Signal Processing	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
3.	PHN-713	Optical Electronics	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
Group-B														
1.	PHN-718	Thin Film Technology	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
2.	PHN-708	Materials for Renewable Energy and Storage	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
3.	PHN-722	Functional Properties of Materials & Devices	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
4.	PHN-721	Nanoscience and Nanotechnology	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
5.	PHN-723	Engineered materials for Device Application	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
6.	PHN-724	Semiconductor Micro-electronic Technology	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
7.	PHN-725	Nano-electronics and -photonics	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
8.	PHN-726	Solar Photovoltaic and Energy Storage	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
9.	PHN-727	Advance Fuel Cell and Battery Technology	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
10.	PHN-728	MEMS and NEMS	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0

11.	PHN-729	Advanced Ceramics and Composites	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0

PROGRAM : M.Tech. (**Photonics**)
DEPARTMENT : Department of Physics

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
1st Year			I Semester (Autumn)											
1.	PHN-701	Numerical Analysis and Computational Techniques	PCC	3	2	0	2	3	3	10-25	25	15-25	30-40	0
2.	PHN-703	Fabrication and Characterization Techniques	PCC	3	3	0	0	3	0	20-35	0	20-30	40-50	0
3.	PHN-711	Laboratory Work in Photonics	PCC	3	0	0	6	0	6	0	50	0	0	50
4.	PHN-713	Optical Electronics	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
5.	PHN-xxx	Programme Elective –I (Group A)	PEC	4	-	-	-	-	-	-	-	-	-	-
		Sub Total		**17**										
			II Semester (Spring)											
1.	PHN-702	Guided-wave Optical Components & Devices	PCC	4	3	0	3	3	0	10-25	25	15-25	30-40	0
2.	PHN-xxx	Programme Elective-II (Group B)	PEC	4	-	-	-	-	-	-	-	-	-	-
3.	PHN-xxx	Programme Elective-III (Group B)	PEC	4	-	-	-	-	-	-	-	-	-	-
4.	PHN-xxx	Programme Elective-IV (Group B)	PEC	4	-	-	-	-	-	-	-	-	-	-
5.	PHN-700	Seminar	SEM	2	0	0	0	0	0	0	0	50	50	0
		Sub Total		**20**										
2nd Year			**III Semester (Autumn)**											
1.	PHN-700A	Industrial/Lab Training	ILT	2	0	0	0	0	0	0	0	0	100	0
2.	PHN-701A	Dissertation Stage-I	DIS	12	-	-	-	-	-	-	-	-	100	-
		Sub Total		**12**										
			IV Semester (Spring)											
1.	PHN-701B	Dissertation Stage-II	DIS	18	-	-	-	-	-	-	-	-	100	-
		Sub Total		**18**										
		TOTAL CREDITS		**67**										

PROGRAM : M.Tech. (**Photonics**)
DEPARTMENT : Department of Physics

List of PECs

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
Group – A														
1.	PHN-709	Semiconductor Device Physics	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
2.	PHN-715	Analog Integrated Circuit Design	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
3.	PHN-717	Digital Signal Processing	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
Group – B														
1.	PHN-719	Radiation Detection and Measurements	PEC	4	3	0	3	3	0	10-25	25	15-25	30-40	0
2.	PHN-725	Nano-electronics and photonics	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
3.	PHN-726	Solar Photovoltaic and Energy Storage	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
4.	PHN-731	Optical Communication System	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
5.	PHN-732	Optical Networks	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
6.	PHN-733	Solid State Lighting	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
7.	PHN-734	Display Technology	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
8.	PHN-735	Photonic Sensors	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
9.	PHN-736	Photonic Analysis and Design	PEC	4	2	0	4	2	3	10-25	25	15-25	30-40	0
10.	PHN-737	Silicon Photonics	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
11.	PHN-738	Quantum Photonics	PEC	4	3	1	0	3	0	20-35	0	20-30	40-50	0

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **DEPARTMENT OF PHYSICS**

1. Subject Code: **PHN-713** Course Title: **Optical Electronics**
2. Contact Hours: **L: 3** **T: 1** **P: 0**
3. Examination Duration (Hrs.): **Theory 3** **Practical 0**
4. Relative Weightage: **CWS: 20-35** **PRS: 00** **MTE: 20-30** **ETE: 40- 50** **PRE: 00**
5. Credits: **4** 6. Semester: **Autumn** 7. Subject Area: **PEC**
8. Pre-requisite: **Nil**
9. Objective: To introduce the concepts and related phenomena of light matter interaction for applications in optical communication system and photonic devices.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Review of Maxwell's equations, wave propagation in isotropic and anisotropic dielectric media, double refraction, plane waves in anisotropic media, wave and ray refractive indices, index ellipsoid.	10
2.	Fundamentals of lasers, light amplification, threshold condition, laser rate equations, line broadening, longitudinal modes of a laser, transverse modes of a laser, Q switching and mode locking, basics of semiconductor lasers.	12
3.	Salient features of optical fibers, numerical aperture, light acceptance angle, attenuation, single-mode and multi-mode fibers, step-index and graded-index optical fibers	4
4.	Electro-optic effect in KDP, $LiNbO_3$ and $LiTaO_3$, longitudinal and transverse modes, general considerations on modulator design.	5
5.	Acousto-optic effect, Raman-Nath and Bragg diffraction, small and large angle Bragg diffraction, acousto-optic modulator, deflector and spectrum analyzer.	5
6.	Nonlinear optical effects, second harmonic generation, sum and difference frequency generation, optical parametric amplification, self-phase modulation, stimulated Raman scattering, stimulated Brillouin scattering	6
	Total	**42**

11. Suggested Books:

S.No.	Name of Authors/ Books/Publishers	Year of Publication/ Reprint
1.	Ghatak A. and Thyagarajan K., "Optical Electronics," Cambridge University Press	2016
2.	Saleh B. E. A., and Teich M. C., "Fundamentals of Photonics," Wiley Eastern	2012
3.	Svelto O., "Principles of Lasers", Springer-Verlag	2010
4.	Agrawal G. P., "Optical Fiber Communication System," Wiley Interscience	2010

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **PHYSICS**

1. Subject Code: **PHN-702** Course Title: **Guided Wave Optical Components and Devices**

2. Contact Hours: **L: 3** **T: 0** **P: 3**

3. Examination Duration (Hrs.): **Theory 3** **Practical 0**

4. Relative Weightage: **CWS: 10-25** **PRS: 25** **MTE: 15-25** **ETE: 30- 40** **PRE: 00**

5. Credits: **4** 6. Semester: **Spring** 7. Subject Area: **PCC**

8. Pre-requisite: **Nil**

9. Objective: To familiarize the students with optical wave guided based technology.

10. Details of Course:

Sl. No.	Contents	Contact Hours
1.	Integrated optics, electromagnetic analysis of symmetric dielectric planar waveguide, TE and TM modes, power associated with the modes, asymmetric planar waveguides and their modal analysis, single-polarization single-mode waveguides, 2-D waveguides and their analysis, effective index method, perturbation method.	10
2.	Guided wave devices, directional couplers, modulators, Mach-Zhender inteferrometer, waveguide gratings, arrayed waveguide gratings.	6
3.	Weakly guiding optical fiber. LP modes of a step-index optical fiber, single mode optical fiber and its characteristics, attenuation, pulse dispersion, dispersion shifted fiber, dispersion compensating fiber, fiber fabrication	8
4.	Fused fiber coupler, beam splitter/combiner, WDM coupler, wavelength interleaver, side-polished optical fiber and its applications, polarization controller, isolator, circulator.	6
5.	Optical fiber amplifiers, erbium doped fiber amplifiers (EDFAs), mechanism of optical amplification in EDFA, noise figure. Raman amplifiers, gain spectrum	6
6.	Fiber gratings, fiber Bragg gratings, coupled mode analysis, reflection spectrum, add/drop multiplexer, dispersion compensation, strain and temperature sensing, fabrication techniques, long-period gratings, WDM filter, gain flattening of EDFA, mode converters	6
	Total	42

	List of Experiments 1. Characterization and analysis of wavelength division multiplexers and Demultiplexers. 2. Characterization of fiber Bragg gratings and their sensing properties. 3. Characterization of optical isolator and circulator. 4. Gain and noise study of erbium doped fiber amplifiers. 5. Study of time division multiplexing of digital optical signals. 6. Study of wavelength division multiplexed optical fiber communication link. 7. Study of adding and dropping of optical channels in a fiber link. 8. Qualitative and quantitative study of optical signals using eye diagrams and bit-error rate. 9. Rise and fall time study for bandwidth estimation of optical devices. 10. Study of RZ and NRZ signal generation and detection; and comparative study of the two for non-linearity mitigation in optical fibers.	14 x 3 hrs

11. Suggested Books:

S.No.	Name of Authors/ Books/Publishers	Year of Publication/ Reprint
1.	Pal B. P., "Guided Wave Optical Components and Devices	2006
2.	Ghatak A. and Thyagarajan K., "Introduction to Fiber Optics," Cambridge University Press	1998
3.	Agrawal G. P., "Optical Fiber Communication System," Wiley Interscience	2003
4.	Keiser, G., "Optical Fiber Communication," McGraw Hill Education	2014
5.	Shenoy, M. R., Khijwania, S. K., Ghatak, A. K., and Pal, B. P., "Fiber optics through experiments," Viva Books	2014

Item No. 79.5: To consider the proposal of Department of Electronics and Communication Engineering for restructuring in the programme structure of M.Tech. (Microelectronics/VLSI) and to introduce a new PCC Course.

The Department proposed to restructure the M.Tech. (Microelectronics/VLSI) programme structure in terms of credit change from 3 credits to 4 credits. It also proposed to introduce a new PCC i.e., ECN-579 "Foundations of Semiconductor Device Physics" along with its syllabus.

The IAPC in its 71st meeting held on 27.06.2019 recommended the proposal **(Appendix-A)**.

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

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: 31 M.Tech. (Microelectronics & VLSI)
Department: EC Electronics & Communication Engineering
Year: I

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weight (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Semester- I (Autumn)														
1.	ECN-573	Digital VLSI Circuit Design	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	ECN-575	Microelectronics Lab-1	PCC	2	0	0	3	0	3	-	100	-	-	-
3.	ECN-576	Simulation Lab-1	PCC	2	0	0	3	0	3	-	100	-	-	-
4.	ECN-578	Digital System Design	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	ECN-579	Foundations of Semiconductor device physics	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.		ELECTIVE-I	PEC	4	-	-	-	-	-	-	-	-	-	-
		Total		20	9	3	6	9	6					
Semester-II (Spring)														
1.	ECN-577	VLSI Technology	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	ECN-700	Seminar	SEM	2	0	0	0	0	3	-	100	-	-	-
3.		ELECTIVE-II	PEC	4	-	-	-	-	-	-	-	-	-	-
4.		ELECTIVE-III	PEC	4	-	-	-	-	-	-	-	-	-	-
5.		ELECTIVE-IV	PEC	4	-	-	-	-	-	-	-	-	-	-
6.		ELECTIVE-V	PEC	2	-	-	-	-	-	-	-	-	-	-
		Total		**20**	**3**	**1**	**0**	3	3					

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: 31 **M.Tech. (Microelectronics & VLSI)**
Department: EC **Electronics & Communication Engineering**
Year: II

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

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

Program Elective Courses (Microelectronics & VLSI)

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	ECN-571	Semiconductor Device Modeling	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2	ECN-572	MOS Device Physics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	ECN-581	Analog VLSI Circuit Design	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4	ECN-582	Semiconductor Microwave Devices & Applications	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5	ECN-583	Optoelectronic Materials & Devices	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6	ECN-584	Mixed Signal Circuit Design	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7	ECN-585	VLSI System Design	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
8	ECN-586	Device & Circuit Interaction	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
9	ECN-587	Nano Scale Devices	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
10	ECN-588	Performance and Reliability of VLSI Circuits	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
11	ECN-589	Advanced VLSI Interconnects	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
12	ECN-590	Organic Electronics	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
13	ECN-591	VLSI Physical Design	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14	ECN-592	Compound Semiconductors and RF Devices	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
15	ECN-593	CAD for VLSI	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
16	ECN-594	VLSI Digital Signal Processing	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
17	ECN-595	VLSI Testing and Testability	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

18	ECN-596	MEMS and NEMS	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
19	ECN-597	Microelectronics Lab.-2	PEC	2	-	-	2	-	-	-	100	-	-	-
20	ECN-598	Simulation Lab.-2	PEC	2	-	-	2	-	-	-	100	-	-	-

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPT. /CENTRE: **Electronics and Communication Engineering**

1. Subject Code: **ECN – 579** Course Title: **Foundations of Semiconductor Device Physics**

2. Contact Hours: **L: 3** **T: 1** **P: 0**

3. Examination Duration (Hrs.): **Theory: 3** **Practical :0**

4. Relative Weight: **CWS:20-35** **PRS:0** **MTE:20-30** **ETE:40-50** **PRE:0**

5. Credits: **04** 6. Semester : **Autumn**

7. Pre-requisite: **None**

8. Subject Area: **PCC**

9. Objective: To instigate fundamental concepts of solid state physics and basic semiconductor devices.

10. Details of the Course:

Sl. No.	Contents	Contact Hours
1.	**Basic Semiconductor properties**: Brief history of semiconductor revolution; types of semiconductor; crystal structure analysis – unit cell, Bravais Lattice, Miller Indices.	3
2.	**Review of quantum mechanics and energy-band theory**: Quantum concepts; basic formalism – particle in a 1-D box, finite potential well; Bloch Theorem; One dimensional analyses of semiconductors – K-P model, Brillouin zone; extrapolation of these concepts to three dimensions.	8
3.	**Equilibrium carrier statistics and R-G processes**: Density of states in 1D, 2D and 3D systems; Fermi-Dirac distribution, FD integral; Maxwell-Boltzmann approximation; equilibrium carrier concentration. Mass-action law; calculation of fermi level in intrinsic, extrinsic and freeze-out conditions; Degenerate semiconductors; recombination-generation (R-G) statistics; surface R-G processes;	7
4.	**Carrier transport:** carrier drift – mobility, narrow dimension effects, scattering phenomenon velocity saturation; diffusion current; Einstein relationship; Quasi-fermi levels, continuity equation; tunneling mechanisms, resistivity, Hall effect	7
5.	**Theory of P-N junction and metal-semiconductor junctions**: electrostatics – built in potential, depletion approximation, Poisson's equation; forward and reverse bias; ideal diode I-V characteristics; breakdown mechanisms; high injection effects; transient and A-C conditions; Metal-semiconductor junctions - Schottky, ohmic and rectifying contacts; semiconductor heterojunctions. Quantum well structures.	7

6.	**MOS capacitor**: Ideal Si/SiO2 MOS capacitor – solution of Poisson's equation, depletion approximation, HFCV, LFCV, deep depletion; non-ideal MOS capacitor - work-function difference, oxide and interface charges, polysilicon depletion effect, quantum effects, tunneling through the insulator.	10
	Total	**42**

11. Suggested Books:

Sl. No.	Name of Books/ Authors	Year of Publication
1.	Robert F. Pierret, "Advanced Semiconductor Fundamentals," Pearson Prentice Hall.	2002
2.	Robert F. Pierret, "Semiconductor Device Fundamentals," Pearson.	2006
3.	Ben G. Streetman and Sanjay K. Banerjee, "Solid State Electronic Devices," Pearson Education India Pvt. Ltd.	2015
4.	Donald A. Neamen, "Semiconductor Physics and Devices", McGraw Hill Higher Education	2002
5	S. M. Sze and Kwok K. Ng, "Physics of Semiconductor Devices," Wiley	2008
6	Mark Lundstrom, "Fundamentals of Carrier Transport," Cambridge University Press	2009
7	K. Seeger, "Semiconductor Physics," Springer	2004

Item No. 79.6: To consider the request of Mr. Shrey Agrawal to rejoin the Ph.D. programme in Department of Metallurgical and Materials Engineering.

Mr. Shrey Agrawal was admitted in Ph.D. programme on institute assistantship in Autumn 2018 in the Department of Metallurgical & Materials Engineering. Due to some unavoidable issues in his family, he resigned from Ph.D. programme on August 17, 2018.

He has requested on May 12, 2019 to rejoin the Ph.D. programme in Metallurgical & Materials Engineering. DRC of Department Metallurgical & Materials Engineering has recommended the same.

The IRC in its 30th meeting held on 24.05.2019 observed that the student has left the programme on his own and should come back through departmental admission procedure. The IRC did not recommend the request.

The above is submitted for the consideration of the Senate.

Item No. 79.7: **To consider the requests of some students regarding continuation of programme in spite of not fulfilling minimum CGPA/ extension beyond permissible limit/continuation of programme in spite of not fulfilling minimum earned credit requirement.**

The IAPC in its 71st meeting held on 27.06.2019 considered the requests of following students under various categories**(Appendix-A)**:

Category-A: Continuation of programme in spite of not fulfilling minimum CGPA

1. Mr. Subodh Thackray (Enr. No. 18513010), M.Tech. (AH), I Year
2. Mr. Sanjeev Kumar Chaudhari (Enr. No. 18531014), M.Tech. (EC), I Year
3. Ms. Heena Rawat (Enr. No. 18524005), M.Tech. (CE), I Year

The IAPC recommended the requests.

Category-B: Extension beyond permissible limit

1. Mr. A. Ravi Teja (Enr. No. 11213001), IDD (EC), V Year
2. Mr. Rahul Kumar (Enr. No. 12115077), B.Tech. (EE), IV Year
3. Mr. Aditya V.S. Gehlot (Enr. No. 12115007), B.Tech. (EE), IV Year
4. Mr. Rajkumar Bagaria (Enr. No. 12117058), B.Tech. (EE), IV Year

The IAPC recommended the requests.

Category-C: Continuation of programme in spite of not fulfilling minimum earned credit requirement

1. Mr. S. Kirubananth (Enr. No. 15116045), B.Tech. (EC), IV Year
2. Mr. Padam Singh (Enr. No. 16115080), B.Tech. (EE), III Year
3. Mr. Sudhir Balakrishnan (Enr. No. 17122027),

B.Tech. (PH), II Year

4. Mr. Yuvraj Pratap Singh Thakur (Enr. No. 15116076),B.Tech.(EC), III Year

5. Mr. Avesh Badal (Enr. No. 15117015), B.Tech. (ME), III Year

6. Mr. Nitish Gautam (Enr. No. 18122015), B.Tech. (PH), I Year

7. Md. Afham Aqdam (Enr. No. 18410013), Int. M.Tech. (ES), I Year

The IAPC recommended the requests at Sl. No. 1 to 5. The IAPC did not recommend the requests at Sl. No. 6 and 7.

The above is submitted for the consideration of the Senate.

Appendix A
Item No. Senate/79.7

DETAILS OF STUDENTS' REQUESTS/ APPEALS

S. No	Name	Details	Recommendations	Supporting Documents
Category-A: Continuation of program inspite of not fulfilling minimum CGPA				
1.	**SubodhThackray** M.Tech. (EMRL), I Yr (Deptt. Of Hydro & Renewable Energy) (Enr. No. 18513010) **(Request to continue studies)**	- Poor time management - SGPA: 5, 4.875 -CGPA: 4.944 -Grades: 1st Sem - D+, D, D+, D+, C 2nd Sem- D, D, C+, D+, D+	Department:Recommended Wellness Centre:Not consulted by the student IAPC: Recommended	N/A
2.	**Sanjeev Kumar Chaudhari** M.Tech. (EC), I Yr (Enr. No. 18531014) **(Request for Second-examination in ECN-615)**	-Health issue- Stomach Infection -SGPA: 5.286, 4 -CGPA: 4.730 -Grades: 1st Sem - C+, D, D+,C,D,C+ 2nd Sem - C+,C+,D,D+,F (PEC) - Missed exam due to health issue	Department: Forwarded CMO: Referred to Surgeon IAPC: Recommended	-Medical documents
3.	**HeenaRawat** M.Tech. (CE), I Yr (Enr. No. 18524005) **(Request to continue studies& applied for Second examination)**	-Did not appear in any exam -Health issue: Optic neurotics (Vision loss) -SGPA: 8.6, 0 -CGPA: 6.143 -Grades: 1st Sem - A,B+, B+, B, C+ 2nd Sem - -	Department:Recommended Wellness Centre:Not consulted by the student IAPC: Recommended	-Medical documents
Category-B: Extension beyond permissible limit				
1.	**A. Ravi Teja** IDD (EC), VYr (Enr. No. 11213001) **(Request for one semester extension)**	-Completed 8th year -Extension of one year was granted in 64th meeting of IAPC on medical ground -Health issue: Social anxiety	Department:Forwarded Wellness Centre:Recommended IAPC: Recommended	-

		- Counselling from Spring 18-19 -TEC: 208 -Balance credits: 18 to complete the degree (Dissertation Stage- II left only) -CGPA: 5.433 -SGPA: 6.167, 6.214, 6, 5.2, 4, 4.808, 2.593, 4.042, 1.143, 3.333, 0, 0, 5.263 -Credits Registered/Earned in last 3 Sem- 6/0, 3/0, 19/19		
2.	**Rahul Kumar** B.Tech. (EE), IVYr (Enr. No. 12115077) **(Request for registration in Autumn Semester 2019-20)**	-Completed 7th year -Extension of one year granted in 64th meeting of IAPC -TEC: 184 -Balance credits: 14 (PCC-3) - Project completed -CGPA: 4.951 -SGPA: 2.458, 3.5, 3.037, 2.355, 2.25, 1.774, 1.714, 2.483, 3.833, 2.824, 1.741, 2.214, 2.769, 1.524 -Credits Registered/Earned in last 3 Sem- 34/16, 27/11, 28/7	Department:Forwarded Wellness Centre:Not consulted by the student IAPC: Recommended	N/A
3.	**Aditya V.S. Gehlot** B.Tech. (EE), IVYr (Enr. No. 12115007) **(Request to continue studies in academic year 2019-20)**	-Completed 7th year -Health issue: Anxiety and depression -Extension of one year was granted in 64th meeting of IAPC -TEC: 139 -Balance credits: 55 to complete the degree	Department:Forwarded Wellness Centre:Recommended IAPC: Recommended	-

		(PCC-8,PEC-4,OEC-1,Management elective-1) (Project completed) -CGPA: 5.259 -SGPA: 3.5, 4.286, 4.333, 3.226, 1.273, 1.333, 0, 0, 0.8, 1.103, 0.381, 1.778, 3.667, 3.417 -Credits Registered/Earned in last 3 Sem- 27/9, 12/8, 36/18		
4.	**Rajkumar Bagaria** B.Tech. (EE), IV Yr (Enr. No. 12117058) **(Request for registration in Autumn Semester 2019-20)**	-Completed 7th year -Extension of one year was granted in 64th meeting of IAPC -TEC: 194 -Balance credits: 4 (MIN-206 left only) -CGPA: 4.892 -SGPA: 3.792, 4.286, 2.429, 2.111, 0.632, 4.111, 3.455, 1.893, 5.375, 4.8, 2.571, 2 -Credits Registered/Earned in last 3 Sem- 40/36, 7/3, 8/4	Department:Forwarded Wellness Centre:Not consulted IAPC: Recommended	N/A
Category-C: Continuation of program in spite of not fulfilling minimum earned requirements				
1.	**S. Kirubananth** B.Tech. (EC), IV Yr (Enr. No. 15116045) **(Request for extension of 2 years)**	-Semester withdrawal (Spring 2016-17) -Health issue: Chronical sinusitis -Min Credits required: 100 -TEC: 77 -Balance credits to min required: 23 - Balance credits to complete degree- 84 -CGPA: 5.923	Department:Recommended Wellness Centre:Recommended IAPC: Recommended	-Medical documents

		-SGPA: 9.429, 8.385, 6.957, 0(W), 5.562, 0, 0, 7 -Credits Registered/Earned in last 3 Sem-17/0, 13/0, 4/4		
2.	**Padam Singh** B.Tech. (EE), III Yr (Enr. No. 16115080) **(Request to continue studies and to repeat 2nd year)**	-Semester withdrawal (Spring 2017-18) -Health issue: Back pain -Request for continuation of program dropped in 66th (emergent) meeting of IAPC as he already availed semester withdrawal and allowed to continue as per regulation -Health issue -Credits required: 72 -TEC: 37 -Balance credits to min required: 35 -Balance credits to complete degree: 129 -CGPA: 2.427 -SGPA: 6.286, 3.231, 0, 0(W), 0,0 -Credits Registered/Earned in last 3 Sem-17/0, 20/0, 22/0	Department:Recommended Wellness Centre:Recommended IAPC: Recommended	-Medical documents
3.	**Sudhir Balakrishnan** B.Tech. (PH), II Yr (Enr. No. 17122027) **(Request to continue studies)**	-Health issue: Psychological issues -Adjustment problems -Credits required: 46 -TEC: 37 -Balance credits to min required: 9 -Balance credits to complete degree: 128 -CGPA: 2.727 -SGPA: 5.238, 4.167, 0,	Department:Recommended Wellness Centre:Recommended IAPC: Recommended	-

		0 -Credits Registered/Earned in last 3 Sem- 26/16, 18/0, 22/0,		
4.	**YuvrajPratap Singh Thakur** B.Tech. (EC), III Yr (Enr. No. 15116076) **(Request to continue studies)**	-Credits required: 72 -TEC: 64 -Balance credits to min required: 8 -Balance credits to complete degree: 103 - Applied for re exam of 7 credits -CGPA: 2.647 -SGPA: 4.762, 2.4, 0, 3.385, 0, 3.550 -Credits Registered/Earned in last 3 Sem- 26/20, 22/0, 20/11	Department:Forwarded Wellness Centre:Recommended IAPC: Recommended	N/A
5.	**AveshBadal** B.Tech. (ME), III Yr (Enr. No. 15117015) **(Request to continue studies)**	- Language problem -Credits required: 72 -TEC: 53 -Balance credits to min required:19 -Balance credits to complete degree: 113 -CGPA: 2.406 -SGPA: 3.762, 3.25, 0.8, 3.5, 0, 0 -Credits Registered/Earned in last 3 Sem- 24/20, 20/0, 15/0	Department:Forwarded Wellness Centre:Not consulted by the student IAPC: Recommended	N/A
6.	**NitishGautam** B.Tech. (PH), I Yr (Enr. No. 18122015) **(Request to continue studies)**	- Health issue: Depression & Social Anxiety - Credits required: 22 -TEC: 15 -Balance credits to min required: 7 -Balance credits to complete degree: 150	Department:Recommended Wellness Centre:Not consulted by the student IAPC: Not Recommended	-

		-CGPA: 1.75 -SGPA: 2.333, 1 -Credits Registered/Earned in last 2Sem-21/11, 16/4		
7.	**Md. Afham Aqdam** Int. M Tech (ES), I Yr (Enr. No. 18410013) **(Request continue studies)**	- Adjustment disorder & moderate depression - Credits required: 22 -TEC: 17 - Balance credits to min required: 5 -Balance credits to complete degree: 175 - CGPA: 2.455 -SGPA: 3.095, 1.333 -Credits Registered/Earned in last 2Sem-21/13, 12/4	Department:Recommended Wellness Centre: Not consulted CMO: Commented IAPC: Not Recommended	Medical documents

Item No. 79.8: **To consider the request of Mr. Alvin Reddy (Enr. No. 18537020), P.G.Diploma (Hydrology) for awarding Diploma.**

The student in question has not completed one PCC of the programme, due to which the requirement to complete diploma is not fulfilled. However he has done an extra PEC and has requested to award PG Diploma on the basis of total number of credits earned in the programme.

The IAPC in its 71st meeting held on 27.06.2019 did not recommend the request of award of one year PG Diploma.

The above is submitted for the consideration of the Senate.

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

सीनेट की उन्नासीवीं बैठक हेतु अनुपूरक कार्य सूची
SUPPLEMENTARY AGENDA FOR THE
79th MEETING OF THE SENATE

बैठक सं0	: उन्नासीवीं
MEETING NO.	**: 79th**
स्थान	: सीनेट हॉल, भा0प्रौ0सं0 रूड़की
VENUE	**: Senate Hall, IIT Roorkee**
दिनांक	: 19 जुलाई 2019
DATE	**: 19th July 2019**
समय	: 4.00 बजे अपरान्ह
TIME	**: 4.00 P.M.**

भारतीय प्रौद्योगिकी संस्थान रूड़की

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

रूड़की 247 667

ROORKEE – 247 667

अनुपूरक कार्यसूची/**SUPPLEMENTARY AGENDA**

मुद्दा सं0/ **Item No.**	विवरण/**Particulars**	पृष्ठ/ **Page(s)**
79.9	इलेक्ट्रॉनिक्स और संचार अभियांत्रिकी विभाग के एमटेक (आरएफ और माइक्रोवेव अभियांत्रिकी) कार्यक्रम संरचना के पुनर्गठन के प्रस्ताव पर विचार करना। To consider the proposal of Department of Electronics and Communication Engineering for restructuring in the programme structure of M. Tech. (RF and Microwave Engg.)	37-41
79.10	शैक्षणिक कार्यक्रम विनियमों में अनुपस्थिति के कारण "नामांकन की समाप्ति" (सं0 33 (ए) स्नातक के लिए और सं0 29 (ए) परास्नातक के लिए) संशोधन पर विचार करना। To consider the revision of the Regulation on 'Termination of Enrolment'- Due to Absence (No. 33(A) for UG & No. 29(A) for PG) in the Academic Programme Regulations.	42
79.11	मानविकी और सामाजिक विज्ञान विभाग के वर्तमानएचएसएन–002 (नैतिकता और आत्म जागरूकता) पाठ्यक्रम के स्थान पर नया पाठ्यक्रम "मनोविज्ञान का परिचय" प्रतिस्थापित किए जाने पर विचार करना। To consider the proposal of Department of Humanities and Social Sciences to replace the existing course HSN-002 (Ethics and Self Awareness) by new course "Introduction to Psychology".	43-45
79.12	स्वीकृत सीमा से अधिक विस्तार के संबंध में छात्र के अनुरोध पर विचार करना। To consider the request of student regarding extension beyond permissible limit.	46

Item No. 79.9: **To consider the proposal of Department of Electronics and Communication Engineering for restructuring in the programme structure of M. Tech. (RF and Microwave Engg.)**

The Department proposed to restructure the M.Tech. (RF and Microwave Engg.) programme structure in terms of credit change from 3 to 4 **(Appendix-A)**.

The IAPC in its 72nd emergent meeting held on 10.07.2019 recommended the proposal.

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

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **30** **M.Tech. (RF and Microwave Engineering)**
Department: **EC** **Electronics & Communication Engineering**
Year: **I**

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weight (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Semester- I (Autumn)														
1.	ECN-531	Microwave Engineering	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	ECN-532	Advanced EMFT	PCC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	ECN-530	Microwave Lab	PCC	2	0	0	3	0	0	-	100	-	-	-
4.		Elective - I	PEC	4	-	-	-	-	-	-	-	-	-	-
5.		Elective - II	PEC	4	-	-	-	-	-	-	-	-	-	-
		Total		18										
Semester-II (Spring)														
1.	ECN-534	Antenna Theory & Design	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
2.	ECN-631	RF Receiver Design	PCC	4	3	1	0	3	0	20-35	0	20-30	40-50	0
3.	ECN-630	Wireless Comm. Lab.	PCC	2	0	0	3	0	0	0	100	0	0	0
4.	ECN-700	Seminar	SEM	2	-	-	-	-	-	-	-	-	100	-
5.		Elective – III	PEC	4	-	-	-	-	-	-	-	-	-	-
6.		Elective – IV	PEC	4	-	-	-	-	-	-	-	-	-	-
		Total		20										

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code: **30** **M.Tech. (RF and Microwave Engineering)**
Department: **EC** **Electronics & Communication Engineering**
Year: **II**

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

Summary				
Semester	1	2	3	4
Semester-wise Total Credits	**18**	**20**	**12**	**18**
Total Credits	**68**			

Program Elective Courses (RF and Microwave Engineering)

PECs FOR SEMESTER-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
1.	ECN-542	Microwave Integrated Circuits	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	ECN-543	High Power mm/THz Wave Engineering	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	ECN-544	Advanced Radar Engineering	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	ECN-539	Fiber Optic Systems	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	ECN-554	Microwave and millimeter-wave Circuits	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	ECN-555	Microwave Imaging	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7.	ECN-511	Linear Algebra and Random Processes	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

Program Elective Courses (RF and Microwave Engineering)

PECs FOR SEMESTER-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
1.	ECN-541	Computational Techniques for Microwaves	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	ECN-557	RF Power Amplifier and Transmitter Design	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	ECN-548	RF & Microwave MEMS	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	ECN-549	RF CMOS Transceiver Design	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	ECN-550	Radar Signal Processing	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	ECN-551	Adaptive Beam Forming and Smart Antennas	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7.	ECN-552	Soft Computing Techniques for RF Engineering	PEC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
8.	ECN-516	Advanced Digital Communication Techniques	PEC	3	3	0	0	3	0	15	-	35	50	-

Item No. 79.10: To consider the revision of the Regulation on 'Termination of Enrolment'- Due to Absence (No. 33(A) for UG & No. 29(A) for PG) in the Academic Programme Regulations.

The IAPC in its 72nd emergent meeting held on 10.07.2019 recommended the following amendment in the regulation:-

Due to absence (Regulation No. 33 (A)for UG & 29(A) for PG)

Existing	Proposed
If a student registered in the first year of the programme is continuously absent from the classes for more than four weeks without informing the Course Coordinators, the Coordinator shall immediately bring it to the notice of Chairman, IAPEC / the Head of the concerned department as the case may be, for informing the Academic Section. The names of such students shall be removed from the Institute rolls and such absence during first year will render the student ineligible for re-admission.	If a student is reported absent without information from the classes for more than two weeks by the Course Coordinators through the Head of the concerned department to the Academic Section, the Academic section will issue a warning letter to the student with a copy to the concerned parents. If the student still continues to remain absent for another two weeks without information the same will be informed to the academic section by the Department. Academic Section will drop the name of the student from the course. Semester will be dropped in case of such absence from all the registered courses.

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

Item No. 79.11: To consider the proposal of Department of Humanities and Social Sciences to replace the existing course HSN-002 (Ethics and Self Awareness) by new course "Introduction to Psychology".

The Department of Humanities and Social Sciences has proposed to replace the course HSN-002 by "Introduction to Psychology" **(Appendix–A)**.

The IAPC in its 72nd emergent meeting held on 10.07.2019 recommended the proposal and syllabus of new core course "Introduction to Psychology" after inclusion of a unit on ethics and self awareness.

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

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

1. Subject Code: **HSN-002** Course Title: **Introduction to Psychology**
2. Contact Hours: **L: 1** **T: 1** **P: 0**
3. Examination Duration (Hrs.): **Theory 2** **Tutorial 0**
4. Relative Weightage: **CWS 20-30** **MTE 20-30** **ETE 40-50**
5. Credits: **2** 6. Semester: **Autumn** **7.** Pre-requisite: Nil
8. Subject Area: **Psychology**
9. Objective of the Course: To introduce and sensitize students to various psychological processes including human values and ethics. This would help the students to understand and analyze their own as well as other's behavior.

10. **Details of Course**

S. No.	Contents	Contact Hours
1.	**Introduction to psychology:** Origin, concept and definition of psychology; Branches of psychology; Application of psychology in different fields.	02
2	**Sensation & Perception:** Concept and processes; Principles of perception; Illusion and delusion; Thresholds, Role of motivation, social and cultural factors in perception.	02
3	**Learning:** Concept and theories of learning; Classical and operant conditioning & their differences; Extinction, discrimination and generalization; Types and the schedules of reinforcement.	03
4	**Memory and Forgetting:** Components of memory - Encoding, Recall, Recognition; Types of memory - Short term, Long-term, Sensory memory, Echoic memory; Metamemory; Amnesia: Theories of forgetting.	02
5.	**Personality & Motivation:** Definition and concept of personality; Freud's Psychoanalytical theory, Jung's theory. Motivational process; Difference among Drive, Need, and motive; Theories of motivation (Maslow's need hierarchy, Herzberg's two factor, Alderfer's ERG).	03
6.	**Professional Ethics:** Definition and application of ethics - Business & environmental ethics; Morality in everyday life; Social psychology theory of ethics (Kohlberg – Heinz Dilemma).	02
	Total	14

11. Suggested Books:

Sl. No.	Name of Books/Authors	Year of Publication
1.	Baron, R.A. *Psychology* (5th ed). Pearson	2002
2.	Coon, D., & Mitterer, J. O. . *Introduction to Psychology: Gateways to Mind and Behavior* (Twelfth Ed). Wadsworth, Cengage Learning.	2010
3.	Morgan, C.T., King, R.A., Weisz, J.R., Schopler, J. *Introduction to Psychology* (7th Edition), Tata-McGraw-Hill	2007
4.	Myers, D. G., DeWall, C. N. *Psychology* (Twelfth Ed). Worth Publisher.	2018
5.	Shafer-Landau, Russ. *The Fundamentals of Ethics* (4th Edition), Oxford university press	2017

Item No. 79.12: To consider the request of student regarding extension beyond permissible limit.

The IAPC in its 72nd emergent meeting held on 10.07.2019 considered the request of Mr. Labhesh Dudi. The details of student' request is as under:

S. No	Name	Details	Recommendations	Supporting Documents
Category-A: Extension beyond permissible limit				
1.	**Labhesh Dudi** B.Tech. (CS), IV Year (Enr. No. 12114037) **(Request for name restoration and one semester extension)**	-Completed 7th year -Health issue: Depression -Extension of one year (2018-19) granted in 64th meeting of IAPC -Name struck off vide OM No. Acad/Reg. Spring/1138/2018-19 dated March 05, 2019 due to non-registration in Spring 2018-19 -TEC: 153 -Balance credits: 42-46 (PEC-1, PCC-7, OEC-1, ESC-1, BSC-1, HSSMC-1) -Project completed -CGPA: 4.882 -SGPA: 3.333, 5.464, 3.250, 2.926, 0, 1.250, 0.727, 1.172, 0, 2.267, 2.393, 3.704, 1.958 -Credits Registered/Earned in last 3 Sem- 28/13, 27/19, 24/11	Department: Forwarded Wellness Centre: Recommended IAPC: Recommended	-Medical Documents

The IAPC (72nd emergent meeting) considered the request of above student and recommended it.

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

Item No. 79.13: To consider organizing Interim Convocation.

The IRC in its 31st meeting held on 11.07.2019 considered the proposal of organizing an Interim Convocation. This will help those students who have completed the requirements of a degree from IIT Roorkee after the Institute Convocation is held and are desiring to go abroad to pursue either higher studies or to join a job. Students, in some cases, need this Degree Certificate for availing jobs internationally. Organizing an Interim Convocation may benefit around 100 Ph.D. students and 15 UG/PG students.

Convocation may be termed as Autumn Convocation and Spring Convocation. Majority of the students will get degree in Autumn Convocation and few in Spring Convocation. The procedures followed will be the same as followed in a regular Convocation. Annual report will be read only in Autumn Convocation.

Another option may be conferring degrees periodically (say monthly).

The above is submitted for the consideration of the Senate.

Item No. 79.14: To consider placing Digital signature on the Degree of students.

The IRC in its 31st meeting held on 11.07.2019 considered the proposal of placing digital signature on the degree awarded to the students during Convocation. At present these are signed by the Director, Registrar and the Chairman BoG. Many of the Institutes have started using digital signatures on the degrees awarded. Use of such signatures is also in line with the NAD, the National Repository of Degrees and Certificates.

The above is submitted for the consideration of the Senate.

Item No.79.15: To consider the requests of Ph.D. students for extension of thesis submission beyond stipulated period of time.

The IRC in its 31st meeting held on 11.07.2019 considered the requests received from Ph.D. students, duly recommended by their respective SRCs, who have completed the maximum duration of Ph.D. as per Rules and Regulations (5 + 1 year for FTRS and 6 + 1 years for PTRS). The cases recommended by the IRC are given below:

S. No.	Name	Enroll. No.	Deptt./ Centre	Date of Final SRC	Due Date for Thesis Submission	Requested Date for Thesis Submission	Remarks
1.	Susheel Kumar Katariya (Part-Time)	12914013	Civil Engg.	Nil	30.12.2017	01.12.2019	07 years completed on15.07.2019. Final SRC not conducted.
2.	Veerendra Yadav (Full-Time)	13914026	Civil Engg.	26.06.2019	30.06.2019	26.10.2019	06 years will be completed on22.07.2019.
3.	Sharwan Ram (Full-Time)	13914028	Civil Engg.	23.04.2019	30.06.2019	22.08.2019	06 years will be completed on 31.07.2019.
4.	Abhishek Kumar Lal (Full-Time)	13912001	Chemical Engg.	Nil	30.06.2019	31.12.2019	06 years completed on11.07.2019.
5	Deepti Ranjan Majhi (Full-Time)	13917005	Earthquake Engg.	30.05.2019	30.06.2019	30.08.2019	06 years completed on11.07.2019.
6.	Arun Kumar Ojha (Full-Time)	13916002	Earth Sciences	29.04.2019	30.06.2019	30.08.2019	06 years completed on11.07.2019.
7	Mani Nandini Sharma (Full-Time)	13919006	Humanities and Social Sciences	Nil	30.06.2019	31.07.2019	06 years completed on11.07.2019.
8	Singh Ankit Rajkumar (Full-Time)	13923016	Mech. and Ind. Engg.	25.06.2019	30.06.2019	25.10.2019	06 years completed on18.07.2019.
9	Manoj Kumar (Full-Time)	13923021	Mech. and Ind. Engg.	27.06.2019	30.06.2019	25.10.2019	06 years will be completed on01.08.2019.
10	Pardeep Kumar (Full-Time)	13925004	Nanotech.	Nil	30.06.2019	31.12.2019	06 years completed on11.07.2019.
11	Swapnil Divekar (Part-Time)	11926016	Paper Technology	25.03.2019	15.03.2019	20.04.2019	7 years has been completed on25.12.2018. The name has been struck-off; As per supervisor, student can submit immediately.
12	Amrish Kumar (Full-Time)	12926015	Paper Technology	20.06.2019	30.06.2019	30.09.2019	6 years has completed on31.12.2018.
13	Deepa Oberoi (Full-Time)	13926005	Polymer and Process Engg.	16.05.2019	30.06.2019	15.07.2019	06 years completed on 11.07.2019.
14	Ayush Chandrakar (Full-Time)	13928001	WRD&M	28.06.2019	30.06.2019	30.09.2019	06 years completed on11.07.2019.

The above is submitted for the consideration of the Senate.

Item No.79.16: To consider the continuation of Institute Assistantship to Ph.D. students, including through sponsored projects, who were admitted during the period when requirement of NET/GATE was made "NOT MANDATORY".

The Senate in its 78th meeting (item 78.13) held on April 10, 2019 discussed the modifications being made in the eligibility criteria and selection procedure to admit project staff in Ph.D. programme. Senate also decided to re-examine the scholarship issue of existing Ph.D. students. The same was discussed in 30th meeting of IRC held on 24.05.2019 under item 30.2.6 while taking up a request of awarding the Institute Assistantship after completion of the project period. It is noted that such students may not possess NET/GATE qualification, which has become mandatory vide item No. 78.28 of 78th Senate.

The IRC has recommended that Ph.D. students who have been admitted in Ph.D. programme after 28.12.2017 (when 71st Senate through item 71.21 took decision of not having NET/GATE mandatory for admission) and before 18.03.2019 (when NET/GATE has become mandatory through approval of Chairman Senate which was reported in 78th Senate on 10.04.2019) be continued in the Ph.D. programme with Institute Assistantship.

The above is submitted for the consideration of the Senate.

Item No.79.17: To report the modified Provisional Degree Certificate issued to Ph.D. students.

The IRC in its 31st meeting held on 11.07.2019 considered requests from recent Ph.D. graduates regarding the language and footnote in the existing PDC which is causing hindrance to some students for obtaining visa & jobs. PDC is the only official document defining that a student has completed the requirements of a degree. The IRC has recommended a modified format with title "Provisional Degree".(**Appendix-A**).

The above is reported to the Senate.

Serial No.: _ _ _ _

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

PROVISIONAL DEGREE

This is to certify that

(Name of Student)

Enrollment No.:_____

has successfully completed all the requirements for the award of Ph.D. degree as per institute Rules and Regulations in the Department/ Centre of _____ on DD-MM-YYYY.

The topic of her/his Ph.D. thesis is:

"_____"

Joint/Deputy/Asstt. Registrar
(Academics)

Issued on: DD-MM-YYYY

Appendix A
Item No. Senate/79.17

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ROORKEE - 247 667, INDIA

No. ____

PROVISIONAL DEGREE CERTIFICATE

This is to certify that **Ms./Mr.** _____ (En.No._____) has completed her/his research work for the award of Ph.D. degree. Her/his viva-voce examination was held on **DD-MM-YYYY** and she/he has successfully completed the requirements prescribed under the regulations for the award of Ph.D. degree. The topic of her/his Ph.D. thesis is "_____".

Assistant Registrar
(Evaluation)

Dated: DD-MM-YYYY

Note: The above Research Scholar has qualified for the Ph.D. degree which will be awarded to him/her in the ensuing Convocation of the Institute.

भारतीय प्रौद्योगिकी संस्थान रूड़की

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

रूड़की 247 667

ROORKEE – 247 667

अन्य मद के अर्न्तगत/**Under any other item**

मुद्दा सं0/ **Item No.**	विवरण/**Particulars**	पृष्ठ/ **Page(s)**
79.18	To consider the PG Regulation point no. (b) under the clause no. 30 regarding admission of a candidate who leaves/discontinues his/her study in M.Tech./M.Sc./ MBA/M.Arch./MURP Programmes.	54
79.19	To consider the seat matrix for implementing 10% EWS reservation for admission in 2 year M.Sc. programme through JAM from the session 2020-21 onwards.	55-56
79.20	To ratify the award of provisional Ph.D. Degree certificates to the students who have completed the requirements for the award of Ph.D. Degree in various disciplines from April 2019 to date.	57-64

Item No. 79.18: To consider the PG Regulation point no. (b) under the clause no. 30 regarding admission of a candidate who leaves/discontinues his/her study in M.Tech./M.Sc./ MBA/M.Arch./MURP Programmes.

The PG Regulations, point no. (b) under the clause no. 30 says.

"A student, who is admitted and registered for a postgraduate programme at the Institute but leaves after completing the programme, or discontinues his studies for any reason whatsoever, including withdrawal from the programme for not achieving the required SGPA/CGPA for continuation of his registration in the said programme, shall not be admitted to a programme at the same level, that is to say that a student who has/is withdrawn from the M.Sc. programme cannot be admitted to any other M.Sc. programme; a student who has/is withdrawn from the M.Tech. programme cannot be admitted to any other M.Tech. programme, of the Institute."

There is no such regulation in UG and Ph.D. However, due to this regulation some of the M.Tech./ M.Sc./MBA/M.Arch./MURP students are not able to take admission.

The above is submitted for the consideration of the Senate.

Item No. 79.19: To consider the seat matrix for implementing 10% EWS reservation for admission in 2 year M.Sc. programme through JAM from the session 2020-21 onwards.

Ministry of HRD vide letter F.No. 12-4/2019-U1 dated 17th January 2019 had communicated the reservation of Economically Weaker Sections (EWSs) in admission in Central Educational Institutions. The same was reported in the 78th Senate meeting held on 10th April 2019.

In compliance of the above, M.Sc. Seat Matrix to implement 10% EWS reservation is given at **Appendix-A.**

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

Proposed Intake for M.Sc. Through JAM-2020 including 10% EWS after increasing 25% in Intake

S.No.	DEPTT	CODE	PROGRAMME	TOTAL-2019-20	Increased 25%	total intake with 25% increase 2020-21	GEN-OLD	GEN-NEW	GEN-EWS 10%	OBC-OLD	OBC-NEW	SC-OLD	SC-NEW	ST-OLD	ST-NEW	PD (distribution to be followed by rotation)
1	Earth Science **(ES)**	1801	M.Sc. (Applied Geology)	15	4	19	8	8	2	4	5	2	3	1	1	1 Gen
2	Biotechnology **(BT)**	1802	M.Sc. (Biotechnology)	37	9	46	18	19	5	10	13	6	7	3	4	2 (1 Gen, 1 OBC)
3	Chemistry **(CY)**	1803	M.Sc. (Chemistry)	45	11	56	23	23	5	12	15	7	8	3	4	2 (1 SC, 1 ST)
4	Mathematics **(MA)**	1804	M.Sc. (Mathematics)	30	8	38	15	15	4	8	10	5	6	2	3	2 (1 Gen, 1 OBC)
5	Physics **(PH)**	1805	M.Sc. (Physics)	25	6	31	12	12	3	7	9	4	4	2	2	2 (1 SC, 1 ST)
6	Humanities & Social Sciences	1806	M.Sc. (Economics)	30	8	38	15	15	4	8	10	5	6	2	3	2 (1 Gen, 1 OBC)
	Total			**182**	**46**	**228**	**91**	**92**	**23**	**49**	**62**	**29**	**34**	**13**	**17**	**11**

Item No.79.20: To ratify the award of provisional Ph.D. Degree certificates to the students who have completed the requirements for the award of Ph.D. Degree in various disciplines from April 2019 to date.

The list is presented in **Appendix 'A'.**

Senate approved PDC List

Sl. No.	Name	Deptt.	Topic	Supervisor	Examiner (For./Ind.)	PDC Date
1	Ms. Seema Praliya	AR	STRATEGIES FOR SUCCESSFUL PUBLIC SPACES IN INDIAN CITIES– A MANAGEMENT DIMENSION	Prof. Pushplata	Prof. Katsunori Furuya, Chiba Univ., Japan Prof. Virendra K. Paul, SPA New Delhi Prof. Kalpana Markandey, Osmania Univ. Hyderabad	05.07.19
2	Mr. Manoj Panwar	AR	MODELLING URBAN PHYSICS FOR SUSTAINABLE DEVELOPMENT	Prof. V. Devadas Prof. Avlokita Agrawal	Prof. Anil Kashyap, Univ. of the West England, UK Prof. V. K. Dhar, NIUA, New Delhi Prof. Nand Kumar, MNIT Jaipur	15.07.19
3	Mr. Shailendra Singh Khichi	BT	STUDIES OF LIPID PRODUCTION FROM MICROALGAE FOR BIODIESEL IN FLAT PANEL PHOTOBIOREACTOR	Prof. Sanjoy Ghosh	Prof. R. H. Wijffels, Wageningen Univ., Nethrlands Prof. Subir Kundu, IIT Varanasi	12.04.19
4	Ms. Anjali Malik	BT	STRUCTURAL AND FUNCTIONAL CHARACTERIZATION OF ARGINASE ENZYME FROM *ENTAMOEBA HISTOLYTICA*	Prof. Shailly Tomar	Prof. Mahesh Narayan, Texas University, USA Prof. Manidipa Banerjee, IIT Delhi Prof. Ruchi Anand, IIT Bombay	15.05.19
5	Ms. Sonam Gupta	BT	ISOLATION, CHARACTERIZATION AND BIOMEDICAL APPLICATIONS OF BIOSURFACTANT	Prof. Vikas Pruthi	Prof. Hans-Curt Flemming, Duisburg Essen Univ., Germany Prof. Amit Kumar, IIT Indore	20.06.19
6	Mr. Hemant Kumar	CH	PREPARATION AND CHARACTERIZATION OF WATER-IN-OIL (W/O) NANO-EMULSIONS	Prof. Vimal Kumar	Prof. Christophe A. Serra, Strasbourg Univ., France Prof. V. S. Moholkar, IIT Guwahati	20.05.19
7	Mr. Aniruddha Sanyal	CH	CFD ANALYSIS OF A FLUID FLOWING PAST A PAIR OF MILDLY HEATED SIDE-BY-SIDE SQUARE CYLINDERS	Prof. Amit Dhiman	Prof. Laszlo Baranyi, Miskolc University, Hungary Prof. Atul Sharma, IIT Bombay	11.05.19
8	Mr. Ratna Sandeep Katiyar	CH	MOLECULAR SIMULATION OF POLYACRYLIC ACID PHASE BEHAVIOUR IN PHYSIOLOGICAL CONDITIONS AND ITS PERFORMANCE AS DOXORUBICIN CARRIER	Prof. P. K. Jha	Prof. Jasper Van der Gucht, Wageningen Univ., Netherlands Prof. Jayant Kumar Singh, IIT Kanpur	12.06.19
9	Ms. Smita Mondal	CH	CONVERSION OF GLYCEROL TO PROPANEDIOL USING HETEROGENOUS CATALYSTS	Prof. Prakash Biswas	Prof. Ajai K. Dalai, Saskatchewan Univ., Canada	12.06.19
10	Mr. Girdhari Lal Devnani	CH	STUDIES ON NOVEL NATURAL FIBERS AND THEIR REINFORCED EPOXY COMPOSITES	Prof. Shishir Sinha	Prof. Simant R. Upreti, Ryerson University, Canada Prof. B. K. Satapathy, IIT Delhi Prof. Santanu Chattopadhyay, IIT Kharagpur	28.06.19
11	Ms. Sneha Malhotra	CH	CFD MODELLING AND EXPERIMENTAL INVESTIGATIONS OF AIR WATER FLOW THROUGH SERPENTINE CHANNEL	Prof. Sumana Ghosh	Prof. S. G. Kandlikar, Rochester Inst. of Tech., USA Prof. Tapas K. Mandal, IIT Guwahati	17.07.19
12	Ms. Khushboo Singh	CY	NICKEL-CATALYZED SUSTAINABLE ORGANIC TRANSFORMATIONS: DIRECT ACCESS TO AMINES, PYRROLES, PYRIDINES, QUINOLINES AND GEM-BIS-SUBSTITUTED KETONES	Prof. Debasis Banerjee	Prof. Carmen Najera, Alicante Universided, Spain Prof. M. L. N. Rao, IIT Kanpur Prof. Anil Kumar Saikia, IIT Guwahati	09.04.19

13	Mr. Bekele Mengesha Dogie	CY	SYNTHESIS, CHARACTERIZATION AND CATALYTIC APPLICATIONS OF DIOXIDOMOLYBDENUM(VI) AND DIOXIDOURANIUM(VI) COMPLEXES	Prof. M. R. Maurya	Prof. Craig C. McLauchlan, Illinois State Univ., USA Prof. Ajay Kumar Singh, IIT Delhi Prof. Dillip Kumar Chand, IIT Madras	18.04.19
14	Ms. Kiran Mawai	CY	STUDIES ON NEW TRANSITION METAL COMPLEXES AND THEIR REACTIVITIES	Prof. Kaushik Ghosh	Prof. Isabelle Malfant, Toulouse University, France Prof. S. P. Rath, IIT Kanpur Prof. C. P. Rao, IIT Bombay	18.04.19
15	Mr. Mohd Waheed	CY	SYNTHESIS AND CHARACTERIZATION OF FLAVONE, COUMARIN, IMIDAZOLE AND ISOXAZOLE DERIVATIVES USING NOVELCATALYSTS	Prof. Naseem Ahmed	Prof. Mushfiquddin Khan, Medical Univ. of South Carolina, USA Prof. A. T. Khan, IIT Guwahati Prof. Faiz Ahmed Khan, IIT Hyderabad	24.04.19
16	Mr. Mahd Zeeshan	CY	STUDIES OF ELECTRONIC STRUCTURE AND THERMAL PROPERTIES OF HEUSLER THERMOELECTRIC MATERIALS	Prof. Hem C. Kandpal	Prof. Eric Toberer, CSM USA Prof. Ramesh Chandra Mallik, IISc Bangalore	07.05.19
17	Ms. Komal Gupta	CY	STUDY OF RNA-MEDIATED FLUORESCING COLLOIDAL CdSe NANOSTRUCTURES – ENHANCED PHOTOPHYSICS AND MORPHOLOGICAL TRANSFORMATION INDUCED BY CONFORMATIONAL CHANGE IN RNA	Prof. Anil Kumar	Prof. Jeffery L. Coffer, Texas Christian Univ., Texas Prof. B. R. Jagirdar, IISc Bangalore Prof. Ashok Kumar Mishra, IIT Madras	15.05.19
18	Ms. Neetu Yadav	CY	DESIGN AND SYNTHESIS OF CHELATING IONOPHORES AS CHEMOSENSORS BASED ON ANALYTICAL STUDIES	Prof. M. R. Maurya Prof. A. K. Singh	Prof. Roberto Paolesse,Univ.of Rome Tor Vergata,Ita Prof. Sushil Kumar Singh, IIT Varanasi	11.06.19
19	Mr. Hariom Singh	CE	GEOSTATISTICAL COMPUTING AS WEB PROCESSING SERVICE USING OPEN SYSTEM ARCHITECTURE	Prof. R. D. Garg Dr. Harish C. Karnatak	Prof.Ashish Sharma, UNSW Sydney Prof. Bharath HAridas Aithal, IIT Kharagpur Dr. Sameer Saran, ISRO Dehradun	09.04.19
20	Mr. Anuj Tiwari	CE	3D CITY MODEL BASED ON SEMANTICS	Prof. Kamal Jain	Prof. Colin Arrowsmith, RMIT University, Australia Prof. Shishkumar Gedam, IIT Bombay Prof. Dheeraj Kumar, IIT Dhanbad	01.05.19
21	Ms. Neelam Rani	CE	WIND PRESSURE DISTRIBUTION ON MULTI-SPAN CANOPY ROOFS	Prof. Sonalisa Ray Prof. A. K. Ahuja	Prof. Rainish N. Sharma, Auckland Univ., New Zealand Prof. Sudip Talukdar, Ilt Guwahati Dr. Lakshmy arameswaran, CSIR Delhi	07.05.19
22	Mr. Ashish Gupta	CE	ANALYSIS OF RETAINING WALL AND REINFORCED SOIL WALL CONSIDERING SEISMIC WAVES	Prof. V. A. Sawant	Prof. Sanjay K. Shukla, Edith Cowan Univ., Australia Prof. Deepankar Choudhury, IIT Mumbai	07.05.19
23	Mr. Faraz Tariq	CE	CORRODED RC ELEMENTS EXPOSED TO FIRE	Prof. Pradeep Bhargava	Prof. Martin Gillie, Warwick University, UK Prof. S. K. Bhattacharyya, IIT Kharagpur	20.05.19
24	Mr. Sumant Kumar	CE	URBAN STORMWATER RUNOFF TREATMENT USING BALLASTED SANDFLOCCULATION PROCESS	Prof. A. A. Kazmi Dr. N. C. Ghosh	Prof. Fumiyuki Nakajima, Tokyo University, Japan Prof. Arvind K. Nema, IIT Delhi Prof. M. S. Mohan Kumar, IISc Bangalore	11.06.19

25	Mr. Lalit Purohit	CSE	WEB SERVICE SELECTION BASED ON QoS PARAMETERS	Prof. Sandeep Kumar	Prof. Lorna Uden, Staffordshire University, UK Prof. Debasis Samanta, IIT Kharagpur Prof. R. B. Mishra, IIT Varanasi	26.04.19
26	Ms. Anjali Gautam	CSE	BRAIN LESION DELINEATION AND CLASSIFICATION	Prof. R. Balasubramanian	Prof. Christian Micheloni, Udine University, Italy Prof. C. Chandra Sekhar, IIT Madras	01.07.19
27	Ms. Swati Gupta	CSE	EVENT EXTRACTION FROM DIGITAL MEDIA	Prof. S. Gangopadhyay Dr. Biplab Banerjee	Prof. M. Govindaraju, Binghamton University, USA Prof. Ashish Anand, IIT Guwahati	07.06.19
28	Ms. Divya Sahgal	CTRANS	REAL-TIME TRAFFIC SIGNAL CONTROL FOR INTERSECTION USING IMAGE PROCESSING	Prof. A. Ramesh	Prof. Kunwar Rajendra, Michigan State Univ., USA Dr. Mukti Advani, CSIR Delhi Prof. C. Rajendran, IIT Madras	04.06.19
29	Mr. Sourabh Jain	CTRANS	INTELLIGENT TRANSPORTATION SYSTEM BASED URBAN CORRIDOR MANAGEMENT STRATEGIES	Prof. S. S. Jain Dr. Gaurav V. Jain	Prof. Alexander Skabardonis, ITS, USA Prof. Akhilesh Kumar Maurya, IIT Guwahati Prof. Sudip Kumar Roy, IIEST Shibpur	24.06.19
30	Mr. Rajesh Prasad Shukla	EQ	BEARING CAPACITY OF SKIRTED FOOTING ON SLOPES	Prof. R. S. Jakka	Prof. Vijay K. Puri, Southern Illinois University, USA Prof. G. D. Dodagoudar, IIT Madras Prof. P. K. Basudhar, IIT Varanasi	09.05.19
31	Mr. Arun Prasath R.	ES	SEISMOTECTONICS OF GARHWAL HIMALAYA BETWEEN ALAKNANDA AND YAMUNA VALLEYS	Prof. Sandeep Singh Dr. Ajay Paul	Prof. Simon Klemperer, Stanford University, USA Prof. N. P. Singh, IIT Varanasi Dr. S. K. Gupta, CSIR Hyderabad	09.04.19
32	Mr. Ajit Kumar Behera	ES	SALTWATER INTRUSION MODELING IN JAGATSINGHPUR COASTAL AQUIFER SYSTEM, ODISHA	Prof. G. J. Chakrapani Dr. Sudhir Kumar	Prof. Stefan Wohnlich, Ruhr-Univeritaet Bochun, Germany Prof. Abhijit Mukherjee, IIT Kharagpur Prof. T. H. Syed, IIT Dhanbad	10.07.19
33	Mr. Prodyut Kumar Bhowmick	ES	TECTONIC ROLE IN STRUCTURE FORMATION AND SEDIMENTATION IN MUMBAI OFFSHORE BASIN	Prof. D. K. Mukhopadhyay Dr. Premanand Mishra	Prof. Michael Quinn, Consulting Geologist, US Prof. Saibal Gupta, IIT Kharagpur Prof. S. K. Biswas, ISM Mumbai	17.07.19
34	Mr. Pannala Sanjeev	EE	POWER CONTROL & MANAGEMENT OF DC MICROGRID	Prof. Pramod Agarwal Prof. N. P. Padhy	Prof. Arindam Ghosh, Curtin University, Australia Prof. Mahesh Kumar, IIT Madras	03.04.19
35	Ms. Soumi Ray	EE	BRAIN IMAGES ANALYSIS FOR SDH AND EDH TRAUMA CLASSIFICATION	Prof. R. S. Anand Prof. Vinod Kumar Prof. N. Khandelwal	Prof. Rangaraj M. Rangayyan, Calgary Univ., Canada Prof. M. K. Bhuyan, IIT Guwahati Prof. Maheshkumar h. Kolekar, IIT Patna	12.04.19
36	Mr. Narendrababu A.	EE	THREE-PHASE MULTIPOINT CLAMPED INVERTERS AND MODULATION STRATEGIES	Prof. Pramod Agarwal	Prof. Geza Joos, McGill University, Canada Prof. G. Narayanan, IISc Bangalore	11.05.19
37	Mr. Jayendra Kumar	EE	FEATURE EXTRACTION AND CLASSIFICATION OF RADIOGRAPHIC WELD IMAGES	Prof. S. P. Srivastava Prof. R. S. Anand	Prof. Dinesh Kant Kumar, RMIT University, Australia Prof. Vikram M. Gadre, IIT Bombay	04.07.19
38	Mr. Janardhana Kotturu	EE	INVESTIGATION ON POWER QUALITY IMPROVEMENT USING UPQC	Prof. Pramod Agarwal	Prof. Prasad Enjeti, Texas A&M University, USA Prof. Bhim Singh, IIT Delhi	07.06.19
39	Ms. Varsha Mishra	ECE	EXPERIMENTAL AND ANALYTICAL APPROACHES FOR THE DEVELOPMENT OF MICROWAVE ABSORBERS	Prof. Dharmendra Singh	Prof. Manoj Gupta, NUS Singapore Prof. Ajay Chakrabarty, IIT Kharagpur	03.04.19

40	Mr. Tushar Goel	ECE	PLANAR ANTENNA SOLUTIONS FOR INTER-SATELLITE LINK BASED FUTURE COMMUNICATION SYSTEMS	Prof. A. Patnaik	Prof. Y. M. M. Antar, Royal Military College, Canada Prof. Girish Kumar, IIT Bombay Prof. S. K. Koul, IIT Delhi	08.04.19
41	Mr. Gaurav Mittal	ECE	DESIGN, ANALYSIS AND CHARACTERIZATION OF TUNABLE BANDPASS FILTERS FOR 5G AND BEYOND	Prof. N. P. Pathak	Prof. Takashi Shimizu, Utsunomiya University, Japan Prof. Amit Kumar Singh, IIT Varanasi	01.05.19
42	Ms. Akanksha Garg	ECE	SYNERGETIC USE OF MICROWAVE AND OPTICAL SATELLITE DATA FOR LAND COVER CLASSIFICATION AND SURFACE PARAMETER RETRIEVAL	Prof. Dharmendra Singh	Prof. M. Chandra, Chemnitz Univ. of Tech., Germany Prof. Manoj Singh Gaur, IIT Jammu	09.05.19
43	Mr. Yuvaraj S.	ECE	INVESTIGATIONS ON MEGAWATT CLASS SUB-THz WAVE COAXIAL CAVITY GYROTRON OSCILLATORS	Prof. M. V. Kartikeyan	Prof. Francisco Falcone, Navarra University, Spain Prof. Jayanta Mukherjee, IIT Bombay Prof. M. Jaleel Akhtar, IIT Kanpur	17.05.19
44	Mr. Prashant Jaichandrao Gaidhane	ECE	ENHANCED SOFT COMPUTING TECHNIQUES FOR ROBUST CONTROLLER DESIGN	Prof. P. M. Pradhan Prof. M. J. Nigam	Prof. Sharad Sharma, Bowie State University, USA Prof. S. K. Nagar, IIT Varanasi Prof. Nitin V. George, IIT Gandhinagar	20.05.19
45	Mr. Om Prakash	ECE	SILICON NANOWIRE CMOS CIRCUIT DESIGN AND RELIABILITY	Prof. S. k. Manhas	Prof. Zhou Xing, Nanyang Tech. Univ., Singapore Prof. Santanu Mahapatra, IISc Bangalore Prof. S. Jit, IIT Varanasi	24.06.19
46	Mr. Chetan Pathak	ECE	CHARACTERIZATION AND MITIGATION OF LINEAR AND NON-LINEAR DISTORTIONS IN SIX-PORT MODULATOR	Prof. Karun Rawat	Prof. Patrick Robin, The Ohio State University, USA Prof. Manav Bhatnagar, IIT Delhi Dr. Meena Mishra, DRDO Lucknow	04.06.19
47	Mr. Chandra Prakash	HRE	STUDY ON SOLAR AIR HEATER DUCT ROUGHENED WITH SPHERICAL AND INCLINED RIB PROTRUSIONS	Prof. R. P. Saini	Prof. Mohammad E. Taslim, Northeastern Univ., USA Prof. H. P. Garg, IIT Delhi	10.07.19
48	Ms. Yogisha	HSS	MAPPING THE SUBALTERN STANDPOINT: A READING OF SELECT DALIT FEMALE NARRATIVES	Prof. Nagendra Kumar	Prof. Olga V. Pchelina, Volga State Univ. of Tech., Republic Prof. M. K. Pandey, IIT Varanasi Prof. Rajni Singh, IIT Dhanbad	03.04.19
49	Mr. Man Singh	HSS	HOME AND NATION: ISSUES OF CULTURAL IDENTITY IN THE NOVELS OF AMITAV GHOSH	Prof. Rashmi Gaur	Prof. Joel Kuortti, Turku University, Finland Prof. Rajni Singh, IIT Dhanbad Prof. Sanjiv Kumar, Central University, Haryana	20.05.19
50	Ms. Amandeep Kaur	HSS	THE RURAL NON-FARM SECTOR IN INDIA: APPROACHES, LINKAGES AND GROWTH DRIVERS	Prof. S. P. Singh	Prof. Steven Haggblade, Michign State Univ., USA Prof. S. K. Bhowmik, Central Univ., Bihar	04.07.19
51	Ms. Juhi Raghuvanshi	MS	INNOVATION CAPABILITY OF MICRO ENTERPRISES IN INDIA	Prof. Rajat Agrawal Prof. P. K. Ghosh	Prof. Sudhanshu Rai, Copehagen Business School, Denmark Prof. Sushil, IIT Delhi	01.05.19
52	Mr. Neeraj Sharma	MS	ENVIRONMENTAL IMPACT INDEX FOR SMART CITIES	Prof. Rajat Agrawal	Prof. Bidit Lal Dey, Brunel University, UK Prof. Sangeeta Sahney, IIT Kharagpur Prof. Surya Prakash Singh, IIT Delhi	26.06.19

53	Mr. Varun Goel	MS	IMPROVING LABOUR PRODUCTIVITY: CHALLENGES AND SOLUTIONS IN INDIAN CONTEXT	Prof. Rajat Agrawal	Prof. Prasanta Kumar Dey, Aston University, UK Prof. Kirankumar S. Momaya, IIT Bombay	26.06.19
54	Mr. Nishant Singh	MS	WORKPLACE SPIRITUALITY AND PSYCHOLOGICAL CONTRACT AS DETERMINANTS OF EMPLOYEE COMMITMENT	Prof. S. Rangnekar	Prof. Meyonggil Gil Choi, Chug Ang University, Korea Prof. Ashwani Kumar, IIM lucknow Prof. Harsh V. Samalia, IIM Shillong	15.05.19
55	Mr. Ankur Kashyap	MS	MODELLING AND MEASURING THE CAPABILITY OF INTELLECTUAL PROPERTY CREATION IN INDIAN HIGHER EDUCATION INSTITUTES	Prof. Rajat Agrawal	Prof. Kamal N. Agarwal, Howard University, USA Prof. Sangeeta Sahney, IIT Kharagpur	21.06.19
56	Mr. Pramod Chandra	MS	A STUDY ON STRATEGIC MARKETING PROSPECTS OF MEDICINAL AND AROMATIC PLANTS OF UTTARAKHAND	Prof. Vinay Sharma	Prof. Dinesh K. Sharma, Maryland Eastern Shore Univ., USA Prof. Anirban Chakraborty, IIM Lucknow Prof. Sanjeev Prashar, IIM Raipur	10.07.19
57	Mr. Om Prakash Yadav	MA	FINITE ELEMENT ANALYSIS AND COMPUTATIONAL MODELING OF SOME NON-LINEAR PARABOLIC PDEs	Prof. Ram Jiwari	Prof. Jinyun Yuan, Centro Politecnico, Brazil Prof. Mani Mehra, IIT Delhi Prof. S. Natesan, IIT Guwahati	03.04.19
58	Mr. Tajender Kumar	MA	STUDY OF QUASIGROUPS WITH CRYPTOGRAPHIC SIGNIFICANCE	Prof. S. Gangopadhyay	Prof. Pantelimon Stanica, Naval Postgraduate School, USA Prof. V. Vetrivel, IIT Madras	06.04.19
59	Mr. Sahil Kumar Dinkar	MA	DESIGN AND APPLICATIONS OF ANTLION OPTIMIZER	Prof. Kusum Deep	Prof. Seyedali Mirjalili, Griffith University, Australia Prof. N. K. Verma, IIT Kanpur Prof. Punam Bedi, DU Delhi	24.06.19
60	Mr. Vivek Kumar	MA	A STUDY OF HYDROSTATIC/HYBRID THRUST PAD BEARINGS CONSIDERING NON-LINEAR BEHAVIOUR OF LUBRICANTS	Prof. Ankik Kumar Giri	Prof. Volker John, WIAS, Germany Prof. Amiya Kumar Pani, IIT Bombay Prof. Sashikumar Ganesan, IISc Bangalore	18.06.19
61	Mr. Anand Kumar Solanki	MA	INVESTIGATIONS ON THE CONDENSATION OF REFRIGERANTS INSIDE A HELICAL COILED TUBE	Prof. Ravi Kumar	Prof. Akio Miyara, Saga University, Japan Prof. Kannan Iyer, IIT Bombay Prof. C. Balaji, IIT Madras	24.06.19
62	Mr. Vishnu Singh	MA	SOME INVESTIGATIONS IN THE AREA OF OPTIMIZATION AND IMPLICATION IN UNCERTAIN ENVIRONMENT	Prof. S. P. Yadav	Prof. Madjid Tavana, La Salle University, USA Prof. Debjani Chakraborty, IIT Kharagpur Prof. Pankaj Dutta, IIT Bombay	17.07.19
63	Mr. Dheeraj Chandra	MIE	STUDY OF VSC FOR SUSTAINABLE DEVELOPMENT OF CHILD IMMUNIZATION PROGRAM IN INDIA	Prof. Dinesh Kumar	Prof. Praveen S. Goel, Engg. & Continuous Improvement, Canada Prof. M. S. Kulkarni, IIT Bombay	28.06.19
64	Mr. Chandan Swaroop Meena	MIE	INVESTIGATION OF BOILING OVER CYLINDRICAL SURFACES AND INTERACTION BETWEEN NEIGHBORING SITES	Prof. Arup K. Das	Prof. Satish Kandlikar, Rochester Inst. of Tech., New York Prof. Prasanta K. Das, IIT Kharagpur Prof. MohdKaleem Khan, IIT Patna	02.07.19
65	Mr. Dungali Sreehari	MIE	DEVELOPMENT OF MICROCHANNELS BY MICRO-USM ON SILICON WAFER FOR HEAT TRANSFER APPLICATIONS	Prof. A. K. sharma	Prof. J. Paulo Davim, Aveiro University, Portugal Prof. Somashekhar S. Hiremath, IIT Madras	02.07.19

66	Mr. Roshan Udaram Patil	MIE	FAILURE ANALYSIS OF BRITTLE MATERIALS USING MULTISCALE PHASE FIELD METHOD	Prof. B. K. Mishra	Prof. Timon Rabczuk, Bauhaus Univ. Weimar, Germany Prof. K. S. R. K. Murthy, IIT Guwahati Prof. B. P. Patel, IIT Delhi	07.06.19
67	Mr. Vivek Kumar	MIE	A STUDY OF HYDROSTATIC/HYBRID THRUST PAD BEARINGS CONSIDERING NON-LINEAR BEHAVIOUR OF LUBRICANTS	Prof. S. c. Sharma	Prof. Shigeka Yoshimoto, Tokyo Univ. of Sci., Japan Prof. R. K. Pandey, IIT Delhi	11.07.19
68	MS. Anjana N. Prajapati	MIE	HEAT TRANSFER CHARACTERISTICS OF MATRIX COOLING CHANNELS USING LIQUID CRYSTAL THERMOGRAPHY	Prof. A. Tariq	Prof. Phil Ligrani, Univ. of Alabama in Huntsville, USA Prof. A. M. Pradeep, IIT Bombay	16.07.19
69	Mr. Rahul Gupta	MME	IMPRESSION CREEP AND HIGH CYCLE FATIGUE BEHAVIOUR OF ULTRASONICALLY PROCESSED INSITU Al6061-Al3Ti/Al3Zr COMPOSITES	Prof. B. S. S. Daniel	Prof. T. S. Srivatsan, University of Akron, USA Prof. R. Prasad, IIT Delhi	01.05.19
70	Mr. Manoj Kumar R.	MME	DEVELOPING POLYMER BASED SURFACE MODIFIED COMPOSITE FOR DRUG ELUTING ORTHOPEDIC IMPLANTS	Prof. Debrupa Lahiri	Prof. Arvind Agarwal, Florida International Univ., USA Prof. T. S. Sampath Kumar, IIT Madras	04.07.19
71	Mr. Rahul Kumar	MME	MATERIAL FLOW ANALYSIS IN FRICTION STIR WELDING OR PROCESSING	Prof. Vivek Pancholi	Prof. Lawrence E. Murr, Univ.of Texas at El Paso,USA Prof. Satish V. Kailas, IISc Bangalore	16.07.19
72	Mr. Abhishek Acharya	NT	DEVICE-CIRCUIT INTERACTIONS IN TUNNEL FET: AN ANALOG DESIGN PERSPECTIVE	Prof. Anand Bulusu	Prof. Adrian M. Ionescu, EPFL, Switzerland Prof. Yogesh Singh Chauhan, IIT Kanpur Prof. Shreepad Karmalkar, IIT Madras	12.04.19
73	Mr. Narendra Singh	PH	SiC BASED THIN FILMS FOR ELECTRONIC DEVICE APPLICATIONS	Prof. Davinder Kaur	Prof. Thomas Thundat, Univ. at Buffalo, USA Prof. Bodh Raj Mehta, IIT Delhi	04.06.19
74	Ms. Saleheen Bano	PPE	CELLULOSE NANOCRYSTALS/POLY (ETHER ETHER KETONE) COMPOSITE MEMBRANES FOR FUEL CELL APPLICATION	Prof. Y. S. Negi	Prof. Masa-aki Kakimoto, Tokyo Inst. of Tech., apan Prof. Veena Choudhary, IIT Delhi Dr. Prakash P. Wadgaonkar, CSIR Pune	04.06.19
75	Ms. Chandravati	PPE	CELLULOSE NANOFIBERS FROM WASTE FOREST BIO-MATERIALS AND ITS APPLICATION IN POLYMER NANOCOMPOSITES	Prof. P. K. Maji	Prof. Sudip Ray, Univ. of Auckland, New Zealand Prof. Vivek Kumar, IIT Delhi Dr. Debdatta Ratna, DRDO Maharashtra	07.06.19
76	Ms. Farha Deeba	PPE	STUDIES ON LIPID AGGLOMERATING OLEAGINOUS YEAST CRYPTOCOCCUS PSYCHROTOLERANS IITRFD IN BIODIESEL PRODUCTION	Prof. Y. S. Negi	Prof. Yanna Liang, Illinois Univ.Carbondale,USA Prof. S. N. Naik, IIT Delhi Prof. Kamal Kishore Pant, IIT Delhi	20.06.19
77	Ms. Iram Naim	PPE	ADVANCED SELECTION TECHNIQUE UNIVARIATE FORECASTING MODELS FOR SEASONAL TIME SERIES	Prof. Tripti Mahara	Prof. Charbel Jose Chiappetta Jabbour, Montpellier Business School, France Prof. Veena Bansal, IIT Kanpur Prof. Binod K. Kanaujia, JNU Delhi	17.07.19
78	Mr. Palmate Santosh Subhash	WRDM	HYDROLOGICAL MODELING TO STUDY THE INTERACTIONS OF LAND USE–CLIMATE–HYDROLOGY FOR SUSTAINABLE RIVER BASIN MANAGEMENT	Prof. Ashish Pandey	Prof. Stacy L. Hutchinson, Kansas State Univ., USA Prof. Eldho T. I., IIT Bombay	23.04.19

79	Mr. Mohan Lal	WRDM	INVESTIGATION OF SCS-CN METHODOLOGY ON EXPERIMENTAL PLOT AND CATCHMENT SCALES	Prof. S. K. Mishra Prof. Yogendra Kumar	Prof. Ronny Berndtsson, Lund University, Sweden Prof. Eldho T. I., IIT Bombay	28.06.19