सीनेट की सतत्तरवी (विशेष) व अठहत्तरवी बैठकों का कार्यवृत्त

MINUTES OF THE 77th (SPECIAL) AND 78th MEETINGS OF THE SENATE

01 मार्च 2019 / 1st MARCH 2019

और / AND

10 अप्रैल 2019 / 10th APRIL 2019

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

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)**
77.0	पीएचडी नियमों और विनियमों पर प्रो0 मनीष श्रीखंडे समिति की रिपोर्ट पर विचार करना। To consider the report of Prof. Manish Shrikhande Committee on Ph.D. Rules & Regulations.	1
78.1	सीनेट की दिनांक 02.01.2019 को आयोजित हुई 76वी बैठक के कार्यवृत्त की पुष्टि करना। To confirm the minutes of the 76th meeting of the Senate held on 02.01.2019.	1
78.2	सीनेट की दिनांक 02.01.2019 को आयोजित हुई 76वी बैठक 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 76th meeting held on 02.01.2019.	1
78.3	निम्नलिखित नये पाठ्यक्रमों को समाविष्ट करने के प्रस्ताव पर विचार करना। (अ) यूजी रिसर्च कोर्स (यूजीआरसी001) – 3 केडिटस, विभाग स्पेसिफिक (आ) अंतर्विषयक यूजीआरसी (यूजीआरसी001) – 3 केडिटस, सभी विभागों के अंतर्विषयक परियोजानाओं के लिए प्रायोज्य। To consider the 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.	1-2
78.4	यूजी और पीजी प्रोजक्ट/डिंजरटेशन मूल्यांकन के लिए संशोधित दिशानिर्देशों पर विचार करना। To consider the revised guidelines for evaluation of UG and PG project/dissertation.	2

11 JUN 2019

78.5	सत्र 2019–20 के लिए शैक्षणिक कैलेंडर पर विचार करना। To consider the Academic Calendar for the session 2019-20.	3
78.6	ग्रेडिंग रूल्स रिव्यू कमेटी की संशोधित रिपोर्ट पर विचार करना। To consider the Revised Report of Grading Rules Review Committee.	3
78.7	धातुकर्म एवं पदार्थ इंजीनियरिगं विभाग और वास्तुकला एवं योजना विभाग द्वारा पीएचडी में प्रवेश के लिए प्रस्तावित संशोधित न्यूनतम पात्रता मानदंड पर विचार करना। 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.	3
78.8	थीसिस जमा करने के लिए समय विस्तार के संबंध में दो छात्रों के अनुरोधों पर विचार करना। To consider the requests of two students regarding extension in time for the submission of thesis.	3
78.9	पीएचडी प्रोगाम की कोर्स केडिट आवश्यकता को पूरा करने के लिए जिन रिसर्च स्कॉलर्स ने ऑटम/स्प्रिंग सेमेस्टर 2018–19 में यूजी स्तर का कोर्स लिया है उनको वन टाईम अपवाद (एक्सपशन) देने के लिए भूविज्ञान विभाग की आईआरसी और डीआरसी की सिफारिशों पर विचार करना। 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 Autumn/Spring semester 2018-19 to complete course credit requirement for Ph.D. programme.	3-4
78.10	2019–2020 के लिए जेम्स थॉमसन छात्रवृत्ति (जेटीएस) के लिए कट–ऑफ रैंक पर विचार करना। To consider the cut-off rank for James Thomason Scholarship (JTS) for 2019-2020.	4
78.11	प्रो0 मनीष श्रीखंडे समिति द्वारा प्रस्तावित पीएचडी नियमों और विनियमों भाग-II: पीएचडी प्रकिया के शेष भाग पर विचार करना। To consider the remaining clauses of Part-II: Ph.D. Procedures as proposed by Prof. Manish Shrikhande Committee on Ph.D. Rules & Regulations.	4
78.12	उन छात्रों को अनंतिम पी0एच0डी0 उपाधि प्रदान करने की पुष्टि किया जाना, जिन्होंने विभिन्न पाठ्यक्रमों में 02.01.2019 से अब तक उपाधि प्राप्त किए जाने की अर्हता प्राप्त की है। 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 w.e.f. 02.01.2019 to date.	4
78.13	प्रोजक्ट स्टाफ का पीएचडी प्रोग्राम में प्रवेश पात्रता के मानदंडों और चयन प्रकिया में संशोधन पर विचार करना। To consider the modification in the eligibility criteria and selection process for admission of a Project staff in Ph.D. programme.	4

11 JUN 2019

78.14	77वी सीनेट द्वारा निर्देशित पीएचडी प्रोग्राम की उम्मीदवारी के लिए कोर्स केडिट आवश्यकताओं पर विचार करना। To consider the course credit requirements for candidacy in a Ph.D. programme as directed by the 77th Senate.	4-5
78.15	शैक्षणिक वर्ष 2019–20 के लिए पीएचडी सहित यूजी और सभी मास्टर कार्यक्रमों के सीट मैट्रिक्स पर विचार करना। To consider the Seat Matrix for UG and all Masters' Programmes including Ph.D. for the academic year 2019-20.	5
78.16	जानपद इंजिनियरिगं विभाग के एमटेक (परिवहन) संरचना में संशोधन के प्रस्ताव पर विचार करना। To consider the proposal of Department of Civil Engineering regarding modification in the structure of M. Tech. (Transportation).	5
78.17	जल एवं नवीकरणीय ऊर्जा विभाग के निम्नलिखित प्रस्तावों पर विचार करना: (अ) एमटेक (एएचईएस) में प्रवेश पात्रता के लिए "इंस्ट्रुमेंटेशन इंजीनियरिग" को जोडना। (आ) बीटेक छात्रों के लिए एक नया ओपन इलेक्टिव कोर्स (ओईसी) आईएएच–303: सोलर फोटोवोल्टिक टैक्नोलोजी और एपलिकेशन्स शुरू करना । To consider the following proposals of Department of Hydro and Renewable Energy: (a) Addition of "Instrumentation Engineering" as eligibility criteria for the admission in M. Tech. (AHES). (b) Introduction of a new Open Elective Course (OEC) for B. Tech. students – (IAH-303 : Solar Photovoltaic Technology and Applications)	5-6
78.18	विभिन्न पुरस्कारों के लिए पुरस्कार समितियों की सिफारिशों पर विचार और अनुमोदन करना। To consider and approve the recommendations of award committees for various awards.	6
78.19	विभिन्न गैर दीक्षांत पुरस्कारों के लिए पुरस्कार विजेताओं पर विचार और अनुमोदन करना। To consider and approve awardees for various non-convocation awards.	6-12
78.20	टाइम मैनेजमेंट के लिए एक पुरस्कार पर विचार और अनुमोदन करना। To consider and approve an award for Time Management.	13
78.21	छात्रों के अनुरोधो पर विचार करना – (अ) अपूर्ण न्यूनतम एसजीपीए की वस्तुस्थिति में कार्यक्रम जारी रखना (ब) मेडिकल ग्राउंड पर सेमेस्टर विड्राल (स) अनुमेय सीमा से परे विस्तार, और (द) द्वितीय दया अपील To consider the requests of students regarding (A) continuation of programme in spite of not fulfilling minimum SGPA, (B) semester withdrawal on medical ground, (C) extension beyond permissible limit and (D) 2nd mercy appeal.	13

11 JUN 2019

11 JUN 2019

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
MEETING SECTION

Minutes of the 77th (Special) & 78th Meetings of the Senate held on 01.03.2019 and 10.04.2019 at 3.30 P.M. in the Senate Hall of the Institute.

The list of participants is appended at **Annexure-I & Annexure-II.**

At the outset, the Chairman welcomed the members.

The agenda was then taken up.

Item No. 77.0: To consider the 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.

Item No. 78.1: To confirm the minutes of the 76th meeting of the Senate held on 02.01.2019.

No comments were received. The Senate confirmed the minutes as circulated vide e-mail dated 25.01.2019.

Item No. 78.2: To report on the actions taken to implement the decisions of the Senate taken in its 76th meeting held on 02.01.2019.

The Senate noted the actions taken on the minutes.

Item No. 78.3: To consider the 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.

11 JUN 2019

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.

Item No. 78.4: To consider the 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 as given in **Appendix A**. In future, the word "project" will be used for all the disciplines/programs.

(c) The proposal for B.Tech. projects was approved as given in **Appendix B**.

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

11 JUN 2019

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**

11 JUN 2019

Autumn / Spring semester 2018-19 to complete course credit requirement for Ph.D. programme.

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.

Item No. 78.10: To consider the cut-off rank for James Thomason Scholarship (JTS) for 2019-2020.

The Senate approved the proposal.

Item No. 78.11: To consider the remaining clauses of Part-II: Ph.D. Procedures as proposed by Prof. Manish Shrikhande Committee on Ph.D. Rules & Regulations.

The Senate approved Part-II of Ph.D. Manual as given in **Appendix E.**

Item No.78.12: 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 w.e.f. 02.01.2019 to date.

The Senate ratified the item as given in **Appendix F.**

Item No. 78.13: To consider the modification in the eligibility criteria and selection process for admission of a Project staff in Ph.D. programme.

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.

Item No. 78.14: To consider the course credit requirements for candidacy in Ph.D. programme as directed by the 77th Senate.

The Senate deliberated the item and approved below:

11 JUN 2019

S. No.	Qualification	Credit Requirements	Remarks
1	M.Tech, M.Arch./MURP, or equivalent	Minimum 9 credits or 3 courses	a. All courses shall be PG level theory 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.
2	M.Sc/M.A./M.B. A.or equivalent, admitted to Science/ HSS/ Management department	Minimum 12 credits or 4 courses	
3	B.Tech. or equivalent, or M.Sc. or equivalent, admitted to any one of the engineering departments/ centres	Minimum 24 credits	

Item No.78.15: To consider the Seat Matrix for UG and all Masters' Programmes including Ph.D. for the academic year 2019-20.

The Senate approved the Seat Matrix as given in **Appendices G to K.**

Further, the Senate noted the Ph.D. Seat Matrix for Autumn Semester 2019-20 as given in **Appendix L.**

Item No. 78.16: To consider the proposal of Department of Civil Engineering regarding modification in the structure of M. Tech. (Transportation).

The Senate approved the structure of M.Tech. (Transportation) as given in **Appendix M.**

Item No. 78.17: To consider the following proposals of Department of Hydro and Renewable Energy:

(a) Addition of "Instrumentation Engineering" as eligibility criteria for the admission in M. Tech. (AHES).

(b) Introduction of a new Open Elective Course (OEC) for B. Tech. students- (IAH-303 :Solar Photovoltaic Technology and Applications)

11 JUN 2019

The Senate approved the proposal as given in **Appendix N.**

Item No 78.18: To consider and approve the recommendations of award committees for various awards.

The Senate approved the proposal.

Item No 78.19: To consider and approve awardees for various non-convocation awards.

The Senate approved the following awardees:

NAME OF Award/ SCHOLARSHIP	CRITERIA OF SCHOLARSHIP	NAME OF STUDENT	ENROLLMENT NO.	GENDER	C.G.P.	BRANCH
Tara Chand Scholarship	Tara Chand Kanti Devi Cash Prizes of Rs. 2500/- to the student scoring highest C.G.P.A in B. Tech Civil 3rd Year	NAVNEET KUMAR	15113073	M	9.504	CE
Rai Bahadur Khushi Ram Sud& Smt. Durga Devi Sud Memorial Cash Prize	Rai Bahadur Khushi Ram Sud & Smt. Durga Devi Sud Memorial Cash Prize of Rs. 5000/- for obtaining highest CGPA in B.Tech. (Civil), II Year class	JATIN AGGARWAL	16113041	M	9.495	CE
Lt. Gen. Ram Adhar Loomba Cash Prize (GIRL)	Lt. Gen. Ram Adhar Loomba Cash Prize of Rs. 5000/- for the student who obtains highest CGPA in B.Tech. (Civil) III Year (among girl students)	KANCHAN SHRIVASTAVA	15113057	F	8.267	CE
Kaustubh Roy Memorial Cash Prize	Kaustubh Roy Memorial Cash Prize of Rs. 6000/- for obtaining highest CGPA up to B. Tech. Mech. Engg. III year	PULKIT SINGAL	15119040	M	9.897	ME
Rai Singh Jain Cash Prize of Rs. 3000/- for the girl student	Rai Singh Jain Cash Prize of Rs. 3000/- for the girl student obtaining highest CGPA in B.Tech. (CSE/E&C/Elect.) I Year	PURVI AGARWAL	17113096	F	9.511	EE
Rai Singh Jain Cash Prize	Rai Singh Jain Cash Prize of Rs. 3000/- for the girl student obtaining highest CGPA in B. Tech. (CSE/E&C/Elect.) II Year	DIVIYA	16115041	F	9.717	EE
Rai Singh Jain Cash Prize	Rai Singh Jain Cash Prize of Rs. 3000/- for the girl student obtaining highest CGPA in B. Tech. (CSE/E&C/Electrical) III Yr.	ANKITA SAXENA	15114011	F	9.326	CSE

11 JUN 2019

Rai Singh Jain & Mrs. Shakuntla Devi Jain Cash Prize	Rai Singh Jain & Mrs. Shakuntla Devi Jain Cash Prize of Rs. 3000/- for the student (Male or Female) obtaining highest CGPA in B. Tech (CSE/E&C/Elect.) I Year	GHETIA SIDDHARTH	17114033	M	9.872	CSE
Rai Singh Jain & Smt. Shakuntla Devi Jain Cash Prize	Rai Singh Jain & Smt. Shakuntla Devi Jain Cash Prize of Rs. 3000/- for the student (Male or Female) obtaining highest CGPA in B.Tech. (CSE/E&C/ Elect.) II Year.	GAJARE PRANJAL MATHU	16115043	M	9.848	EE
Rai Singh Jain & Smt. Shakuntla Devi Jain Cash Prize	Rai Singh Jain & Smt. Shakuntla Devi Jain Cash Prize of Rs. 3000/- for the student (Male or Female) obtaining highest CGPA in B.Tech. (CSE/E&C/ Elect.) III Year.	HRITURAJ SINGH	15115060	M	9.9	EE
Prof. P. Mukhopadhyay Cash Prize	Prof. P. Mukhopadhyay Cash Prize of Rs. 2000/- for obtaining highest CGPA in B.Tech. (Elect.) III year.	HRITURAJ SINGH	15115060	M	9.9	EE
Shri Raghuraj Behari Mathur Cash Prize (M)	Shri Raghuraj Behari Mathur Cash Prize of Rs. 20,000/- for a male student who has obtained highest CGPA amongst male students in B. Tech. Civil I year	ADITYA HRIDAY UPADHYAY	17113005	M	9.787	CE
Shri Raghuraj Behari Mathur Cash Prize (F)	Shri Raghuraj Behari Mathur Cash Prize of Rs. 20,000/- for a female student who has obtained highest CGPA amongst female students in B. Tech. Civil I year	SAKSHI GUPTA	17113105	F	8.787	CE
Gauri Shanker – Malti Prize	Gauri Shanker – Malti Prize of Rs. 10,000/- for the student who obtains highest CGPA in B.Tech. (Civil) III Year.	NAVNEET KUMAR	15113073	M	9.504	CE
Dr. G. Pande Gold Medal	For obtaining highest CGPA in M.Sc. (Previous) examination.	SHARANYA SARKAR	17610020	F	9.864	M.Sc Biotech.

11 JUN 2019

Air Cmdr Shyam Chand Mehra	Air Cmdr Shyam Chand Mehra Scholarship" of Rs. 10,000/- to a girl student of B. Tech 1st year for obtaining highest CGPA in B.Tech. Electrical Engg.	PURVI AGARWAL	17113096	F	9.511	EE
Air Cmdr Shyam Chand Mehra	Air Cmdr Shyam Chand Mehra Scholarship of Rs. 10,000/- to a girl student of B.Tech. 2nd year for obtaining highest CGPA in B.Tech. Electrical Engg.	DIVIYA	16115041	F	9.717	EE
Air Cmdr Shyam Chand Mehra	Air Cmdr Shyam Chand Mehra Scholarship of Rs. 15,000/- to a girl student of B. Tech. 3rd year for obtaining highest CGPA in B. Tech. Electrical Engg.	AAYUSHI SHRIVASTAVA	15115002	F	8.89	EE
EC-72 Batch" Cash Award	EC-72 Batch" Cash Award of Rs. 10,000/- for the student of 3rd year B.Tech. (E & CE) based upon performance of the student up to 2nd year.	SIDHARTH THOMAS	16112087	M	9.761	ECE
"1988 Batch Award" Cash Award	"1988 Batch Award" Cash Award of Rs. 12000/- to a student of all UG Programmes in Engineering 1st year on the basis of Academics Performance of Autumn Semester .	MOHIT KUMAR	18114049	M	10	CSE
"1988 Batch Award" Cash Award	"1988 Batch Award" Cash Award of Rs. 12000/- to a student of all UG Programmes in Engineering 2nd year on the basis of Academics Performance upto 1st year.	SHUBHAM JOHRI	17312025	M	9.956	MSM
"1988 Batch Award" Cash Award	"1988 Batch Award" Cash Award of Rs. 12000/- to a student of all UG Programmes in Engineering 3rd year on the basis of Academics Performance upto 2nd year.	GAJARE PRANJAL MATHU	16115043	M	9.848	EE
"1988 Batch Award" Cash Award	"1988 Batch Award" Cash Award of Rs. 12000/- to a student of all UG Programmes in Engineering 4th year on the basis of Academics Performance upto 3rd year.	PULKIT SINGAL	15119040	M	9.9	ME

11 JUN 2019

Vinay K. and Sunita Jain Award	"Vinay K. and Sunita Jain Award" for Excellence in B.Tech. and IDD programmes in E & CE/CSE/Elect. Engg., related to Information and Communication Technologies (ICT) of Rs. 5,000/- for Fourth year male student on the basis of performance up to 3rd year. In case the recipient is receiving another award at the same time, the award should go to next performer.	HRITURAJ SINGH	15115060	M	9.9	EE
Vinay K. and Sunita Jain Award	"Vinay K. and Sunita Jain Award" for Excellence in B.Tech. and IDD programmes in E & CE/CSE/Elect. Engineering related to Information and Communication Technologies (ICT) of Rs. 5,000/- for Fourth year Female student on the basis of performance up to 3rd year. In case the recipient is receiving another award at the same time, the award should go to next performer.	ANKITA SAXENA	15114011	F	9.326	CSE
Ajit Singh Yadav Memorial Proficiency Prize	Ajit Singh Yadav Memorial Proficiency Prize" the First Cash Prize of Rs. 20000/- to a student (Male/Female) of Mechanical & Industrial Engineering Deptt. 3rd year on the basis of weightage upto 75% having highest CGPA upto 2nd year in MIED and 25% (1) Introduction to Environmental Studies (CE) (2) Ethics & Self Awareness(HSS) and (3) Engineering Analysis & Design (ME).	JOSE ABY	16117039	M	9.511	ME

11 JUN 2019

Ajit Singh Yadav Memorial Proficiency Prize	Ajit Singh Yadav Memorial Proficiency Prize" the Second Cash Prize of Rs. 10000/- to a student (Male/Female) of Mechanical & Industrial Engineering Deptt. 3rd year on the basis of weightage upto 75% having highest CGPA upto 2nd year in MIED and 25% (1) Introduction to Environmental Studies (CE) (2) Ethics & Self Awareness(HSS) and (3) Engineering Analysis & Design (ME).	Ritesh Ranjan	16117071	M	9.733	ME
Ajit Singh Yadav Memorial Proficiency Prize	Ajit Singh Yadav Memorial Proficiency Prize" the First Cash Prize of Rs. 25000/- to a student (Male/Female) of Mechanical & Industrial Engineering Deptt. 4th year on the basis of weightage upto 75% having highest CGPA upto 3rd year in MIED and 25% (1) Introduction to Environmental Studies (CE) (2) Ethics & Self Awareness(HSS) and (3) Engineering Analysis &Design (ME) and (4) Principles of Industrial Engineering (ME).	PULKIT SINGAL	15119040	M	9.9	ME
Ajit Singh Yadav Memorial Proficiency Prize	"Ajit Singh Yadav Memorial Proficiency Prize" the Second Cash Prize of Rs. 15000/- to a student (Male/Female) of Mechanical & Industrial Engineering Deptt. 4th year on the basis of weightage upto 75% having highest CGPA upto 3rd year in MIED and 25% (1) Introduction to Environmental Studies (CE) (2) Ethics & Self Awareness(HSS) and (3) Engineering Analysis & Design (ME) and Principles of Industrial Engineering (ME)	Anjanroop Singh	15117010	M	9.35	ME

11 JUN 2019

Ajit Singh Yadav Memorial Proficiency Prize	"Ajit Singh Yadav Memorial Essay Prize" for two best essays from all departments at IIT Roorkee. The topic for the essay shall be decided by the Institute for each year.	Ist- Sakshi Priya 2nd- Sanskar Chordiya	Ist- 16111030 2nd- 17117075	Ist- Female 2nd- Male		Ist- Biotech-nology 2nd- Mechani-cal
Dwarka Dass Balwant Kaur Thapar Cash Prize	Dwarka Dass Balwant Kaur Thapar" Cash Prize Rs. 6000/- to M.Tech. (AHES) Ist year student highest CGPA but not getting any other award of similar or higher amount.	Gautam Narula	17512005	M	8.526	
Ashwani Kumar Goel, ALEO Manali Hydropower Award	'Ashwani Kumar Goel, ALEO Manali Hydropower Award" of Rs. 10,000/- to a student having second highest CGPA among M.Tech. (AHES) I year students.	Ayush Jain	17512003	M	9.158	AHES
Chattishgarh State Power Generation Corporation Hydro Awards	"Chattisgarh State Power Generation Corporation Hydro Awards" of Rs. 10,000/- p.a. to B.Tech. 3rd/ 4th Student for Securing Highest Marks in the Subject IAH-01 SHP Development for Autumn Semester	Vivek Dhaka	16113119	M	78	IAH
Mr. Harish Ms. VeenaMidha Cash Prize	Mr. Harish & Ms. Veena Midha Cash Prize of Rs. 10,000/- to a student of M.B.A. (HRM) I Year Student.	Sahil Jatele		M	83.2	MBA
Balmar Lawrie Cash Prize	Balmar Lawrie Cash Prize of Rs. 10,000/- to Technology Management.	Sahil Jatele		M	80.5	MBA
Bihar Hydro Awards	Bihar Hydro Awards of Rs. 10,000/- to a student Securing Highest C.G.P.A. in M.Tech. I Year Student.	Namgay Tenzin	17512012	M	9.474	AHES
Excellence Award by 1972 batch	Excellence Award by 1972 batch of Chemical Engg. Scholarship Rs. 15,000/- for 2nd and 3rd Year (Innovative Mind, Total highest Marks, Business IQ, Sports)	1. Shivani Singh 2. Pushkal Sharma	1. 16112081 2. 15112065	1. F 2. M		Chemical
Om Prakash Gupta and Sushila Devi Memorial	Om Prakash Gupta and Sushila Devi Memorial Scholarship of Rs. 10,000 to a girl student of B.Tech. I	Disha Bhatia	17112024	F	9.532	Chemical

11 JUN 2019

Scholarship	Year obtaining highest marks.					
Prof. B.S. Varshney Memorial Cash Prize	Prof. B.S. Varshney Memorial Cash Prize of Rs. 5,000 for Securing highest grades in the following two subjects: CH 206 Application of Th.CH 204 Transfer Process I (Heat Trans).	Sakshi	16112076	F		Chemical
Chhattisgarh State Power Generation Corporation Hydro Awards	Cash Prize of Rs10,000/- to M.Tech. AHES I year – Securing highest CGPA in the I year and not awarded any other award of same or higher amount	Iqbal	17512008	M	9.474	AHES
Chhattisgarh State Power Generation Corporation Hydro Awards	Cash Prize of Rs. 10,000/- M.Tech. EMRL I year – Securing highest CGPA in the I year and not awarded any other award of same or higher amount.	Yashveer Jayra	17513010	M	8.611	EMRL
Chhattisgarh State Power Generation Corporation Hydro Awards	Cash Prize of Rs10,000/- M.Tech. AHES I year – Securing highest marks in the Seminar	Namgay Tenzin	17512012		92	AHES
Chhattisgarh State Power Generation Corporation Hydro Awards	Cash Prize of Rs 10,000/- M.Tech. EMRL I year – Securing highest marks in the Seminar	Ketan Sonkar	17513007		82	EMRL
Usha Annual Award	Cash Prize of Rs10,000/- M.Tech. AHES I year – Securing highest grade in Small Hydro Power Planning & Management Course	Namgay Tenzin	17512012		83	AHES
B.K. Agrawal Award for Academic Excellence	Cash Prize of Rs40,000/- to a student of B.Tech. 4th year on the basis of highest CGPA upto the 6th Semester of B.Tech. Chemical Engg.	Pushkal Sharma	15112065	M	9.639	Chemical Engg.

11 JUN 2019

Item No.78.20:To consider and approve an award for Time Management.

The Senate approved the proposal.

Item No. 78.21: To consider the 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.

(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.

Item No. 78.22: To consider the 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.

11 JUN 2019

Item No.78.23: To report adoption of MHRD notification regarding introduction of EWS category in admissions.

The Senate noted the item.

Item No. 78.24: To report institution of new awards and scholarships.

The Senate noted the item.

Item No. 78.25: To report the inclusion of a new programme elective course (PEC) MAN-528 "Simulation Techniques" in the Integrated M.Sc. (Applied Maths) & M.Sc. (Mathematics) programmes.

The Senate noted the item.

Item No. 78.26: To report the inclusion of a new programme elective course (PEC) EEN-614: Bio Medical Robotics.

The Senate noted the item.

Item No. 78.27: To report the approval on the request of Mr. Pankaj Singh Rawat, Department of Physics.

The Senate noted the item.

Item No. 78.28: To report adoption of MHRD Office Memorandum with respect to qualification for JRF/SRF.

The Senate noted the item. Further, the Senate decided that from now onwards qualifications as specified by MHRD shall also be applicable to new Ph.D. students who will seek registration through projects.

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

11 JUN 2019

Annexure-I

Following were present on 01.03.2019:

1.	Prof. Ajit K. Chaturvedi	Director & Chairman
2.	Prof. M.P. Sharma	(Alternate Hydro Energy Centre)
3.	Prof. V. Devdas	(Architecture & Planning)
4.	Prof. Ila Gupta	(Architecture & Planning)
5.	Prof. Pushplata	(Architecture & Planning)
6.	Prof. Bijan Choudhary	(Biotechnology)
7.	Prof. Sanjay Ghosh	(Biotechnology)
8.	Prof. Pravindra Kumar	(Biotechnology)
9.	Prof. Ramasare Prasad	(Biotechnology)
10.	Prof. Partha Roy	(Biotechnology)
11.	Prof. Ashwani Kumar Sharma	(Biotechnology)
12.	Prof. R.P. Singh	(Biotechnology)
13.	Prof. C.B.Majumdar	(Chemical Engineering)
14.	Prof. M.R. Maurya	(Chemistry)
15.	Prof. Mala Nath	(Chemistry)
16.	Prof. R.K. Peddinti	(Chemistry)
17.	Prof. K.R. Justin Thomas	(Chemistry)
18.	Prof. Anupam Chakrabarti	(Civil Engineering)
19.	Prof. S.K. Ghosh	(Civil Engineering)
20.	Prof. Kamal Jain	(Civil Engineering)
21.	Prof. C.S.P. Ojha	(Civil Engineering)
22.	Prof. M. Parida	(Civil Engineering)
23.	Prof. Rajat Rastogi	(Civil Engineering)
24.	Prof. Akhil Upadhyay	(Civil Engineering)
25.	Prof. R. Balasubramanian	(Computer Science & Engineering)
26.	Prof. Durga Toshniwal	(Computer Science & Engineering)
27.	Prof. Pankaj Agarwal	(Earthquake Engineering)
28.	Prof. B.K. Maheshwari	(Earthquake Engineering)
29.	Prof. Manish Shrikhande	(Earthquake Engineering)
30.	Prof. Sunil Bajpai	(Earth Sciences)
31.	Prof. R. Krishnamurthi	(Earth Sciences)
32.	Prof. S. Mukhopadhyay	(Earth Sciences)
33.	Prof. A.K. Saraf	(Earth Sciences)
34.	Prof. A.K. Sen	(Earth Sciences)
35.	Prof. Sandeep Singh	(Earth Sciences)
36.	Prof. Biswarup Das	(Electrical Engineering)
37.	Prof. N.P. Padhy	(Electrical Engineering)
38.	Prof. Sudeb Dasgupta	(Electronics & Communication Engg.)
39.	Prof. M.V. Kartikeyan	(Electronics & Communication Engg.)
40.	Prof. Nagendra Kumar	(Humanities & Social Sciences)
41.	Prof. N.K. Goel	(Hydrology)
42.	Prof. M.K. Jain	(Hydrology)
43.	Prof. M. Perumal	(Hydrology)
44.	Prof. Ramesh Chandra	(Institute Instrumentation Centre)
45.	Prof. Rama Bhargava	(Mathematics)

11 JUN 2019

46. Prof. Kusum Deep (Mathematics)
47. Prof. Sunita Gakkhar (Mathematics)
48. Prof. Tanuja Srivastava (Mathematics)
49. Prof. N. Sukavanam (Mathematics)
50. Prof. D.K. Dwivedi (Mechanical & Industrial Engg.)
51. Prof. B.K. Mishra (Mechanical & Industrial Engg.)
52. Prof. Manish Mishra (Mechanical & Industrial Engg.)
53. Prof. K. Murugesan (Mechanical & Industrial Engg.)
54. Prof. B.S.S. Daniel (Metallurgical & Materials Engg.)
55. Prof. S.K. Nath (Metallurgical & Materials Engg.)
56. Prof. Anjan Sil (Metallurgical & Materials Engg.)
57. Prof. Y.S. Negi (Paper Technology)
58. Prof. Aalok Misra (Physics)
59. Prof. Tashi Nautiyal (Physics)
60. Prof. Vipul Rastogi (Physics)
61. Prof. G.D. Varma (Physics)
62. Prof. D.K. Walia (Physics)
63. Prof. Deepak Khare (WRD&M)
64. Prof. S.K. Singhal, Head, Alternate Hydro Energy Centre
65. Prof. P. Gopinath, ADOAA (Admission)
66. Prof. S.H. Upadhyay, ADOSW (Bhawans & Messes)
67. Prof. M.K. Barua, ADOSW (Students Activities)
68. Prof. P. Arumugam, Associate Dean (International Relations)

Students' representatives:

69. Mr. Satish Jaiswal, General Secretary, Academic Affairs (PG)

70. Mr. Prashant Garg, Registrar & Secretary, Senate

The Senate noted the communications received from the following members for their inability to attend the meeting:

1. Dr. C. Jayakumar, Librarian
2. Prof. Rajesh Srivastava, Department of Physics
3. Prof. R.K. Dutta, Centre of Nanotechnology
4. Prof. N.K. Samadhiya, Department of Civil Engineering
5. Dr. Sharad K. Jain, Director, NIH
6. Prof. M.L. Kansal, Department of Water Resources Development & Management
7. Prof. Umesh Kumar Sharma, Department of Civil Engineering
8. Prof. Sugata Gangopadhyay, Department of Computer Science & Engineering
9. Prof. Mahua Mukherjee, Department of Architecture & Planning.
10. Prof. Anand Joshi, Department of Earth Sciences
11. Prof. Anil Kumar Sharma, Department of Management Studies

11 JUN 2019

Annexure-II

Following were present in the 78th Senate meeting held on 10.04.2019:

1.	Prof. Ajit K. Chaturvedi	Director & Chairman
2.	Prof. Arun Kumar	(Hydro & Renewable Energy)
3.	Prof. R.P. Saini	(Hydro & Renewable Energy)
4.	Prof. M.P. Sharma	(Hydro & Renewable Energy)
5.	Prof. V. Dadas	(Architecture & Planning)
6.	Prof. Ila Gupta	(Architecture & Planning)
7.	Prof. Maua Mukherjee	(Architecture & Planning)
8.	Prof. Pushplata	(Architecture & Planning)
9.	Prof. Sanjay Ghosh	(Biotechnology)
10.	Prof. Pravindra Kumar	(Biotechnology)
11.	Prof. Ramasare Prasad	(Biotechnology)
12.	Prof. Partha Roy	(Biotechnology)
13.	Prof. Ashwani Kumar Sharma	(Biotechnology)
14.	Prof. R.P. Singh	(Biotechnology)
15.	Prof. P.P. Kundu	(Chemical Engineering)
16.	Prof. B. Prasad	(Chemical Engineering)
17.	Prof. Shishir Sinha	(Chemical Engineering)
18.	Prof. Bina Gupta	(Chemistry
19.	Prof. P. Jeevanandam	(Chemistry)
20.	Prof. M.R. Maurya	(Chemistry)
21.	Prof. Mala Nath	(Chemistry)
22.	Prof. R.K. Peddinti	(Chemistry)
23.	Prof. U.P. Singh	(Chemistry)
24.	Prof. K.R. Justin Thomas	(Chemistry)
25.	Prof. Z. Ahmad	(Civil Engineering)
26.	Prof. Anupam Chakrabarti	(Civil Engineering)
27.	Prof. Pradeep Bhargava	(Civil Engineering)
28.	Prof. P.K. Garg	(Civil Engineering)
29.	Prof. R.D. Garg	(Civil Engineering)
30.	Prof. S.K. Ghosh	(Civil Engineering)
31.	Prof. B.R. Gurjar	(Civil Engineering)
32.	Prof. Kamal Jain	(Civil Engineering)
33.	Prof. C.S.P. Ojha	(Civil Engineering)
34.	Prof. M. Parida	(Civil Engineering)
35.	Prof. Rajat Rastogi	(Civil Engineering)
36.	Prof. Mahendra Singh	(Civil Engineering)
37.	Prof. N.K. Samadhiya	(Civil Engineering)
38.	Prof. Umesh Kumar Sharma	(Civil Engineering)
39.	Prof. Akhil Upadhyay	(Civil Engineering)
40.	Prof. Sugata Gangopadhyay	(Computer Science & Engineering)
41.	Prof. Durga Toshniwal	(Computer Science & Engineering)
42.	Prof. Pankaj Agarwal	(Earthquake Engineering)
43.	Prof. B.K. Maheshwari	(Earthquake Engineering)
44.	Prof. Manish Shrikhande	(Earthquake Engineering)
45.	Prof. Sunil Bajpai	(Earth Sciences)
46.	Prof. G.J. Chakrapani	(Earth Sciences)

11 JUN 2019

47. Prof. Mohd. Israil (Earth Sciences)
48. Prof. Anand Joshi (Earth Sciences)
49. Prof. R. Krishnamurthi (Earth Sciences)
50. Prof. A.K. Saraf (Earth Sciences)
51. Prof. A.K. Sen (Earth Sciences)
52. Prof. Sandeep Singh (Earth Sciences)
53. Prof. Biswarup Das (Electrical Engineering)
54. Prof. N.P. Padhy (Electrical Engineering)
55. Prof. G.N. Pillai (Electrical Engineering)
56. Prof. Sudeb Dasgupta (Electronics & Communication Engg.)
57. Prof. Debashish Ghosh (Electronics & Communication Engg.)
58. Prof. M.V. Kartikeyan (Electronics & Communication Engg.)
59. Prof. N.P. Pathak (Electronics & Communication Engg.)
60. Prof. Nagendra Kumar (Humanities & Social Sciences)
61. Prof. M.K. Jain (Hydrology)
62. Prof. S. Rangenekar (Management Studies)
63. Prof. Rama Bhargava (Mathematics)
64. Prof. Kusum Deep (Mathematics)
65. Prof. Sunita Gakkhar (Mathematics)
66. Prof. Tanuja Srivastava (Mathematics)
67. Prof. Navneet Arora (Mechanical & Industrial Engg.)
68. Prof. D.K. Dwivedi (Mechanical & Industrial Engg.)
69. Prof. B.K. Gandhi (Mechanical & Industrial Engg.)
70. Prof. S.P. Harsha (Mechanical & Industrial Engg.)
71. Prof. Dinesh Kumar (Mechanical & Industrial Engg.)
72. Prof. B.K. Mishra (Mechanical & Industrial Engg.)
73. Prof. Manish Mishra (Mechanical & Industrial Engg.)
74. Prof. K. Murugesan (Mechanical & Industrial Engg.)
75. Prof. P.M. Pathak (Mechanical & Industrial Engg.)
76. Prof. A.K. Sharma (Mechanical & Industrial Engg.)
77. Prof. G.P. Chaudhuri (Metallurgical & Materials Engg.)
78. Prof. S.K. Nath (Metallurgical & Materials Engg.)
79. Prof. Ujjwal Prakash (Metallurgical & Materials Engg.)
80. Prof. Anjan Sil (Metallurgical & Materials Engg.)
81. Prof. Y.S. Negi (Paper Technology)
82. Prof. S.C. Sharma (Paper Technology)
83. Prof. Aalok Misra (Physics)
84. Prof. Tashi Nautiyal (Physics)
85. Prof. Vipul Rastogi (Physics)
86. Prof. Rajesh Srivastava (Physics)
87. Prof. G.D. Varma (Physics)
88. Prof. K.L. Yadav (Physics)
89. Prof. M.L. Kansal (WRD&M)
90. Prof. Deepak Khare (WRD&M)
91. Prof. S.K. Mishra (WRD&M)
92. Prof. S.K. Singhal, Head, Hydro & Renewable Energy Department
93. Prof. R.K. Dutta, Head, Centre of Nanotechnology
94. Prof. M.K. Barua, Head, Department of Management Studies
95. Prof. P. Gopinath, ADOAA (Admission)
96. Prof. S.H. Upadhyay, ADOSW (Bhawans & Messes)

11 JUN 2019

97. Prof. P. Arumugam, Associate Dean (International Relations)
98. Dr. C. Jayakumar, Librarian

Students' representatives:

99. Ms. Priyanka Chaudhary (on behalf of Convener SAC)
100. Mr. Sarim Khan, General Secretary, Academic Affairs (UG)
101. Mr. Satish Jaiswal, General Secretary, Academic Affairs (PG)

102. Mr. Prashant Garg, Registrar & Secretary, Senate

Prof. Rajat Agarwal, Chairman, SCSP attended the meeting on invitation.

The Senate noted the communications received from the following members for their inability to attend the meeting:

1. Prof. Ramesh Chandra, Institute Instrumentation Centre
2. Prof. Bijan Choudhury, Department of Biotechnology
3. Prof. K.S. Hari Prasad, Department of Civil Engineering
4. Prof. B.S.S. Daniel, Department of Metallurgical & Materials Engg.
5. Prof. N. Sukavanam, Department of Mathematics

11 JUN 2019

Appendix A
Item No. Senate/78.4

Guidelines for evaluation of Int. M.Sc./M.Sc. Project

Credits: 12 **Stage-I:** 03 **Stage-II:** 09
Finalization of supervisor(s)* and broad area of project: one semester prior to stage-I evaluation
Finalization of title of project: at the time of submission of report.
Evaluation of Stage-I: 3 credits (25%) to be completed bythe time of grade finalization of Autumn semester.

****Evaluation of Stage-II:** 9 credits (75%) to be completed bythe time of grade finalization of Spring semester.

Evaluation Board: To be decided by the DAPC
Marks Distribution (out of 100): To be decided by the DAPC
Grading method: Absolute
In case a student has been awarded the F grade, he/she shall have to repeat the course in a regular semester.
*Co-supervisor can be taken from outside the department also.
**In the programs where the project is only in the final semester, 100% evaluation would be carried out in that semester.

11 JUN 2019

Appendix B'
Item No. Senate/78.4

Guidelines for evaluation of B.Tech. Project

Credits: 12 **Stage-I:** 04 **Stage-II:** 08
Finalization of supervisor(s)* and broad area of project: Latest by the start of 7th semester.
Finalization of title of project: Latest by Mid-Term Evaluation in Spring Semester
Evaluation of Stage-I: 4 credits to be completed by the time of grade finalization of Autumn semester.
Evaluation of Stage-II: 8 credits to be completed bythe time of grade finalization of Spring semester.
Evaluation Board: To be decided by the DAPC
Marks Distribution (out of 100): To be decided by the DAPC
Grading method: Absolute
In case a student has been awarded the F grade, he/she shall have to repeat the course in a regular semester.
*Co-supervisor can be taken from outside the department also.

11 JUN 2019

Appendix 'C'
Item No. Senate/78.5

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ACADEMIC CALENDER FOR THE YEAR 2019-20
(Autumn Semester)

S. No.	Details	Autumn Semester	
		Date	Day
1.	Reporting and Academic Registration of New PhD and Masters' students	12.07.2019	Friday
2.	Re-examination and Second examination (for Spring Semester 2018-19)	12.07.2019- 15.07.2019	Friday- Monday
3.	Academic Registration of existing students in the Departments/Centres	16.07.2019	Tuesday
4.	Commencement of Classes for existing students & new PG(including PhD) students	17.07.2019	Wednesday
5.	Reporting and Academic Registration of new UG (including IMT/IMS) students admitted through JEE (advanced)	20.07.2019	Saturday
6.	Last date for sending the grades of Re-examination	22.07.2019	Monday
7.	Commencement of Classes for new UG students admitted through JEE (advanced)	24.07.2019	Wednesday
8.	Last date for Academic Registration	01.08.2019	Thursday
9.	Last date for addition/deletion of courses	02.08.2019	Friday
10.	Mid Term Examination (MTE)	13.09.2019 14.09.2019 16.09.2019 17.09.2019	Friday Saturday Monday Tuesday
11.	Mid-Semester Break	18.09.2019- 22.09.2019	Wednesday- Sunday
12.	Last date for PhD defence for degree to be awarded in Convocation - 2019	23.09.2019	Monday
13.	Last date for showing MTE answer scripts	24.09.2019	Tuesday
14.	Last date for submission of remaining document(s) by new UG and PG(including PhD) students	30.09.2019	Monday
15.	Annual Convocation – 2019	First week of October (tentative)	
16.	Last date for withdrawal of courses	01.11.2019	Friday
17.	Notification to the students having short attendance up to 07.11.2019 by the Departments/Centres and to send the Final list to Academic Section	08.11.2019	Friday
18.	Last date for Teaching	08.11.2019	Friday
19.	End Term Examination (excluding Sunday & Holiday) (Practical examinations, if any, may be held during last few laboratory days)	13.11.2019- 23.11.2019	Wednesday- Saturday
20.	Last date for communicating marks of all the course components and showing End Term Examination Answer Scripts to students	29.11.2019	Friday
21.	Last date for evaluation of all Projects/ Dissertations/ Seminars	29.11.2019	Friday
22.	Winter vacation for students (except for M. Tech/ IDD final year and PhD students)	30.11.2019 01.01.2020	Saturday Wednesday
23.	Finalization & electronic communication of grades for all courses by the Departments	02.12.2019	Monday
24.	Last date for students to apply for grade modification	03.12.2019	Tuesday
25.	Last date for sending final grades (including grades of PhD) to Academic Section after modifications, if any	04.12.2019	Wednesday
26.	Last date for submission of progress report of the PhD students to Academic Section by the Departments/Centres	04.12.2019	Wednesday
27.	Period for availing vacation leave by faculty	05.12.2019- 01.01.2020	Thursday- Wednesday
28.	Re-examination and Second examination (for Autumn Semester 2019-20)	02.01.2020 04.01.2020	Thursday- Saturday

11 JUN 2019

Teaching days for Autumn Semester 2019-20 (w.e.f. 17.7.2019 to 08.11.2019)

Days	Months																						Less for MTE/Thomso	Total Teaching days PG(I-yr UG)
	July					August					September					October					Nov				
Mon	-	-	-	22	29		5	-	19	26	-	9	16	23	30		7	14	21	-		4	1	12 (11)
Tue	-	-	-	23	30		6	13	20	27	3	-	17	24		1	-	15	22	-		5	1	12 (11)
Wed	-	-	17	24	31		7	14	21	28	4	11	-	25		-	9	16	23	30*		6	-	15 (14)
Thu	-	-	18	25		1	8	-	22	29	5	12	-	26		3	10	17	24	31*		7	-	15(14)
Fri	-	-	19	26		2	9	16	23	30	6	13	-	27		4	11	18	25		1	8	2	14(13)
Sat	-	-	-	27†		-	10†	-	24†	-	-	14	-	28†		-	12†	-			-	-	1	5†
Total days	11(7)					20(22)					17(18)					19(20)					6(6)		5	68 (68)

*Time-table rescheduling (for all the classes)

30.10.2019 (Wednesday) – Monday Time Table
31.10.2019 (Thursday) – Tuesday Time Table

†The following Saturdays would be teaching days **only for I-year BTech/IDD/IMS/IMT/BArch**

27.07.2019 (Saturday) – Tuesday Time Table
10.08.2019 (Saturday) – Monday Time Table
24.08.2019 (Saturday) – Thursday Time Table
28.09.2019 (Saturday) – Friday Time Table
12.10.2019 (Saturday) – Monday Time Table

Details of days used in MTE and THOMSO

MTE (September 13,14,16,17, 2019) - 13.09.2019 - Friday
14.09.2019 - Saturday
16.09.2019 - Monday
17.09.2019 - Tuesday

THOMSO (October 18 – 20, 2019) - 18.10.2019 – Friday (Non-teaching day)

11 JUN 2019

List of Holidays

Id-Ul-Zuha (Bakrid)	12.08.2019	Monday
Independence Day	15.08.2019	Thursday
Ganesh Chaturthi	02.09.2019	Monday
Muharram*	10.09.2019	Tuesday
Mahatma Gandhi's Birthday	02.10.2019	Wednesday
Dashehra (Vijay Dashmi)	08.10.2019	Tuesday
Diwali (Dipawali)	27.10.2019	Sunday
Govardhan Puja	28.10.2019	Monday
Bhai Duj	29.10.2019	Tuesday
Milad-UlNabi or Id-E-Milad (Birthday of Prophet Mohammad)	10.11.2019	Sunday
Guru Nanak's Birthday	12.11.2019	Tuesday
Christmas Day	25.12.2019	Wednesday

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ACADEMIC CALENDAR FOR THE YEAR 2019-20
(Spring Semester)

S.No.	Details	Spring Semester	
		Date	Day
1.	Reporting and Academic Registration of new PhD students	26.12.2019	Thursday
2.	Academic Registration of existing students in the Departments/Centers	02.01.2020	Thursday
3.	Re- examination and Second examination (for Autumn Semester 2019-20)	02.01.2020-04.01.2020	Thursday - Saturday
4.	Commencement of Classes for all students	03.01.2020	Friday
5.	Online subject registration of new PhD students	07.01.2020-08.01.2020	Tuesday Wednesday
6.	Last date for sending the grades ofre-examination/second examination	13.01.2020	Monday
7.	Last date for Academic Registration	14.01.2020	Tuesday
8.	Last date for addition of courses	15.01.2020	Wednesday
9.	Last date for submission of remaining document(s) by new PhD students	17.02.2020	Monday
10.	Mid Term Examination (MTE)	04.03.2020-07.03.2020	Wednesday-Saturday
11.	Mid- Semester Break	09.03.2020-13.03.2020	Monday-Friday
12.	Last date for showing MTE answer scripts	16.03.2020	Monday
13.	Last date for withdrawal of courses	16.04.2020	Thursday
14.	Last date for evaluation of projects/seminars	20.04.2020	Monday
15.	Notification to the students having short attendance upto 20.04.2019 by Departments/Centres and to send the Final list to Academic Section	21.04.2020	Tuesday
16.	Last date of teaching	23.04.2020	Thursday
17.	End Term Examination (excluding Sunday & holidays) (Practical examinations, if any, may be held during last few laboratory days)	24.04.2020 04.05.2020	Friday Monday
18.	Last date for communicating marks of all the course components and showing End Term Examination Answer Scripts to students	09.05.2020	Saturday
19.	Summer Vacation for Students (except for MTech/IDD Final Year and PhD students)	09.05.2020 12.07.2020	Saturday – Sunday
20.	Finalization & electronic communication of grades by the Departments	11.05.2020	Monday
21.	Last date for students to apply for grade modification	14.05.2020	Thursday
22.	Last date for sending final grades (including grades of PhD)to Academic Section after incorporating modifications, if any	15.05.2020	Friday
23.	Last date for submission of progress reports of the PhD students to Academic Section by the Departments/Centres	15.05.2020	Friday
24.	Period for availing vacation leave by faculty	19.05.2020 12.07.2020	Tuesday Sunday
25.	Last date of evaluation & submission of grades for Final Year MTech/MArch/MURP/IDD/IMT Dissertation	26.06.2020	Friday
26.	Re-examination and Second examination (for Spring Semester 2019-20)	13.07.2020 15.07.2020	Monday - Wednesday

11 JUN 2019

Teaching days for Spring Semester 2019-20 (w.e.f. 03.01.2020 to 23.04.2020)

Days	January					February				March					April				Less for MTE/ CON/	Total Teaching days
Monday	-	6	13	20	27	3	10	17	24	2	-	16	23	30		6	13*	20		15
Tuesday	-	7	14	21	28	4	11	18	25	3	-	17	24	31		7	14*	21	1	14
Wednesday	-	8	15	22	29	5	12	19	26	4	-	18	25		1	8	15	22	1	14
Thursday	-	9	16	23	30	6	13	20	27	5	-	19	26		-	9	16	23	1	13
Friday	3	10	17	24	31	7	14	-	28	6	-	20	27		3	-	-		1	11
Saturday										7					5*				1	01
Total days	21					19				18					15				5	68

***Time-table rescheduling (for all the classes)**

05.04.2020 (Saturday) – Teaching day as per Friday Time Table
13.04.2020 (Monday) – Friday Time Table
14.04.2020 (Tuesday) – Non-teaching day

Details of teaching days used in MTE and COGNIZANCE

MTE (March4-7, 2020) - 04.03.2020 – Wednesday
05.03.2020 – Thursday
06.03.2020 – Friday
07.03.2020 – Saturday

COGNIZANCE (March 27 – 29, 2020) - 27.03.2020 – Friday (Non-teaching day)

11 JUN 2019

List of Holidays

Republic Day	26.01.2020	Sunday
Maha Shivratri	21.02.2020	Friday
Holi	10.03.2020	Tuesday
Ram Navami	02.04.2020	Thursday
Good Friday	10.04.2020	Friday
Mahavir Jayanti	17.04.2020	Friday
Budh Purnima	07.05.2020	Thursday
Id-ul-Fiter*	24.05.2020	Sunday

*Subject to change on visibility of moon

11 JUN 2019

Appendix D
Item No. Senate/78.6

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 willfinalize 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).

11 JUN 2019

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.

11 JUN 2019

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 ≤	A+	≤ 100
82 ≤	A	≤ 90
73 ≤	B+	≤ 81
64 ≤	B	≤ 72
55 ≤	C+	≤ 63
46 ≤	C	≤ 54
35 ≤	D	≤ 45
-	F	≤ 34

11 JUN 2019

PART-II PROCEDURES

R.1.0 Registration

a) New Students

All new students should report at the institute on the day as specified in the offer of admission, along with the documents specified therein.

New students, awaiting the results of the qualifying examination, will be allowed to register provisionally on the submission of an undertaking. In case a student registers after the last date of addition/deletion of courses, s/he cannot register for course credits in that semester. However, the duration for completing the candidacy requirements shall be counted from the date of admission to the Ph.D. programme.

b) Current Students

All current students are required to register every semester till they submit the thesis. The registration process involves:

- Filling a prescribed Course Detail Form (before candidacy)/Progress Report (after candidacy)
- Depositing prescribed fee and dues, if any.

If a student is likely to submit her/his thesis within two weeks from the date of registration, s/he need not register in that semester. If a student wishes to stay in the campus after submission of thesis, s/he will need to register. Students on authorized leave, may register through their thesis supervisor.

c) *Change of Registration from M Tech/IDD to Ph.D.*

Students pursuing M.Tech./M.Arch/ MURP/ IDD/ IMT programmes of IIT Roorkee with CGPA not less than 8.50 may opt for a lateral entry to the Ph.D. programme. This option can be availed after completing two semesters of M.Tech/M.Arch/MURP, or after completing all theory courses of IDD/IMT.

d) Change of Registration from Full-time to Part-time Programme

If a student wishes to join an organization, s/he can request for change of her/his status to part-time, provided that all requirements for candidacy have been completed. The Dean of Academic Affairs can approve the request on the recommendation of DRC/CRC.

(e) Change of Registration from Part-time to Full-time Programme

If a part-time student has secured an authorized leave for the intended duration of stay (not less than one semester) from her/his parent organization, s/he can request to change status from part-time to full-time.

11 JUN 2019

R.1.1 Joining Departments/Centres and constitution of SRC

The following process should be followed for initiating the Ph.D. programme:

a) All new candidates should report to the Head of department/centre. The departments/centres shall send the list of new candidates who have joined in a semester to the Academic Affairs office.

b) The thesis supervisor(s) (refer section A.5) shall propose the Student Research Committee (SRC) which shall comprise of three members and the supervisor(s). One of these three members shall be proposed as the Chairperson SRC. The proposed Chairperson SRC should havesupervised at least one Ph.D. at IIT Roorkee. The SRC membersmust have requisite expertise and may be drawn from any department, CFTI or from industry. Retired experts can also be considered. If required, the SRC meetings may be conducted through video conferencing.

c) Once SRC has been approved by the Head of Department/Centre, the SRC will recommend to the Chairperson DRC/CRC the courses which the candidate shall register for.The approvals of the Head, Chairperson DRC/CRC will be communicated to the Academic Affairs office for record.

d) If thesis supervisor is not assigned, the DRC/CRC shall prescribe the courses to be registered.

R.2.0 Supervisor

R.2.1 Thesis Supervisor

Every candidate shall have a thesis supervisor from the institute. The supervisor can be:

i) Any full time faculty member holding Ph.D. degree with minimum 3 years of service remaining.

ii) Visiting faculty/Emeritus Fellow/Scientific Officer/ full-time faculty member with less than 3 years of service remaining, holding Ph.D. degree, can supervise a Ph.D. student jointly with a faculty member as defined in (i) above.

iii) Co-supervisor can be from outside the institute, if recommended by the DRC/CRC.

iv) There can be at most three supervisors with not more than one from outside the institute.

The DRC/CRC may evolve specialization-wise guidelines for assigning thesis supervisors to candidates with institute assistantship. There will not be any limit on the number of research scholars which can be concurrently supervised by a faculty member subject to the condition that the research scholars with institute assistantship can be at most eight (solo and joint supervision included).

R.2.2 Addition of a Supervisor

Addition of a supervisor may be approved by the Head of Department/Centre on the recommendation of the SRC. A co-supervisor will be added if the sole supervisor of a student ends his/her formal association with the institute. If a sole supervisor proceeds on leave, the Chairperson SRC will assume the administrative role of the supervisor.

R.2.3 Request for change of supervisor by a research student

The DRC/CRC can consider the request for a change of supervisor, with the consent of the current supervisor and the proposed supervisor. In case this consent is not forthcoming, the issue may be referred to a three-member committee comprising of the Head of Department/Centre, Chairperson DRC/CRC and Chairperson SRC. The committee shall make every effort to salvage the academic programme of the student while ensuring due credits to the current supervisor in publications, patents and thesis. The Head will send the name of new supervisor to the DoAA for record.

R.3 Course Credit Requirements

R.3.1 Minimum CGPA and Probation

Candidates shall register for all the courses recommended by the SRC and earn a minimum of 7.00 CGPA. Technical Communication, Communication skills, Language course and Project shall not be counted towards the minimum course credits and the calculation of CGPA. The candidate should secure an AP grade for an audit course.

A candidate with less than 7.00 CGPA shall be allowed to take up more courses in the following semester while keeping the maximum duration for completing candidacy requirements unchanged. The CGPA will be calculated using the best possible combination of courses meeting the minimum credit requirements.

R.3.2 Relaxation in Course Credit Requirement

Candidates with extra course credits in qualifying degree, or relevant experience post qualifying degree as enumerated below can request for relaxation in course credits. The SRC may recommend such requests for the consideration of the DoAA. In no case shall the reduced credits requirements be less than the credits requirements as stated for candidates admitted with M.Tech./M.Arch./MURP degree.

R.3.2.1 B.Tech. with Minor Specialisation / Honours Courses

Relaxation in course credit requirements, up to a maximum of 12 credits, may be considered for candidates who have completed B.Tech. degree with Minor specialisation / Honours departmental courses. The SRC should examine the courses claimed as extra P.G. level credits with respect to the contact hours and content. Minimum theory courses to be taken up by a candidate shall be as specified for candidates with M.Tech. degree.

R.3.2.2 Master's Degree

Relaxation in course work requirement may be considered if a candidate registers in Ph.D. programme within two years from the completion of respective Master's degree.

a. Candidates who have completed the M.Tech. / IDD / M.Sc. / M.Arch. / MURP / MBA / IMS / IMT programme from IIT Roorkee can request for relaxation of a maximum of 9 P.G. level credits earned during those programmes (other than project, dissertation and labs) towards fulfilment of his/her course requirement for the Ph.D. programme on the recommendation of the SRC and approval of the DoAA, provided these credits

11 JUN 2019

were in excess of the minimum requirement for earning the said degree.

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

R.3.2.3 Admitted with Professional Experience

Course credit requirements can be completed in the form of project/dissertation/ seminar/NPTEL courses. There is no minimum residency requirement for such candidates.

R.3.3 Course Credit Requirements

Minimum course credit requirementsare given in Table 1 below:

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

S No	Qualification	Credit requirements	Remarks
1	M. Tech., M. Arch./MURP, or equivalent	Minimum 9 credits of P.G. level theory courses or 3 P.G. level courses	a. All candidates need to register 2 additional creditsfor seminar. b. Candidates can take at most one self-study theory course / NPTEL course of P.G. level as approved by DAPC.
2	M.Sc/M.A./M.B.A.or equivalent, admitted to Science/ HSS/ Management department	Minimum 12 credits of P.G. level theory courses or 4 P.G. level courses	
3	B.Tech. or equivalent, or M.Sc. or equivalent, admitted to any one of the engineering departments/centres	Minimum 24 credits of P.G. level theory courses or 8 PG level courses	

Note: Online course can be taken in lieu of a course without laboratory work.

R.4 Candidacy for Ph.D.

Once a candidate completes the required course and seminar credits with a CGPA of at least 7.00, s/he shall be admitted to candidacy for Ph.D. after s/he clears a comprehensive examination and her/his research proposal is accepted by the SRC. The comprehensive examination is designed to test the comprehension of student in the broad subject area of research. The syllabus for comprehensive examination shall be defined by the SRC. Departments/Centres shall have clearly defined procedure regarding the format and evaluation of the comprehensive examination in respective specializations. Candidate can avail up to a maximum of two attempts to clear the comprehensive examination. The report on the candidacy will be communicated by the SRC to the DoAA for consideration.

The maximum duration for completing candidacy requirements shall be as follows:

(a) For candidate with M.Tech./M.Arch./MURP or equivalent degree and M.Sc./M.A./ M.B.A. or equivalent admitted to Science /HSS/ Management department: 18 months.

11 JUN 2019

(b)For candidate with B.Tech./M.Sc. or equivalent admitted to Engineering discipline: 24 months.

In case a candidateis unable to complete the candidacy requirement within the stipulated period, a three months extension can be given by DoAA and a further three months extension may be given by IRC.

R.5 Performance Monitoring

All full-time and part-time Ph.D. candidates (students who have completed candidacy requirements) shall register every semester for 12 credits (6 units), or 8 credits (4 units) respectively of thesis work to be evaluated by the thesis supervisor(s). For each unit, the grade earned shall be either [S]atisfactory/[U]nstisfactory. A warning will be issued to a student as soon as s/he accumulates 6 unit U grades. If a student accumulates 12 unit U grades, then her/his programme will be terminated.

Ph.D. student shall submit a progress report and deliver a seminar once every year. The report should include the work done so far and highlight the progress made in the one year period since the last seminar. The SRC shall record its evaluation of the progress and communicate it to the Academic Affairs office. Half-Yearly progress reports will be considered by the SRC without any presentation by the student.

R.6 Submission of Thesis

The minimum duration and the publications required for thesis submission shall be as per the rules in force at the time of admission.

For the addition of a co-supervisor in a thesis, his/her period of association with the thesis should be at least 18 months.

R.6.1 Minimum Duration for Thesis Submission

The minimum working period for the submission of thesis is two years from the date of candidacy. For part-time students the minimum working period shall be 3 years from the date of candidacy.

R.6.2 Maximum Duration for Thesis Submission

The maximum period for the submission of thesis shall be five years from the date of initial registration for full-time students and six years from the date of initial registration for part-time students. If a student has converted his/her status from full-time to part-time before the expiry of five years, the maximum duration for thesis submission shall be as per a part-time student.

The DoAA may extend this limit by six months on the recommendation of SRC. Further extension by six months may be considered by the IRC.

The supervisor(s)shall convene a meeting of the SRC when the research work is complete, the student has earned at least 24 units S thesis grades and a draft of the thesis is ready. At this stage, it is expected that the student has already published (or, accepted for publication) at least two papers out of which at least one paper should be in a peer reviewed journal of repute, or in some select disciplines it could be in the proceedings of an

11 JUN 2019

international conference of repute as endorsed by the SRC. If the SRC deems fit, it may recommend submission of thesis even in the absence of required publications. However, such cases shall be reported to the Senate.

The student shall submit a draft copy of the thesis to the SRC members at least 7 days prior to the scheduled meeting. The student will present his/her research work to the SRC and if the SRC approves it for submission, it will send its recommendation to the DoAA along with a list of potential examiners. The supervisor may check their availability before the SRC meeting. The examiners on the panel should be established researchers from all over the world.

The student should submit the thesis within four months of the SRC meeting.

R.7 Evaluation and Defence of Thesis

The thesis shall be sent to three examiners for evaluation and the student shall be asked to defend his/her thesis in front of the Oral Defense Committee (ODC), if any two out of three examiners recommend acceptance of the thesis. The ODC shall consist of the Head of Department/Centre (or nominee), Chairperson SRC, the external examiner and supervisor(s). Before the thesis defence, the student shall consider the comments of the examiners and submit a detailed response for the consideration of the ODC. In case major revisions are required, the revised thesis should be submitted within one year. The ODC shall communicate its recommendations to the DoAA.

The external examiner can participate in the viva-voce examination through a digital communication medium with the prior approval of the DoAA.

Evaluation of a thesis shall be as per the rules in force at the time of submission of the thesis.

R.8 Leave, Assistantship and Withdrawal

R.8.1 Leave Rules

A full-time student should be present in the campus except when on authorized leave. S/he will be entitled to casual leave for 8 days, vacation leave for 15 days and 15 days leave on medical grounds, per year. Once during the entire programme, the Head of Department/Centre may sanction, on the recommendation of the thesis supervisor, additional leave of maximum 15 days. A student is entitled to Assistantship/Fellowship for the sanctioned leave period including periods of maternity leave (180 days) and paternity leave (15 days).

Duty leave up to a maximum of one year in the entire duration of the programme may be granted by the Head of Department/Centre for field trips, to visit other institutions, and to present paper(s) in Seminars/ Conferences/ Workshops. Requests for duty leave for more than one year will be considered by the IRC.

R.8.2 Assistantship

Assistantship/Fellowship shall be released on the recommendation of the supervisor and Head of Department/Centre.

11 JUN 2019

R.8.3 Withdrawal from Semester

A student can seek withdrawal from a semester on medical grounds, or under exceptional conditions beyond her/his control. Request on medical ground shall be supported by documents issued by the institute hospital, or issued by a certified medical practitioner and vetted by the institute Chief Medical Officer. Such requests shall be considered by the DoAA.

In case a student wishes to temporarily withdraw from her/his Ph.D. Programme, s/he may do so only after candidacy, on the recommendation of SRC and approval of the DoAA. Temporary withdrawal may be granted for up to one year (two semesters). Further extensions may be considered by the IRC.

The period of temporary withdrawal will not be counted, when counting the number of semesters completed by the student in the programme.

R.9 Cancellation of Registration

Registration of a student may be cancelled if:

- (S)he is found to have falsified any document at any point of time;
- (S)he fails to register in a semester;
- (S)he fails to meet the minimum required academic performance;
- (S)he is found to be involved in a major act of misconduct.

11 JUN 2019

Third Senate approved PDC List

Sl. No.	Name	Deptt.	Topic	Supervisor	Examiner (For./Ind.)	PDC Date
1	Mr. Ali Abbas	AHEC	INVESTIGATIONS OF PARAMETERS AFFECTING DRAFT TUBE PERFORMANCE	Prof. Arun Kumar	Prof. T. Staubli, Hochschule Luzern, Switzerland Prof. Dhiman Chatterjee, IIT Madras Prof. Vishnu, MANIT Bhopal	15.01.19
2	Ms. Harshit Sosan Lakra	AR	INDIGENOUS COMMUNITIES' PERCEPTION OF ASSOCIATION WITH A PLACE, CULTURAL CAPITAL AND ENABLING ENVIRONMENT IN AN URBAN CONTEXT	Prof. Pushplata	Prof. Sandeep Agrawal, Univ. of Alberta, Canada Prof. Mahavir, School of Planning & Arch., Delhi Prof. Kujur Joseph Marianus, Ranchi	06.03.19
3	Ms. Pooja Kesari	BT	STRUCTURAL AND FUNCTIONAL STUDIES OF PLANT PROTEINS	Prof. Pravindra Kumar	Prof. Christian Betzel, Hamburg Univ., Germany Prof. Amit Kumar Das, IIT Kharagpur Prof. Renu Deswal, Delhi University, Delhi	16.02.19
4	Mr. Atin Sharma	BT	STUDIES ON PHYSIOLOGICAL IMPORTANCE OF HFQ AND SRNA TARGETS IN *ACINETOBACTER BAUMANNII*	Prof. Ranjana Pathania	Prof. Ayush Kumar, Manitoba University, Canada Prof. Anirban Banerjee, IIT Bombay Prof. D. Chakravortty, IISc Bangalore	11.02.19
5	Mr. Harvijay Singh	BT	STUDIES ON ALPHAVIRUS CYSTEINE PROTEASE FOR ANTIVIRAL DRUG DISCOVERY	Prof. Shally Tomar	Prof. Richard J. Kuhn, Purdue University, USA Prof. M.R.N. Murty, IISc Bangalore Prof. Punit Kaur, AIIMS New Delhi	10.01.19
6	Ms. Anju Kumari	BT	FUNCTIONALIZED MEMBRANE WITH LIPID BILAYER FOR IMMOBILIZED ENZYMATIC SYSTEMS	Prof. Saurav Datta	Prof. Manish Kumar, Park University, USA Prof. G. Pugazhenthi, IIT Guwahati Prof. Anupam Shukla, IIT Delhi	23.01.19
7	Ms. Gunjan Saini	BT	STUDIES ON SOLUTE BINDING PROTEINS FROM *CANDIDATUS* LIBERIBACTER ASIATICUS	Prof. A. K. Sharma	Prof. M. Narayan, Texas University, USA Prof. Punit Kaur, AIIMS New Delhi	15.01.19
8	Mr. Bhanendra Singh	BT	BIODETOXIFICATION OF LIGNOCELLULOSIC HYDROLYSATE LIQUOR TO IMPROVE BIOFUEL PRODUCTION	Prof. Saurav Datta	Prof. Seth W. Snyder, Northwestern Univ., USA Prof. Rintu Banerjee, IIT Kharagpur	08.03.19
9	Mr. Rajat Mudgal	BT	STUDIES OF SUBSTRATE-BASED INHIBITORS TARGETING NON-STRUCTURAL PROTEINS OF ALPHAVIRUSES	Prof. Shailly Tomar	Prof. Richard W. Hardy, Indiana Univ., USA Prof. Manidipa Banerjee, IIT Delhi Prof. Savita Yadav, AIIMS New Delhi	22.03.19
10	Ms. Archana Mishra	BT	BIOETHANOL PRODUCTION BY FRACTIONAL HYDROLYSIS AND CO-CULTURE FERMENTATION	Prof. Sanjoy Ghosh	Prof. Abdel Ghaly, Nova Scotia, Canada Prof. Latha Rangan, IIT Guwahati	27.03.19
11	Mr. Bandaru Venkata Ramanaiah	CH	ENERGY CONSERVATION IN COAL BASED SPONGE IRON CLUSTER USING	Prof. Shabina Khanam	Prof. T. Mojozi, Wits University, RSA Prof. S. Bandyopadhyay, IIT Bombay	08.01.19

			TOTAL SITE INTEGRATION		Prof. Ramagopal Uppaluri, IIT Guwahati	
12	Ms. Iram Parveen	CY	SYNTHESIS AND BIOLOGICAL APPLICATIONS OF FLAVONOID BASED NATURAL PRODUCTS	Prof. Naseem Ahmed	Prof. Mushfiquddin Khan, Medical University,USA Prof. M. Ravikanth, IIT Bombay Prof. Faiz Ahmed Khan, IIT Hyderabad	20.02.19
13	Mr. Nishant Gautam	CY	ENERGY STORAGE MATERIALS: NEW TRANSITION METAL OXIDES, OXY-FLUORIDES AND PHOSPHATES	Prof. T. K. Mandal	Prof. Y. Shirley Meng, California University, USA Prof. U. V. Varadaraju, IIT Madras Prof. N. Munichandraiah, IISc Bangalore	11.02.19
14	Ms. Manju Bala	CY	STUDIES ON NEW RUTHENIUM COMPLEXES AND THEIR REACTIVITIES	Prof. Kaushik Ghosh	Prof. Dixneuf Pierre H., CNRS University, France Prof. Sabuj K. Kundu, IIT Kanpur Prof. G. K. Lahiri, IIT Bombay	07.03.19
15	Mr. Shray Pathak	CE	MULTI-CRITERIA DECISION ANALYSIS FOR IDENTIFYING STORMWATER HARVESTING SITES	Prof. R. D. Garg Prof. C. S. P. Ojha	Prof. V. Lakshmi, South Carolina Univ., Columbia Prof. Onkar Dikshit, IIT Kanpur	31.01.19
16	Ms. Murkonda Pavani	CE	ANALYSIS OF PLATES ON REINFORCED EARTH BEDS	Prof. Priti Maheshwari	Prof. Braja M. Das, State University, USA Prof. Gali Madhavi Latha, IISc Bangalore Prof. Sarvesh Chandra, IIT Kanpur	31.01.19
17	Mr. Pradeep Kumar	CE	PAVEMENT SURFACE CONDITION EVALUATION AND CLASSIFICATION USING GEOSPATIAL TOOLS	Prof. P. K. Garg Prof. M. Parida	Prof. M. Kappas, GIS Remote Sensing, Germany Prof. Rajan Choudhary, IIT Guwahati Dr. Sameer Saran, IIRS Dehradun	18.03.19
18	Mr. Vimal Kumar	CE	BEHAVIOUR OF PRESTRESSED CONCRETE SLABS UNDER IMPACT LOADING	Prof. M. A. Iqbal Prof. A. K. Mittal	Prof. Norman Jones, University of Liverpool, UK Prof. P. Venkitanarayan, IIT Kanpur Prof. R. Velmurugan, IIT Madras	18.03.19
19	Ms. Swati Bhave	CE	EXPERIMENTAL STUDY ON HYDRAULICS OF BOTTOM RACKS WITH T-SHAPE BARS	Prof. A. Ahmad	Prof. Stefano Lanzoni, Univerrsita di Padova, Italy Prof. Deo Raj Kaushal, IIT Delhi Prof. Rajesh Srivastava, IIT Kanpur	08.03.19
20	Ms. Sonali Bhowmik	CE	ANALYTICAL AND EXPERIMENTAL INVESTIGATIONS ON CONCRETE MEMBERS UNDER FATIGUE LOADING	Prof. Sonalisa Ray	Prof. J. Saliba, Universite de Bordeaux, France Prof. K. Darunkumar Singh, IIT Guwahati	14.03.19
21	Mr. Aditya Singh Rajput	CE	SEISMIC EVALUATION AND UPGRADATION OF CORRODED CONFINED REINFORCED CONCRETE COLUMNS	Prof. Umesh K. Sharma	Prof. ILdiko Mert, Institute Mat. Tech., Austria Prof. Yogesh M. Desai, IIT Bombay	25.03.19
22	Mr. Rajkumar Saini	CSE	EXPLOITING LOCAL INFORMATION FOR TRAJECTORYCLASSIFICATION UNDER SURVEILLANCE	Prof. Partha Pratim Roy	Prof. K.C. Santosh, South Dakota University, USA Prof. Phalguni Gupta, IIT Kanpur	31.01.19
23	Ms. Shivani Sharma	CSE	PRIVACY PRESERVING SENSITIVE PATTERN HIDING TECHNIQUES FOR BIG DATA	Prof. Durga Toshniwal	Prof. Imre J. Rudas, Obuda University, Hungary Prof. S. K. Rath, NIT Rourkela	24.01.19
24	Mr. Shivesh Tripathi	CTRN	DESIGN, ANALYSIS AND CHARACTERIZATION OF BASIC	Prof. M. Parida Prof. N. P. Pathak	Prof. Sagar Naik, Waterloo University, Canada Prof. Akhilesh Mohan, IIT Kharagpur	30.01.19

			BUILDING BLOCKS OF SOFTWARE DEFINED RADIO BASED INTELLIGENT TRANSPORT SYSTEMS FOR 5 G AND BEYOND			
25	Ms. Rimpi Dhiman	ES	**U-Pb GEOCHRONOLOGICAL AND GEOCHEMICAL EVOLUTION OF DHAULADHAR AND DALHOUSIE GRANITES OF HIMACHAL HIMALAYAS**	Prof. Sandeep Singh	Prof. M. Leech, San Francisco State Univ., USA Prof. Mallickarjun Joshi, IIT Varanasi Prof. C. S. Dubey, University of Delhi, Delhi	14.03.19
26	Ms. Vaneeta Devi	EQ	**FREQUENCY PATTERN ANALYSES OF GROUND MOTION HISTORY**	Prof. M. L. Sharma	Prof. Mario Ordaz, Nacional Autonoma Univ., Mexico Prof. T. G. Sitharam, IISc Bangalore Prof. S. S. Teotia, Kurukshetra Univ., Kuruksetra	01.01.19
27	Mr. Bhavesh Pandey	EQ	**SITE CHARACTERIZATION AND ATTENUATION STUDIES FOR NORTHERN INDIA**	Prof. R. S. Jakka	Prof. Chun-Hsiang Kuo, NCREE, Taiwan Prof. T. G. Sitharam, IISc Bangalore	01.01.19
28	Mr. Gaurav Kumar	EQ	**DEVELOPMENT AND OPTIMIZATION OF CONTROLLERS FOR MITIGATION OF SEISMIC VIBRATIONS**	Prof. R. S. Jakka Prof. Ashok Kumar	Prof. S. M. Yang, National Cheng Kung Univ., Taiwan Prof. R. S. Jangid, IIT Bombay	16.02.19
29	Mr. Amit Goyal	EQ	**SEISMIC EVALUATION OF BLOCK MASONRY INTERLINKED WITH VISCOELASTIC LINK ELEMENTS**	Prof. Pankaj Agarwal	Prof. Paolo Morandi, E.C.T.R.E.E., Italy Prof. Durgesh C. Rai, IIT Kanpur	21.02.19
30	Mr. Neeraj Kumar	EQ	**DYNAMIC SITE-CITY-INTERACTION ANALYSIS OF STRUCTURES INURBAN ENVIRONMENT**	Prof. J. P. Narayan	Prof. H. Fujiwara, NRIESDR, Japan Prof. P. N. Singha Roy, IIT Kharagpur Prof. P. K. Khan, IIT (ISM) Dhanbad	21.02.19
31	Mr. Dhiraj Raj	EQ	**SEISMIC BEHAVIOUR OF FOUNDATIONS AND BUILDINGS ON SLOPES**	Prof. Yogendra Singh	Prof. Behzad Fatahi, University of Tech.,Australia Prof. Jyant Kumar, IISc Bangalore	11.02.19
32	Mr. Santosh K. Singh	EE	**PERFORMANCE ANALYSIS OF UPS INVERTERS SYSTEMS**	Prof. S. G. Choudhuri	Prof. Ambrish Chandra, ETS Canada Prof. Bhim Singh, IIT Delhi Prof. H. M. Suryawanshi, VNIT Nagapur	07.03.19
33	Mr. Yogesh K. Sariya	EE	**FUNCTIONAL NETWORK CONNECTIVITY ANALYSIS OF HUMAN BRAIN**	Prof. R. S. Anand	Prof. Lucina Q. Uddin, University of Miami, USA Prof. Vikram M. Gadre, IIT Bombay Prof. B. Thomas, Medical College, Kerala	25.03.19
34	Mr. Dinesh	E&CE	**IMAGE FORENSICS BASED ON JPEG COMPRESSION ARTIFACTS**	Prof. Vinod Pankajakshan	Prof. Mauro Barni, Siena University, Italy Prof. Prabin Kumar Bora, IIT Guwahati Prof. Umapada Pal, ISI Kolkata	03.01.19
35	Ms. Neetu Joshi	E&CE	**GRAPHENE BASED PLASMONIC INTEGRATED CIRCUITS FOR TERAHERTZ APPLICATIONS**	Prof. N. P. Pathak	Prof. Berardi Sensale Rodriguez, Utah Univ., USA Prof. K. J. Vinoy, IISc Bangalore Dr. Akhilesh Jain, RRCAT Indore	12.02.19
36	Mr. Zahir Ahmed Ansari	E&CE	**Robust Algorithms for online visual tracking systems**	Prof. M. J. Nigam	Prof. Tsu-Chin (T-c) Tsao, HSSEAS, USA Prof. S. K. Nagar, IIT (BHU) Varanasi	23.02.19

11 JUN 2019

37	Mr. Virnce Vimal	E&CE	**NOVEL ALGORITHMS FOR IMPROVING LIFE TIME AND TAKELING LINK RUPTURE IN WIRELESS NETWORKS**	Prof. M. J. Nigam	Prof. Vivek Jain, Res. & Tech. Centre, USA Prof. Vimal Bhatia, IIT Indore Prof. Neetesh Purohit, IIIT Allahabad	12.03.19
38	Ms. Sasmita Dash	E&CE	**DESIGN AND ANALYSIS OF GRAPHENE PLASMONIC ANTENNAS FOR TERAHERTZ APPLICATION**	Prof. A. Patnaik	Prof. Arokiaswami Alphones, NTU Singapore Prof. S. A. Ramakrishna, IIT Kanpur Prof. K. J. Vinoy, IISc Bangalore	28.01.19
39	Mr. Praveen Jaraut	E&CE	**DIGITAL PREDISTORTION LINEARIZATION FOR MULTI-BAND/MULTI-CHANNEL SOFTWARE DEFINED TRANSMITTERS**	Prof. Meenakshi Rawat	Prof. D. Schreurs, Kasteelpark Arenberg, Belgium Prof. Manav Bhatnagar, IIT Delhi	06.03.19
40	Ms. Meenakshi Awasthi	E&CE	**ENERGY EFFICIENT COOPERATIVE SPECTRUM SENSING IN COGNITIVE RADIO NETWORKS**	Prof. Vijay Kumar Prof. M. J. Nigam	Prof. J.Ben Othman, University of Paris 13,France Prof. Vimal Bhatia, IIT Indore Prof. Prabhat K. Upadhyay, IIT Indore	12.03.19
41	Ms. Mandakini	HSS	**CRITICAL ANALYSIS OF WOMEN'S DEPICTION IN MODERN INDIAN PAINTINGS**	Prof. Ila Gupta Prof. P. Jha	Prof. Subhash Kak, USA Prof. Anupama Sharma, MANIT Bhopal Prof. Santosh Kumar Misra, PMCA Odisha	16.02.19
42	Mr. Ashwini Kumar	HSS	**LATERALITY AND COGNITIVE INTERFERENCE IN STROOP LIKE TASKS AMONG RIGHT AND NON-RIGHT HANDERS**	Prof. R. M. Singh Prof. Indiwar Misra	Prof. Fernand Gobet, Liverpool University, UK Prof. H. S. Asthana, IIT (BHU) Varanasi Prof. Nandita Babu, DU Delhi	16.02.19
43	Mr. Akarsh Arora	HSS	**MEASURING POVERTY IN UTTAR PRADESH, INDIA: FROM UNIDIMENSIONAL TO MULTIDIMENSIONAL APPROACH**	Prof. S. P. Singh	Prof. Nanak Kakwani, Univ. of New South Wales, Australia Prof. Pushpa Trivedi, IIT Bombay	22.03.19
44	Ms. Hansika Singhal	HSS	**PSYCHOLOGICAL CAPITAL AS A PREDICTOR OF SUBJECTIVE WELL-BEING AND CAREER COMMITMENT**	Prof. Renu Rastogi	Prof. Tojo Thatchenkery, George Mason Univ.,USA Prof. Meenakshi Gupta, IIT Bombay	28.03.19
45	Ms. Kumari Soni	HSS	**IMPACT OF PSYCAPON EMPLOYEE ENGAGEMENT & ORGANIZATIONAL EFFECTIVENESS**	Prof. Renu Rastogi	Prof. Bahaudin G.Mujtaba, Nova Southeastern Univ.,USA Prof. Pooja Purang, IIT Bombay Prof. Nachiketa Tripathi, IIT Guwahati	21.02.19
46	Mr. Vikram Kumar	HY	**HYDROLOGICAL RESPONSE OF AN EXPERIMENTAL WATERSHED OF LESSER HIMALAYA**	Prof. Sumit Sen	Prof. Harry Dixon, Centre Ecology & Hydology,UK Prof. Prabhat K. Singh Dikshit, IIT Varanasi	14.03.19
47	Ms. Jyoti Jaiswal	IIC	**STUDIES ON OPTICAL PROPERTIES OF SPUTTER-DEPOSITED NANOSTRUCTURED THIN FILMS**	Prof. Ramesh Chandra	Prof. Yogendra K. Mishra, Kiel University, Germany Prof. Parinda Vasa, IIT Bombay	24.01.19
48	Mr. Himanshu Gupta	MS	**ANALYSIS AND DESIGN OF A FRAMEWORK FOR GREEN INNOVATION IMPLEMENTATION IN SMEs**	Prof. M. K. Barua	Prof. Charbel J. Chiappetta Jobbour, MBS France Prof. B. K. Mohanty, IIM Lucknow	21.02.19

11 JUN 2019

49	Mr. Shashi Kant	MS	**A STUDY OF ORGANIZATIONAL EVIDENCES OF GANDHIAN MANAGEMENT PERSPECTIVE WITH SPECIAL REFERENCE TO BHEL**	Prof. Vinay Sharma	Prof. Siva Prasad Ravi, Nipissing Univ., Canada Prof. Sujoy Bhattacharya, IIT Kharagpur	08.03.19
50	Mr. Sumit Mishra	MS	**VALUE REALIZATION IN MARKETING THEORY: AN ANCIENT INDIAN PERSPECTIVE**	Prof. Vinay Sharma	Prof. S. Bruce Thomson, Federation Univ. Australia Prof. Devashish Das Gupta, IIM Lucknow Prof. Sanjeev Prashar, IIM Raipur	22.03.19
51	Ms. Anamika Singh	MS	**DETERMINANTS OF LIQUIDIFY IN INDIAN COMMERCIAL EVALUATION BANKS: AN FLMPIRICAL EVALUATION**	Prof. A. K. Sharma	Prof. Hafez Abdo, Sheffield Hallam University, UK Prof. B. V. Phani, IIT Kanpur Prof. Surendra S. Yadav, IIT Delhi	29.03.19
52	Mr. Chirra Sricharan	MIE	**SCF STUDY UNDER SALES PROMOTIONS IN AN AUTOMOBILE INDUSTRY**	Prof. Dinesh Kumar	Prof. Nachiappan Subramanian, Sussex Univ.,UK Prof. Sushil, IIT Delhi Prof. A. Subash Babu, IIT Bombay	01.01.19
53	Mr. Satish Kumar	MIE	**ACTIVE DYNAMIC ANALYSIS AND CONTROL OF SPACE BASED ADAPTIVE MEMBRANE STRUCTURES**	Prof. S. H. Upadhyay	Prof. D. Dane Quinn, Akron University, USA Prof. Satish Chandra Jain, IIT Mandi Dr. B. S. Manjul, ISRO Ahmedabad	08.02.19
54	Mr. Gaurav Sharma	MIE	**STUDIES ON METALLURGICAL AND MECHANICAL BEHAVIOR OF DIFFUSION BONDED STEEL JOINTS**	Prof. D. K. Dwivedi	Prof. Dulce Rodrigues, Coimbra Univ., Portugal Prof. Amitava De, IIT Bombay Prof. S. Aravindan, IIT Delhi	31.01.19
55	Mr. V. M. Suntharavel Muthaiah	MME	**THERMAL STABILITY AND MECHANICAL PROPERTIES OF FE-CR NANOSTRUCTURES PREPARED BY MECHANICAL ALLOYING FOLLOWED BY SPARK PLASMA SINTERING**	Prof. Suhrit Mula	Prof. Pratik Kumar Ray, Lowa State University, USA Prof. B. S. Murty, IIT Madras Prof. R. Jayaganthan, IIT Madras	16.02.19
56	Mr. Shailesh Kumar Chaurasia	MME	**MECHANICAL AND TRIBOLOGICAL PROPERTIES OF POWDER FORGED Fe-P ALLOYS**	Prof. Ujjwal Prakash	Prof. Margaret M. Stack, Strathclyde University, UK Prof. M. Kamaraj, IIT Madras Prof. Harpreet Singh, IIT Ropar	11.02.19
57	Mr. Umesh Chandra Bind	NT	**ION IMPLANTATION AND CHEMICAL MODIFICATION OF CuO NANOPARTICLES AND THEIR ELECTROCHEMICAL APPLICATIONS**	Prof. R. K. Dutta	Prof. Yasuaki Einaga, Keio University, Japan Prof. Raghunath Acharya, BARC Mumbai	04.01.19
58	Ms. Pallavi Gupta	NT	**FUNCTIONALIZED POLYMERIC SCAFFOLDS FOR NEURAL TISSUE ENGINEERING**	Prof. S. K. Nath Prof. Debrupa Lahiri	Prof. S. Venkatraman, NTU Singapore Prof. Ashok Kumar, IIT Kanpur Prof. Kaushik Chatterjee, IISc Bangalore	26.02.19
59	Ms. Swati	PH	**ROLE OF ISOPIN IN HEAVY AND NEUTRON-RICH NUCLEI**	Prof. P. Van Isacker	Prof. P. Van Isacker, GANIL France Prof. A. Shrivastava, BARC Mumbai Prof. Rudrajyoti Palit, TIFR Mumbai	01.01.19
60	Mr. Gaurav Bharti	PH	**RESPONSE OF NEUTRAL ATMOSPHERE ANDIONOSPHERE TO VARIOUS GEOPHYSICAL CONDITIONS**	Prof. M. V. Sunil Krishna	Prof. Gordon G. Shepherd, York Univ., Canada Dr. Gurbax S. Kaljina, IIG Mumbai Dr. S. Sridharan, NARL Tiruptai	12.03.19

11 JUN 2019

61	Mr. Madhab Bera	PPE	**STRUCTURE-PROPERTY RELATIONSHIPS IN GRAPHENE BASED POLYMER NANOCOMPOSITES**	Prof. P. K. Maji	Prof. Suprakas Sinha Ray, DST-CSIR, South Africa Prof. Arup R. Bhattacharyya, IIT Bombay Prof. Niranjan Karak, Tezpur Univ., Sonitpur	02.02.19
62	Mr. Sauraj	PPE	**SYNTHESIS AND BIOEVALUALTION OF XYLAN BASED PRODRUGS FOR COLON CANCER TREATMENT**	Prof. Y. S. Negi	Prof. Thomas Heinze, Friedrich Schiller Univ., Gerrmany Prof. Veena Koul, IIT Delhi Prof. Veena Choudhary, IIT Delhi	13.03.19
63	Mr. Sandeep Shukla	WRD	**SNOWPACK ESTIMATION AND ITS IMPACT ON RIVER FLOW REGIME**	Prof. M. L. Sharma Dr. Sanjay K. Jain	Prof. Ian Holman, Cranfield University, UK Dr. S. P. Aggarwal, IIRS Dehradun Prof. A. P. Dimri, JNU Delhi	18.01.19

11 JUN 2019

S. No.	Program	Seat Capacity	Gender Neutral	Change in	Modified Seat capacity	Modified	Female excluding Supernumerary	% of EWS	Increase Seat	New Seat Capacity	New Gender Neutral	% Female of C19	Supernumerary	Final Female Only	Final Gender Neutral	Seat including Supernumerary	% of Female in 2019
		C18	GN18	seat capacity	2019	gender neutral	F18		I19	C19	GN19		SN19	F19			
1	Biotech	35	29	0	35	29	6	3	2.2	37.2	30.8	17.13	0	6.4	30.8	37.2	17.13
2	Chemical	90	78	0	90	78	12	3	5.7	95.7	82.7	13.55	4	17.0	82.7	99.7	17.02
3	Civil	135	128	0	135	128	7	3	8.5	143.5	135.1	5.89	20	28.4	135.1	163.5	17.40
4	Comp. Sc.	75	72	0	75	72	3	3	4.7	79.7	75.9	4.77	12	15.8	75.9	91.7	17.23
5	Electrical	120	108	0	120	108	12	3	7.6	127.6	114.3	10.42	11	24.3	114.3	138.6	17.53
6	Electronics	80	71	0	80	71	9	3	5.1	85.1	75.2	11.59	6	15.9	75.2	91.1	17.42
7	Engg. Physics	30	26	0	30	26	4	3	1.9	31.9	27.6	13.55	2	6.3	27.6	33.9	18.55
8	Mechanical	100	100	0	100	100	0	3	6.3	106.3	105.2	1.01	21	22.1	105.2	127.3	17.34
9	Metallurgical	80	73	0	80	73	7	3	5.1	85.1	77.2	9.24	8	15.9	77.2	93.1	17.08
10	Polymer	30	26	0	30	26	4	3	1.9	31.9	27.6	13.55	2	6.3	27.6	33.9	18.65
11	Production	40	38	0	40	38	2	3	2.5	42.5	40.1	5.71	6	8.4	40.1	48.5	17.37
12	Architecture	30	24	0	30	24	6	3	1.9	31.9	25.6	19.82	0	6.3	25.6	31.9	19.82
13	Geological	30	24	0	30	24	6	3	1.9	31.9	25.6	19.82	0	6.3	25.6	31.9	19.82
14	Geophysical	30	26	0	30	26	4	3	1.9	31.9	27.6	13.55	2	6.3	27.6	33.9	18.65
15	Mathematics	30	28	0	30	28	2	3	1.9	31.9	29.6	7.28	4	6.3	29.6	35.9	17.61
16	Chemistry	20	16	0	20	16	4	3	1.3	21.3	17.0	19.82	0	4.2	17.0	21.3	19.82
17	Physics	20	17	0	20	17	3	3	1.3	21.3	18.0	15.12	1	4.2	18.0	22.3	18.83
	Total	975	884		975	884	91		61.6	1036.6	935.1		99	200.5	935.1	1135.6	

	Please Enter the values in Green Columns (B, C, D, E and I) only	
C18	Seat Capacity 2018 as given in JOSAA website	
GN18	Gender Neutral 2018 as given in JOSAA website	
% of EWS	Percentage of EWS for 2019	

For new programs C and D columns will be zero

For new programes eneter the seat capacity in E

For change in seat capacity enter the difference from last capacity in E

Appendix H

Item No. Senate/78.15

Proposed Seat for M.Tech./M.Arch./MURP Admission 2019-20

S.No	Academic Department/ Centre & (Code)	Academic Programmes		Main Gate Discipline(s)					Other GATE Disciplines					EWS* 5%	Total Intake Dept/ Centre
		Name	Code	GATE Discipline Code	GEN	OBC	SC	ST	GATE Discipline Code	GEN	OBC	SC	ST		
1	Architecture and Planning (ARD)	M.Arch.	10	AR(12)	6	3	2	1	-	-	-	-	-	1	25
		M.U.R.P.	11	AR(10)	5	2	2	1	CE(2)	1	1	0	0		
2	Alternate Hydro Energy Centre (AHC)	M.Tech. Alternate Hydro Energy Systems	12	CE(2)	1	1	0	0	AG/CH/EE/EC/ME/ PI/XE (13)	7	3	2	1	1	27
		M.Tech. Environmental Management of Rivers and Lakes	13	CE(3)	1	1	1	0	AG/CH/EE/ME/PI/XE/AR/CY/BT/PH/MA/XL/EY(8)	4	2	1	1		
3	Chemical Engineering (CHD)	M.Tech. Chemical Engineering	14	CH(20)	9	6	3	2	-	-	-	-	-	1	21
4	Civil Engineering (CED)	M.Tech. Environmental Engg.	16	CE(11)	5	3	2	1	CH(2)	1	1	0	0	3	91
		M.Tech. Geomatics Engg.	17	CE(7)	3	2	1	1	AR/CS/EC/EE /AG/MN(7)	4	2	1	0		
		M.Tech. Geotechnical Engg.	18	CE(13)	7	3	2	1	MN (2)	1	1	-	-		
		M.Tech. Hydraulic Engg.	19	CE(11)	5	3	2	1		-	-	-	-		
		M.Tech. Structural Engg	20	CE(21)	9	6	4	2	-	-	-	-	-		
		M.Tech. Transportation Engg.	21	CE(14)	7	4	2	1	-	-	-	-	-		
5	Earthquake Engineering (EQD)	M.Tech. Soil Dynamics	22	CE(12)	6	3	2	1	-	-	-	-	-	1	41
		M.Tech. Structural Dynamics	23	CE(18)	9	5	3	1	-	-	-	-	-		
		M.Tech. Seismic Vulnerability and Risk Assessment	24	CE(10)	5	3	1	1	-	-	-	-	-		
6	Electrical Engineering (EED)	M.Tech. Electric Drives & Power Electronics	25	EE(15)	8	4	2	1	-	-	-	-	-	2	62
		M.Tech. Instrumentation and Signal Processing	26	EE(10)	5	3	1	1	EC/IN(5)	3	1	1	0		
		M.Tech. Power System Engg.	27	EE(15)	7	5	2	1	-	-	-	-	-		
		M.Tech. Systems and Control	28	EE(11)	5	3	2	1	EC/IN(4)	1	1	1	1		
7	Electronics and Communication Engineering (ECD)	M.Tech. Communication Systems	29	EC(12)	6	3	2	1	-	-	-	-	-	1	34
		M.Tech. R.F. & Microwave Engg	30	EC(10)	5	3	1	1	-	-	-	-	-		
		M.Tech. Microelectronics and VLSI	31	EC/PH(11)	5	3	2	1	-	-	-	-	-		
8	Computer Science and Engineering (CSD)	M.Tech. Computer Science & Engg	32	CS(31)	15	9	5	2	-	-	-	-	-	1	32
9	Hydrology (HYD	M.Tech. Hydrology	33	CE/AG(18)	9	5	3	1	GG/XE/PH/ EY(3)	1	1	0	1	1	22
10	Mechanical and Industrial Engineering (MED)	M.Tech. CAD, CAM & Robotics	34	ME/PI(12)	6	4	1	1	-	-	-	-	-	2	60
		M.Tech. Machine Design Engg.	35	ME/PI(12)	6	3	2	1	-	-	-	-	-		
		M.Tech. Production & Industrial Systems Engg.	36	ME/PI(12)	6	3	2	1	-	-	-	-	-		
		M.Tech. Thermal Engg.	37	ME/PI(11)	5	3	2	1	-	-	-	-	-		
		M.Tech. Welding Engg.	38	ME/PI(11)	5	3	2	1	-	-	-	-	-		
11	Metallurgical and Materials Engineering (MTD)	M.Tech. Industrial Metallurgy	39	MT(3)	2	1	0	0	ME/PI/XE (8)	4	2	1	1	1	23
		M.Tech. Materials Engg.	40	MT(4)	2	1	1	0	PH/ME/PI/CY/XE (7)	3	2	1	1		
12	Paper Technology Saharanpur Campus (PPD)	M.Tech. Pulp & Paper	41	CH(8)	4	2	1	1	ME/BT/TF/EY (4)	2	1	1	0	1	26
		M.Tech Packaging Technology	42	CH(7)	3	2	1	1	BT/CY/ME/TF (6)	3	2	1	0		
13	Water Resources Development and Management (WRD)	M.Tech. Irrigation Water Management	43	CE/AG(8)	4	2	1	1	-	-	-	-	-	1	21
		M.Tech. Water Resources Development	44	CE/EE/ME (12)	5	4	2	1	-	-	-	-	-		
15	Physics (PHD)	M.Tech. Solid State Electronic Materials	46	PH(7)	3	2	1	1	EE/EC/MT (3)	2	1	0	0	1	21
		M.Tech. Photonics	47	PH(7)	3	2	1	1	EE/EC/MT/IN (3)	1	1	1	0		
16	Nanotechnology (NTC)	M.Tech. Nanotechnology	48	MT/ME/EC/CH/BT/ CE (4)	2	1	1	0	CY/PH/XL (6)	2	2	1	1	1	11
17	Disaster Mitigation and Management (DMC)	M.Tech. Disaster Mitigation and Management	49	CE(5)	2	1	1	1	ME/PI/CS/CH/AR/GG/PH/MA/XL/XE/EY /BT (5)	2	2	1	0	1	11
18	Transportation Systems (TSC)	M.Tech. Infrastructure Systems	50	CE(3)	1	1	1	0	ME/PI/CH/EE/EC/CS/ AR (7)	3	2	1	1	1	11
19	Biotechnology (BTD)	M.Tech. Bioprocess Engineering	51	CH (5)	2	1	1	0	BT/AG/XE/TF (5)	2	2	1	1	1	11
		Total			204	119	68	36		47	30	15	9	22	550

* EWS seats will be allotted to the candidates with any eligible GATE discipliine in the department/programme as per merit.

11 JUN 2019

Appendix I
Item No. Senate/78.15

Intake for M.Sc. for 2019-20

S.No.	DEPTT	CODE	PROGRAMME	TOTAL	GEN	OBC	SC	ST	PD 5% Horizontal
1	Earth Science **(ES)**	1801	M.Sc. (Applied Geology)	15	8	4	2	1	0
2	Biotechnology **(BT)**	1802	M.Sc. (Biotechnology)	37	18	10	6	3	G-1, B-1, T-1
3	Chemistry **(CY)**	1803	M.Sc. (Chemistry)	45	23	12	7	3	G-1, B-1, C-1
4	Mathematics **(MA)**	1804	M.Sc. (Mathematics)	30	15	8	5	2	G-1
5	Physics **(PH)**	1805	M.Sc. (Physics)	25	12	7	4	2	G-1
6	Humanities & Social Sciences **(HS)**	1806	M.Sc. (Economics)	30	15	8	5	2	G-1
			Total	182	91	49	29	13	9

11 JUN 2019

Appendix 'J'
Item No. Senate/78.15

Seat Matrix for MBA programme 2019-20

Programme	Intake	GEN	OBC	SC	ST	PD
MBA	95	48	26	14	7	5% Horizontal

11 JUN 2019

Appendix K
Item No. Senate/78.15

Proposed seat matrix for admission to Ph.D. Programme under PMRF (July 2019)

Name of the Department	PMRF Discipline	Intake
	Agriculture and Food Engineering	
Architecture and Planning	Architecture and Regional Planning	4
Biotechnology	Biological Sciences	5
	Biomedical Engineering	
Chemical Engineering	Chemical Engineering	2
Chemistry	Chemistry	4
Civil Engineering	Civil Engineering	8
Computer Science	Computer Science	2
• Electrical Engineering • Electronics & Communication Engineering	Electrical Engineering (including ECD)	7
	Engineering Design	
• Hydro and Renewable Energy • Applied Science and Engineering • Center for Transportation Systems • Centre for Disaster Mitigation & Management • Centre for Nanotechnology • Earth Sciences • Earthquake Engineering • Electronics and Communication Engineering • Hydrology • Paper Technology • Polymer and Process Engineering • Water Resources Development and Management	Interdisciplinary Programs in Science and Engineering (AHC, ASE, TSC,DMC, NTC, ESD, EQD, HYD, PPD, PPE, WRD)	15
Metallurgical and Materials Engineering	Material Science and Metallurgical Engineering	4
Mathematics	Mathematics	3
Mechanical & Industrial Engineering	Mechanical	6
	Mining, Mineral, coal and Energy sector	
	Ocean Engineering and Naval Architecture	
Physics	Physics	4
	Textile Technology	
	TOTAL	64

11 JUN 2019

Appendix L
Item No. Senate/78.15

Category wise vacancy i.e. 27% for OBC, 15% for SC, 7.5% for ST and 3% for EWS category for admission to Ph.D program for Autumn Semester of the session 2019-20 under Institute Assistantship

Deptt/ centre	Faculty Position (01.01.19)	Total seats @4.0 x no. of faculty	Increased with 6.37%	Category wise Total Seats					Seats Filled					Vacancy					
				Gen	Gen-EWS	OBC	SC	ST	Gen	OBC	SC	ST	Total filled	Total vacancy	Gen	EWS* 3%	OBC	SC	ST
(Roorkee Campus)																			
AHEC	5	20	21	10	1	6	3	1	6	7	3	1	17	4	3	1	0	0	0
Arch & Plng	18	72	77	36	2	21	12	6	28	14	10	0	52	25	8	2	7	2	6
Biotechnology	26	104	111	53	3	30	17	8	46	15	4	1	66	45	7	3	15	13	7
C-Trans	4	16	17	8	1	5	2	1	10	3	2	1	16	4	1	1	2	0	0
Dis. Mit. &Magnt	4	16	17	8	1	5	2	1	6	4	1	1	12	5	2	1	1	1	0
Nanotechnology	4	16	17	8	1	5	2	1	7	4	1	0	12	5	1	1	1	1	1
Chemical Engg	19	76	81	39	2	22	12	6	23	23	12	1	59	22	15	2	0	0	5
Chemistry	24	96	102	48	3	28	15	8	32	11	9	0	52	50	16	3	17	6	8
Civil Engg	43	172	183	87	5	49	28	14	75	44	22	5	146	37	12	5	5	6	9
Computer Sc. & Engg	12	48	51	24	2	14	7	4	15	5	4	0	24	27	9	2	9	3	4
Earth Sciences	22	88	94	45	3	25	14	7	34	9	3	1	47	47	11	3	16	11	6
Earthquake Engg	12	48	51	24	2	14	7	4	19	8	1	2	30	21	5	2	6	6	2
Electrical Engg	30	120	128	61	4	34	19	10	49	22	7	0	78	50	12	4	12	12	10
E&CE	22	88	94	45	3	25	14	7	24	14	3	0	41	53	21	3	11	11	7
Hum &Soc. Sciences	15	60	64	30	2	17	10	5	20	16	7	1	44	20	10	2	1	3	4
Hydrology	8	32	34	16	1	9	5	3	12	2	1	1	16	18	4	1	7	4	2
Inst. Instr. Centre	1	4	4	2	0	1	1	0	0	1	0	0	1	3	2	0	0	1	0
Management Studies	14	56	60	28	2	16	9	5	27	9	7	0	43	17	1	2	7	2	5
Mathematics	26	104	111	53	3	30	17	8	21	21	9	0	51	60	32	3	9	8	8
Mech&Indl Engg	42	168	179	85	5	48	27	14	61	37	25	5	128	51	24	5	11	2	9
Met & Mat Engg	21	84	89	42	3	24	13	7	26	20	12	1	59	30	16	3	4	1	6
Physics	36	144	153	73	5	41	23	11	44	22	5	1	72	81	29	5	19	18	10
WRD & M	5	20	21	10	1	6	3	1	8	3	2	0	13	8	2	1	3	1	1
Total	**413**	**1652**	**1759**	**835**	**55**	**475**	**262**	**132**	**593**	**314**	**150**	**22**	**1079**	**683**	**243**	**55**	**163**	**112**	**110**
(Saharanpur Campus)	Total Seat @ 8 x no. of faculty																		
Applied Sc. & Engg	4	32	34	16	1	9	5	3	14	7	1	0	22	11	2	1	2	4	2
Paper Technology	5	40	43	20	1	12	7	3	17	5	5	0	27	14	3	1	6	1	3
Polymer & Process Engg	12	96	102	49	3	27	15	8	32	14	11	0	57	42	17	3	12	3	7
Total	**21**	**168**	**179**	**85**	**5**	**48**	**27**	**14**	**63**	**26**	**17**	**0**	**106**	**67**	**22**	**5**	**20**	**8**	**12**

*** Note: if the cut-off for GEN is X, it should not go below 0.9X for OBC/EWS and 0.67X for SC/ST/PD based on IRCresolution No. 28.2.13**

11 JUN 2019

DEPARTMENT OF CIVIL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program code: 21 M. Tech. (Transportation Engineering)
Department: CE Civil Engineering
Year: I

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Semester – I (Autumn)														
1	CEN-561	Traffic Analysis and Design	PCC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
2	CEN-562	Pavement Analysis and Design	PCC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
4	CEN-563	Urban Mass Transit Systems	PCC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
4	CEN-564	Geometric Design	PCC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
5	-	Program Elective – I	PEC	3/4										
		Total		19/20										
Semester – II (Spring)														
1	CEN-664	Transportation Planning	PCC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
2	CEN-700	Seminar	SEM	2	0	0	2	3	-	-	-	-	100	-
3		Program Elective – II	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
4		Program Elective – III	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
5		Program Elective - IV	PEC	3/4										
6		Program Elective - V	PEC	2	-	-	4	-	3	-	50	-	50	-
		Total		19/20										

11 JUN 2019

DEPARTMENT OF CIVIL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program code: 21 M. Tech. (Transportation Engineering)
Department: CE Civil Engineering
Year: II

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

Summary				
Semester	1	2	3	4
Semester wise total credits	19/20	19/20	12	18
Total credits	68/70			

11 JUN 2019

Programme Elective Courses (Transportation Engineering)

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weights (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
Courses Against Autumn Semester Electives														
1	BM-513	Business Statistics	PEC	3	3	-	-	3	-	15	-	35	50	-
2	CEN-501	Environmental Modelling and Simulation	PEC	4	3	1	2/2	3	-	20	20	20	40	-
3	CEN-513	Remote Sensing and Digital Image Processing	PEC	4	3	0	2	3	-	15	25	20	40	-
4	CEN-521	Advanced Numerical Analysis	PEC	4	3	0	2	3	-	15	25	20	40	-
5	CEN-522	Advanced Soil Mechanics	PEC	4	3	1	2/2	3	-	20	20	20	40	-
6	CEN-543	Advanced Concrete Design	PEC	4	3	0	2	3	-	15	25	20	40	-
7	CEN-545	Finite Element Analysis	PEC	4	3	-	2	3	-	15	25	20	40	-
8	CEN-565	Planning, Design and Construction of Rural Roads	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
9	CEN-566	Airport Planning and Design	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
10	CEN-567	Transportation Systems Analysis	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
11	CEN-568	Advanced Highway Material Characterisation	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
11	CTN-501	Quantitative Techniques for Infrastructure Systems Analysis	PEC	4	3	-	2	3	-	15	25	20	40	-

Courses Against Spring Semester Electives														
1	CEN-604	Environmental Impact and Risk Assessment	PEC	4	3	1	-	3	-	25	-	25	50	-
2	CEN-614	Theory and Application of GIS	PEC	4	3	-	2	3	-	15	25	20	40	-
3	CEN-621	Advanced Geotechnical Exploration and Testing	PEC	4	3	1	-	3	-	25	-	25	50	-
4	CEN-661	Advanced Highway Construction and Maintenance	PEC	4	3	1	2/2	3	-	15-30	20	15-25	30-40	-
5	CEN-662	Intersection Design and Control	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
6	CEN-663	Pavement Evaluation and Management	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
7	CEN-665	Road Traffic Safety	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
	CEN-666	Transport Economics	PEC	4	3	1	-	3	-	20-35	-	20-30	40-50	-
8	CEN-667	Transportation Studies and Analysis Lab	PEC	2	-	-	4	-	3	-	50	-	-	50
9	CEN-668	Multi-Agent Transport Simulation Framework	PEC	2	-	-	4	-	3	-	50	-	-	50

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT/CENTRE: **CIVIL ENGINEERING**

1. Subject code: **CEN-561** Course Title: **Traffic Analysis and Design**
2. Contact Hours: **L: 3** **T: 1** **P: 0**
3. Examination Duration (Hrs): Theory: **3** Practical: **0**
4. Relative Weightage: CWS: **20-35** PRS: **0** MTE: **20-30** ETE: **40-50** PRE: **0**
5. Credits: **04** 6. Semester: **Autumn**
7. Subject Area: **PCC** 8. Pre-requisite: **Nil**
9. **Objective:** To introduce the advances in traffic engineering analysis and design and to make the students conversant with relevant field applications.

10. Details of Course:

S. No.	Particulars	Contact Hours
1	Introduction: Elements of traffic engineering, issues for traffic engineers; road users, vehicles, highways and control devices.	04
2.	Traffic Stream Characteristics: Traffic stream parameters, Time Space diagram, relationship among q,k,u, Macroscopic Fundamental Diagrams (MFD).	04
3.	Traffic Studies: Traffic volume studies, speed, travel time and delay studies, parking studies, RSI Survey, WTP Survey, accident data collection, pedestrian studies.	04
4.	Traffic design: Capacity analysis concepts – urban streets and rural highways, design of parking facilities, street design.	06
5.	Statistical application in Traffic Engineering: Overview of Probability Functions and Statistics, Normal Distribution and application, Confidence Bounds, Sample Size, Binomial Distribution, Poisson Distribution, Hypothesis Testing.	08
6.	Microscopic Modeling: Classification of Time Headway, Random Headway State, Constant Headway State, Intermediate Headway State, Car Following Theory.	06
7.	Time Series Analysis: Basic Components of Time Series, Smoothening and Decomposition Methods, Data Filters, Auto Correlations and Moving Averages.	04
8.	Management Techniques: Traffic calming; Congestion and road user pricing; priority movements; traffic regulations and control systems; use of intelligent systems.	06
	TOTAL	**42**

11. Suggested Books:

S. No.	Name of Books / Authors	Year of Publication
1.	William R. Mcshane and Roger P. Roess, "Traffic Engineering", Pearson (4th Edition).	2013
2.	Kadiyali, L.R., "Traffic Engineering and Transport Planning", Khanna Publishers.	2012
3.	C A O'Flaherty, Ed , "Transport Planning and Traffic Engineering", Butterworth Heinemann, Elsevier, Burlington, MA	2006
4.	May, A.D., "Fundamentals of Traffic Flow", Prentice Hall, Inc. 2nd Ed.	1990
5.	Carlos F. Daganzo. "Fundamentals of Transportation and Traffic Operations", Pergamon	1997
6.	Simon P. Washington, Matthew G. Karlaftis and Fred L. Mannering, "Statistical and Econometric Methods for Transportation Data Analysis", Second Edition, CRC Press	2011

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Civil Engineering Department**

1. Subject Code:**CEN-562** Course Title: **Pavement Analysis and Design**
2. Contact Hours: **L: 3** **T: 1** **P: 0**
3. Examination Duration (Hrs.): **Theory 3** **Practical 0**
4. Relative Weightage: CWS: **20-35** PRS: **0** MTE: **20-30** ETE: **40-50** PRE: **0**
5. Credits: **4** 6. Semester: **Autumn** 7. Subject Area: **PCC**
8. Pre-requisite: **Nil**
9. Objective: To impart knowledge to students related to analysis and design with respect to Highway Pavement.
10. Details of Course:

S. No.	Particulars	Contact Hours
1.	**Introduction:** Components of pavement structure, importance of subgrade soil properties on pavement performance. Functions of subgrade, subbase, base course and wearing course.	4
2.	**Stresses in Pavements:** Flexible pavements - Stresses in homogeneous masses and layered systems, deflections, shear failures, equivalent wheel and axle loads; Rigid pavements - Westergaard's and Thomlinson's analysis of warping stresses, Combination of stresses due to different causes, Effect of temperature variation on Rigid Pavements	8
3.	**Design Elements of Flexible Pavements:** Loading characteristics-static, impact and repeated loads, effects of dual wheels and tandem axles, area of contact and tyre pressure, modulus or CBR value of different layers, equivalent single wheel load, equivalent stress and equivalent deflection criterion, equivalent wheel load factors, climatic and environmental factors.	6
4.	**Design Methods for Flexible Pavements:** California bearing ratio (CBR) adopted in various countries, IRC: 37-2018, AASHTO Design Guide, Triaxial method, Boussinesq's and Burmister's analysis, Pavement designing software (IITPAVE, KENPAVE, MICH-PAVE); Design of flexible pavements for low volume roads.	8
5.	**Rigid Pavements:** Design of rigid pavement using IRC: 58-2015 and AASHTO guidelines, Wheel load stresses, Role of modulus of subgrade reaction, Westergaard's analysis, Bradbury's approach Arlington test, Pickett's corner load theory and charts for liquid, elastic and soil of finite and infinite depths of subgrade.	8
6.	**Types of Concrete Pavements:** Roller Compacted Concrete Pavement, Plain Jointed Concrete Pavement, Continuously Reinforced Concrete Pavement, Prestressed concrete pavement, Design of Tie Bars and Dowel Bars, Role of Dry Lean Concrete; Rigid pavement design for low volume roads	8
	Total	42

11. Suggested Books:

S. No.	Name of Books / Authors	Year of Publication
1	Yoder, E.J. and Witczak, M.W., "Principles of Pavement Design 2nd Ed", John Wiley & Songs, Inc.	1975
2	O'Flaherty, A. Coleman, "Highways : the Location, Design, Construction and Maintenance of Road Pavements", 4th Ed., Elsevier	2006
3	Fwa, T.F., "The Hand Book of Highway Engineering", CRC Press Taylor & Francies Group.	2006
4	Khanna, S.K. and Justo, C.E.G., "Highway Engineering Nem Chand Jain & Bros, 8th Ed.	2005
5	Papagiannakis, A.T. and Masad, E.A., "Pavement Design and Materials, John Wiley & Sons Inc.	2008
6	Yang H. Huang, " Pavement Analysis and Design" Second Edition, Pearson Education Inc.	2004

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT: **Civil Engineering**

1. Subject Code: **CEN-563** Course Title: **Urban Mass Transit Systems**
2. Contact Hours: **L: 3** **T: 1** **P: 0**
3. Examination Duration **Theory: 3** **Practical: 0**
4. Relative Weightage: CWS: **20-35** PRS: **0** MTE: **20-30** ETE: **40-50** PRE: **0**
5. Credits: 4 6. Semester **Autumn**
7. Prerequisite: NIL 8. Subject Area: **PCC**
9. Objective of Course: To introduce the students to urban mass transit systems, their types, suitability, planning, operation and management aspects.
10. Details of the Course.

S. No.	Course Description	Contact hours
01	**Introduction**: Mass transit systems, Elements / components of transit systems; Urban Mass Transit systems, types, characteristics, suitability and adaptability of these systems; Evolution of urban transportation.	3
02	**Transit System Planning**: Planning needs; Short-range and long-range planning; Planning procedures and methodology, Data collection; Medium performance transit systems and high-performance transit systems; trends in transit planning.	6
03	**Transit Demand Estimation and Evaluation:** Transit demand forecasting; transit mode evaluation; comparison and selection of most suitable transit mode.	8
04	**Transit System Operations:** Basic operational elements; transit travel characteristics; transit scheduling; transit line analysis – planning objectives, geometry, types and their characteristics, capacity of transit lines, system procedures for improving transit line capacity.	10
05	**Transit Networks and System Analysis:** Transit networks – types and their characteristics; transfers in transit networks; system analysis in transit – conceptual models, modeling procedures; terminal or station location planning – issues, objectives, station spacing decisions.	8
06	**Economics and Financing of Transit Systems:** Transit system performance and economic measures; transit fares – structure, collection and levels; financing of transit services; public and private integration of transit services.	6
	Total	42

Suggested Books:

S. No	Authors / Title / / Publisher	Year of publication
1	Vukan R. Vuchic, "Urban Transit – Operations, Planning and Economics", John Willey and Sons, Inc., USA	2004
2	Vukan R. Vuchic, "Urban transit systems and technologies", John Willey and Sons, Inc., USA	2007
3	C A O'Flaherty, 'Transport Planning and Traffic Engineering', Butterworth-Heinemann, Burlington	2006
4	C Jotin Khisty and B Kent Lall, "Transportation Engineering" Prentice-Hall of India Pvt Ltd., New Delhi	2003

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT/CENTRE: **Civil Engineering**

1. Subject Code : **CEN-564** Course Title : **Geometric Design**
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. Subject Area : **PCC**
8. Pre-requisite: **Nil**
9. Objective: To introduce concepts and design procedures for different types of roads and associated facilities.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	**Introduction:** Design Controls - Topography and physical features, traffic, vehicular characteristics, speed and safety; Space standards for urban, rural and hill roads, Sight distance requirements, Access controls	6
2.	**Cross-section Elements :** Single lane, Two lane, Multi-lane highways, Expressways, Urban roads; Street design concepts, bicycle tracks, pedestrian facilities, street furniture, Design of Speed Breaker	6
3.	**Alignment :** Horizontal Alignment - Curve design, Super-elevation design, Transition curve design, Attainment of super-elevation, Pavement widening, Sight distance on horizontal curves; Vertical Alignment - Gradients, Grade compensation, Design of vertical curves, Combination of horizontal and vertical alignment, vertical clearance for underpasses and elevated structures	6
4.	**Highway Capacity:** Two lane, Four lane, Six lane non-urban highways, Urban roads, Expressways, HCM USA and IRC Specifications	8
5.	**Intersection Geometry:** Visibility requirements, Principles of channelization, Layout design for types of intersections, on-ramps and off-ramps (flyovers and Access controlled facilities), Acceleration and deceleration lanes, Two-way turn lanes,	6
6.	**Design of Facilities:** Design of on-street and off-street parking facilities, multi-storyed Parking; Design of bus shelters and bus lay-bye, Bus terminal, Truck terminals and truck lay-bye, Container terminal, Toll Plaza, Foot-over bridge and sky-walk	10
	Total	**42**

11. Suggested Books:

S. No.	Name of Authors/Books/Publishers	Year of Publication/ Reprint
1.	Wright, P.H. & Dixon, K.K., "Highway Engineering", 7th Ed., John Wiley & Sons.	2004
2.	Transportation Research Board (TRB), Highways Capacity Manual, National Research Council, Washington D.C.	2010
3.	Khisty, C.J. and Lal, B.K., "Transportation Engineering - An Introduction", Prentice Hall of India Pvt. Ltd.	2006
4.	Kadiyali, L.R., "Traffic Engineering and Transport Planning", Khanna Publishers.	2008

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT: Civil Engineering

1. Subject Code: **CEN- 565** Course Title: **Planning, Design and Construction of Rural Roads**
2. Contact Hours: **L: 3** **T: 1** **P: 0**
3. Examination Duration **Theory: 3** **Practical: 0**
4. Relative Weightage: CWS: **20-35** PRS: **0** MTE: **20-30** ETE: **40-50** PRE: **0**
5. Credits: 4 6. Semester **Autumn**
7. Prerequisite: NIL 8. Subject Area: **PEC**
9. Objective of Course: To introduce the concepts of Planning, Geometric Design, Pavement Design, Construction and Maintenance of Rural Roads
10. Details of the Course:

S. No.	Course Description	Contact hours
01	**Planning of Rural Roads**: Classification of Roads, Brief introduction to earlier 20 year Plans, System's Approach, NATPAC Model, Gravity Model, CRRI Model, FBRNP Model, Concepts of PMGSY	08
02	**Geometric Design**: Geometric Design Standards for Rural Roads with special reference to PMGSY, Hill Road Standards.	04
03	**Pavement Design:** Various pavement design methods for Rural roads including Flexible and Rigid pavements using IRC:SP-20, IRC-72, IRC-37, IRC:SP-62, CRRI Nomograms	04
04	**Mix Design Methods:** CRRI Method, Triangular Chart Method, Fuller's Method, Rothfuch method, PI based Method	06
05	**Materials:** Brief introduction to conventional materials, Marginal and Waste Materials including Fly Ash, GBFS, BFS, SMS, Bagasse, CRMB, etc	06
06	**Construction:** Case Studies of Waste Material Utilization in Rural Roads, Low Cost Techniques for Rural Road Construction, Tractor Bound Technology, Special Considerations for Hill Areas	06
07	**Drainage:** Transverse and Longitudinal Drainage, Design of drains, Minor CD Works, Filter Design etc.	04
08	**Maintenance:** Type and Causes of Failures, Remedies	04
	Total	42

Suggested Books:

S. No	Authors / Title / / Publisher	Year of publication
1	Rural Roads Manual , SP-20, IRC	2002
2	Document on Rural Road Development, Vol I & II, CRRI	1990
3	PMGSY Operation Manual, NRRDA, Govt of India	2005
4	Specifications for Rural Roads, MoRD, IRC	2004
5	Khanna S.K., Justo C.E.G,, Highway Engineering, Nem Chand & Bros, Roorkee	2004
7	Quality Assurance Handbook for Rural Roads, NRRDA, Govt. of India	2007

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT: Civil Engineering

1. Subject Code: **CE-566** Course Title: **Airport Planning and Design**
2. Contact Hours: **L: 3** **T: 1** **P: 0**
3. Examination Duration Theory 3 Practical 0
4. Relative Weightage: CWS: **20-35** PRS: **0** MTE: **20-30** ETE: **40-50** PRE: **0**
5. Credits: 4 6. Semester **Autumn**
7. Prerequisite: NIL 8. Subject Area: **PEC**
9. Objective of Course: To familiarize students on various techniques related to airport planning and design.
10. Details of the Course.

S. No.	Course Description	Contact hours
01	**Airport Planning:** Airport master plan, aircraft characteristics related to airport planning and site selection, air traffic demand analysis, planning surveys, airport zoning.	08
02	**Geometric Design:** Airport classification, runway and taxiway geometric standards, exit taxiways, separation and clearances.	06
03	**Terminal Areas:** Facilities, space requirement, number and size of gate positions, aircraft parking system.	06
04	**Visual Aids :** Airport day time markings, airport lighting, visibility, visual aids	03
05	**Structural design of airport pavements:** Design Factors, Design of flexible and rigid pavements	06
06	**Airside capacity and delay:** Mathematical models for capacity and delay, space time concept, models for mixed traffic	06
07	**Air Traffic Control: I**mportance of flight rules, navigational aids, air traffic controls, obstruction and clearance requirements	04
08	**Airport Drainage :** Design run-off, inlet size and location design, surface and subsurface design	03
	Total	**42**

Suggested Books:

S. No.	Authors / Title / / Publisher	Year of publication
1	Robert Horonjeff and Francis X. McKelvey, "Planning & Design of airports, McGraw Hill, Inc, 4th edition	1993
2	S. K. Khanna, M. G. Arora and S. S. Jain, "Airport Planning & Design", Nem Chand and Bros, Roorkee	2000
3	Ashford, N. and Wright, P. H., "Airport Engineering, Wiley, 3rd edition.	1992
4	ICAO, "Aerodrome design manual", International Civil Aviation Organization, Montreal, Canada	1983

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT: **Civil Engineering**

1. Subject Code: **CEN- 567** Course Title: **Transportation Systems Analysis**
2. Contact Hours: **L: 3** **T: 1** **P: 0**
3. Examination Duration Theory 3 Practical 0
4. Relative Weightage: CWS: **20-35** PRS: **0** MTE: **20-30** ETE: **40-50** PRE: **0**
5. Credits: 4 6. Semester **Autumn**
7. Prerequisite: NIL 8. Subject Area: **PEC**
9. Objective of Course: To introduce the students to the analysis of different transportation systems, their components, operations, systems analysis approaches and economics.
10. Details of the Course:

S. No.	Course Description	Contact hours
01	**Introduction**: Scope of transportation and impact on society; System planning process and problem solving process; transportation problems.	06
02	**Transportation Technologies**: Transportation technologies, suitability and adaptability; Transportation system components; Transportation system characteristics – technological and operational; Path – vehicle interaction; Volume – Density relationship for containers.	10
03	**Analysis of Systems:** Generation of alternatives; Performance evaluation of system and performance functions; Operational planning and analysis of components; Transportation network analysis and Minimum path algorithms; Travel in space and time; Planning for non-motorized transportation; Freight transportation planning–models and methods; Residential location choice models, Car-ownership models; transportation software.	12
04	**Transportation Economics:** Transportation demand and supply; Equilibrium between supply and demand, transportation system equilibrium; Elasticity – direct and cross; concept of consumer surplus; transport demand models – sketch planning, incremental demand model, model estimation from traffic counts; transportation cost, travel – market equilibrium.	08
05	**Sustainable Transportation Planning:** Sustainable transportation – issues and principles; non-motorized transportation planning; Impact evaluation and impact models.	06
	Total	42

Suggested Books:

S. No	Authors / Title / / Publisher	Year of publication
1	Marvin L Manheim, "Fundamentals of Transportation Systems Analysis", The MIT Press, Cambridge, Massachusetts	1980
2	Adib Kanafani, "Transportation Demand Analysis", McGraw Hill Inc, New York, U.S.A.	1983
3	Steenbrink, P.A., Optimization of Transport Network, John Wiley & Sons, NY.	1974
4	Konstadinos G Goulias, "Transportation System Planning – Methods and Applications", CRC Press, London	2002
5	C Jotin Khisty and B Kent Lall, "Transportation Engineering – An Introduction", Prentice Hall of India Pvt Ltd., New Delhi	2003
6	Thomas A Domencich and Daniel McFadden, "Urban Travel Demand – A Behavioural Analysis", North-Holland Publishing Company, Amsterdam	1975

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT: Civil Engineering

1. Subject Code: **CEN- 568** Course Title: **Advanced Highway Material Characterization**
2. Contact Hours: **L: 3** **T: 1** **P: 2/2**
3. Examination Duration **Theory 3** **Practical 0**
4. Relative weight **CWS 15-30** **PRS 20** **MTE 15-25** **ETE 30-40** **PRE 0**
5. Credits: 04 6. Semester **Autumn**
7. Prerequisite: NIL 8. Subject Area: **PEC**
9. Objective of Course: To introduce the advanced technologies in pavement engineering materials and to make the students conversant with characterization of various conventional and alternative road construction materials.
10. Details of the Course.

S. No.	Course Description	Contact hours
1	**Soil:** Classification of soil, Identification and strength tests- Atterberg limits, compaction tests, California Bearing Ratio (CBR), Unconfined Compressive Strength (UCS), Modulus of subgrade reaction, Resilient Modulus, Permeability, Free Swelling Index (FSI), Deleterious materials, sand equivalent test, Soil stabilization techniques.	06
2	**Aggregates:** Origin and Classification, physical, mechanical and durability properties, sampling techniques, aggregate texture and skid resistance, Polish Stone Value, Alkali-aggregate reactivity.	06
3	**Binders:** (i) **Bitumen**: Bitumen sources and manufacturing, Bitumen constituents and its properties, Structure and Rheology, tests on bitumen-emulsions & cutback, modified bitumen and its types, goals of modification, properties of modified bitumen, separation test, long-term and shorter aging of bitumen, Elastic recovery test of modified bitumen (ii) **Cement**: Origin, composition, Types of cement, physical properties of cement (consistency, setting times, soundness and strength of cement), flow test.	10
4	**Bituminous and Concrete Mix Designs:** Design of Granular Sub-base and their desirable properties; Design of Wet Mix Macadam and their desirable properties; Design of Bituminous Mixtures & reports- Desirable properties of mixes, Moisture susceptibility, stripping value, Fillers, Theory of fillers and specifications; Marshall Method MS-2; Foamed Asphalt Mix Design; Cold Mix Design. Concrete Mix Design - Constituents and their requirements, Physical, plastic and structural properties of concrete, Factors influencing mix design, Design of concrete mixes, porosity of concrete; Dry Lean Concrete; Pavement Quality Concrete (PQC)	12
5	**Alternative Pavement Materials:** Recycled Concrete aggregates, Reclaimed asphalt pavement materials, use of industrial and agricultural wastes for pavement construction, chemical and mineral admixtures	08
	Total	**42**

LABORATORY TESTS

S. No.	Course Description
1	**Soil and Aggregate testing:** Free Swelling Index (FSI) and Deleterious material content, CBR test, Unconfined Compression test, Sand equivalent test, aggregate polishing and skid resistance test, soundness test.
2	**Straight-run bitumen/Modified bitumen Tests:** Penetration value test, Elastic recovery test of binders & Dynamic Shear Rheometer (DSR)
3	Formulation of design mixes for sub-base and unbound base course (Granular Sub-base & Wet mix Macadam)

11 JUN 2019

4	**Bituminous Mixture:** Proportioning of aggregates, preparation of test specimens, and testing, formulations of bituminous mixtures (conventional bituminous mixtures for bound base courses
5	**Concrete mixes:** Proportioning of aggregates, preparation of test specimens, and testing, design of dry lean concrete mix, design of pavement quality concrete mix
6	**Alternative pavement materials:** Design of cement treated sub-base and base using reclaimed asphalt pavement materials.

Suggested Books:

S. No	Authors / Title / / Publisher	Year of publication
1	P. Kumar Mehta, Paulo J.M. Monteiro, "Concrete microstructure, properties, and materials, Third Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi.	2006
2	Dr. L.R. Kadyali and Dr. N.B. Lala, "Pricnciples and Practices of Highway Engineering", Khanna Publishers, New Delhi.	2010
3	Paul H. Wright and Karen K. Dixon, " Highway Engineering" Seventh EditionJohn Wiley & Sons, Inc.	2004
4	Yang H. Huang, "Pavement Analysis and Design", Second Edition, Pearson Prentice Hall.	2004
5	T.F. Fwa, "The Handbook of Highway Engineering", CRC, Taylor & Francis Group.	2006
6	S.K. Khanna, C.E.G. Justo and A.Veeragavan, "Highway Engineering" Revised 10th Edition, Nem Chand & Bros., Roorkee.	2015
7	Read, J. And Whiteoak, D., "*The Shell Bitumen Handbook*", Fifth edition, Shell Bitumen, Thomas Telford Publishing, London	2003

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT: Civil Engineering

1. Subject Code: **CEN- 661**
2. Course Title: **Advanced Highway Construction and Maintenance**
3. Contact Hours: **L: 3** **T: 1** **P: 2/2**
4. Examination Duration **Theory 3** **Practical 0**
5. Relative weight **CWS 15-30** **PRS 20** **MTE 15-25** **ETE 30-40** **PRE 0**
6. Credits: **4** 7. Semester **Spring**
8. Prerequisite: NIL 9. Subject Area: **PEC**
10. Objective of Course: To introduce the advances in highway construction and evaluation, making the students conversant with the different construction and evaluation techniques.
11. Details of the Course.

S. No.	Course Description	Contact hours
1	**Embankment & Subgrade** Setting Out. Clearing and Grubbing, Road formation width, Borrow Pits, Quarries, Construction under special cases, Embankment Construction, Subgrade construction, Backfilling, Preparation of cut formation, Surface and subsurface drains.	06
2	**Flexible Pavements** ***Subbase:*** Granular Subbase (GSB): ***Unbound Courses:*** Water Bound Macadam (WBM), Wet Mix Macadam (WMM); ***Bound Courses:*** Bituminous Macadam (BM), Dense Bituminous Macadam (DBM); ***Wearing Courses:*** Bituminous Concrete (BC), Semi Dense Bituminous Concrete (SDBC).	06
3	**Cement Concrete Pavement** Dry Lean Concrete (DLC), Roller Compacted Concrete Pavement (RCCP), Pavement Quality Concrete (PQC), Continuously Reinforced Concrete Pavement (CRCP), Cement Concrete Pavement Construction Techniques: Manual, Automated (Fixed Form, Slip Form).	10
4	**Highway Maintenance & Evaluation:** Need of Highway maintenance, methods of maintenance for flexible and rigid pavement layers; Load man, Different Types of Falling Weight Deflectometers (FWD) for evaluation of rigid and flexible pavements, Distress Modes - Cracking, Rutting etc. Factors influencing deflections, Back-calculation of Pavement Layer Moduli and detection of loss of bonding of cement concrete pavements using FWD data; Destructive Structural Evaluation; Different Methods of NDT(Working Principles): Benkelman Beam, Pavement Safety Evaluation: Skid Resistance, Purposes, functional Evaluation: Serviceability concepts, Distress types: Bituminous and Concrete pavements; Visual Rating; PSI; Methods of Measuring Roughness:	08
5	**Quality Control in Highway Construction:** Execution and quality control prior to construction, during construction and post construction: Standard deviation, mean, normal distribution, control chart – Quality audit of finished pavement – Performa of quality assurance records.	06
	Total	42

LABORATORY TESTS:

S. No.	Course Description
1	**Aggregate testing:** Aggregate polishing value and skid resistance test
2	**Straight-run bitumen/Modified bitumen Tests:** Emulsion and Cutback, PAV (Pressure ageing vessel) and RTFOT (Rolling thin film oven test) – video class & demonstration, bitumen viscosity test (Rotational viscometer) – video class & demonstration
3	**Bituminous Mixture:** Resilient modulus of bituminous mixture (video class & demonstration), foamed asphalt mixture, cold mixture), fatigue and rutting tests (video class and demonstration)

11 JUN 2019

4	**Concrete mixes:** Abrasion resistance test on hardened concrete (video class & demonstration), Concrete permeability test, Mercury Intrusion Porosimetry (MIP) –video class & demonstration
5	**Highway Maintenance related experiments:** Benkelman Beam tests, Merlin Test, Falling Weight Deflectometer, Axle Load Survey, Roughness survey of roads using Roughometer

Suggested Books:

S. No.	Authors / Title / / Publisher	Year of publication
1	Hou Xiangshen, Ma Songlin, "Highway maintenance and management" China communication Press.	2016
2	Sanford Eleazer Thompson, "Concrete in Highway Construction- A text book for highway engineers and supervisors" Forgotten Books Publisher	2018
3	Dr. L.R. Kadiyali and Dr. N.B. Lala, " Principles and Practices of Highway Engineering", Khanna Publisher.	2005
4	Richard Robinson, Uno, Danielson, Martin Snaith, "Road Maintnenance Management" Concepts and Systems, Palgrave publisher	1998
5	Kandhal Prithvi Singh, "Bituminous Road Construction in India", PHI Learning Private Limited, Delhi- 110092.	2016

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT: Civil Engineering

1. Subject Code: **CEN-662** Course Title: **Intersection Design and Analysis**
2. Contact Hours: **L: 3** **T: 1** **P: 0**
3. Examination Duration **Theory 3** **Practical 0**
4. Relative weightage **CWS 20-35** **PRS 0** **MTE 20-30** **ETE 40-50** **PRE 0**
5. Credits: **4** 6. Semester **Spring**
7. Prerequisite: NIL 8. Subject Area: **PEC**

9. Objective of Course: To discuss various methods of design and analysis of different types of road intersections and interchanges.
10. Details of Course

Sl No.	Topics to be covered	Contact hours
1	Types of intersections, Principles of design, types of maneuvers, relative speed, conflict points and area	6
2	Intersection geometrics and their influence on design/operation	3
3	Operational analysis of two-way and all-way stop controlled intersections and roundabouts by US and Indian methods, mini roundabouts	6
4	Analysis of signal controlled intersections by US, British and Swedish methods, delay and its evaluation	12
5	Types of signals, Design of signals by Indian, US and British methods, signal coordination	6
6	Grade separated intersections and interchanges	4
7	Weaving sections and their operational evaluation	3
8	Intersection signs, marking and lighting	2

Suggested Books:

S. No.	Name of Books / Authors / Publisher	Year of Publication
1	Transportation Engineering & Planning, by C. S. Papacostas and P. D. Prevedouros, Prentice Hall of India Private Limited, New Delhi	2001
2	Principles of Highway Engineering and Traffic Analysis, by Fred L Mannering, Walter P. Kilareski and Scott S. Washburn, Wiley India Edition	2007
3	Transportation Engineering, by C. Jotin Khistya and B. Kent Lall Prentice Hall of India Private Limited, New Delhi	2006
4	Transport Planning and Traffic Engineering, by C A O Flaherty, Hodder Headline Group, London	1997
5.	Highway Capacity Manual of US, by Transportation research Board, Washington DC	2000

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **Civil Engineering Department**

1. Subject Code: **CEN-663** Course Title: **Pavement Evaluation and Management**
2. Contact Hours: **L: 3** **T: 1** **P: 0**
3. Examination Duration (Hrs.): **Theory 3** **Practical 0**
4. Relative weightage **CWS 20-35** **PRS 0** **MTE 20-30** **ETE 40-50** **PRE 0**
5. Credits: **4** 6. Semester: **Spring** 7. Subject Area: **PEC**
8. Pre-requisite: Nil
9. Objective: To provide knowledge related to Evaluation and Management with respect to Road Development.
10. Details of Course:

S. No.	Contents	Contact Hours
1.	**Pavement Evaluation:** General concept of pavement evaluation, Evaluation of pavement performance; Evaluation of pavement structural capacity; Evaluation of pavement distress - Structural and functional, serviceability, fatigue cracking, pavement deformation and low temperature shrinkage cracking; Evaluation of pavement safety – Skid resistance, measurement, variation with time, traffic and climate, control.	6
2.	**Pavement Performance Evaluation:** Factors affecting performance, relation between performance and distress; Visual ratings, PSI, Methods of measuring roughness, response and profile; IRI – Quarter Car Model, riding number; Pavement performance prediction models for flexible and rigid pavements.	6
3.	**Pavement Structural Evaluation:** Different methods of NDT - Benkelman Beam, Bump Integrator, Dynaflect, LaCroix Deflectometer, Road Ratar, Rolling Dynamic Deflectometer, Loadman, Falling weight deflectometers; Factors influencing deflection; Back calculation of Pavement Layer Moduli; Flexible overlays and determination of overlay thickness. Rigid overlays and determination of overlay thickness. Design of Overlay by Benkelman Beam and Falling Weight Deflectometer.	12
4.	**Design Alternatives – Analysis, Evaluation and Selection:** Framework for pavement design, design objectives and constraints, Basic structural response models, characterization of physical design inputs, Generating alternative pavement design strategies. Economic evaluation of alternative pavement design strategies, analysis of alternative design strategies. Predicting distress, predicting performance, selection of optimal design strategies.	6
5.	**Pavement Management System (PMS):** Components and related activities, steps in implementation of a PMS; Design, construction and maintenance; Rehabilitation and Feedback data system; Examples of Working Design and Management Systems; Evaluation of alternate strategies and decision making; Techniques, tools and use of expert system in PMS.	8
6.	**Pavement Maintenance Management:** Components and related activities, Budgeting, Maintenance strategies and prioritization, Pavement life cycle cost analysis – components and methods.	4
	Total	42

11. Suggested Books:

S. No.	Name of Books / Authors	Year of Publication
1	Hass, R., Hudson, W.R. and Zaniewski, J. "Modern Pavement Management" Krieger.	1994
2	Fwa, T.F., "The Hand Book of Highway Engineering", CRC Press, Taylor & Francies Group.	2006
3	Shain, M.Y., "Pavement Management for Airports, Roads and Parking Lots", Kluwer Academic Publishers Group.	2004

11 JUN 2019

4	Khanna, S.K. and Justo, C.E.G., "Highway Engineering" Nem Chand & Bros, Roorkee (U.A.) 8th Ed.	2005
5	Hudson, W.R., Haas, R. and Uddin, W., "Infrastructure Management", McGraw Hill.	1997
6	Hass R. & Hudson, W.R., "Pavement Management System", Mc Graw Hill Company, Inc. New York	1978

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT/CENTRE : **Department of Civil Engineering**

1. Subject Code : **CEN -664** Course Title : **Transportation Planning**
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: **Spring** 7. Subject Area : **PCC**
8. Pre-requisite: **Nil**
9. Objective of Course: To introduce the concept of travel demand modeling using four-stage sequential transportation planning.

10. Details of the Course.

S. No.	Contents	Contact Hours
1	**Introduction to Transportation**: Fields of Transportation, Role in Society, System-Environment Ensemble, Transportation Problems	05
2	**Planning Process**: Hierarchical Structure; Characteristics and objectives of planning, Problem solving and its morphology, Planning methodologies; Overview of urban transportation planning; Urban structure interaction and concepts.	08
3	**Transportation Data:** Data needs and sources; Survey methodology, Quality v/s quantity, Errors, Data collection methods, Attitudinal surveys, Questionnaire design and standardization, Study area and analysis zones, Sample size, Sampling units, frames and techniques.	07
4	**Trips:** Aggregate and disaggregate analysis, Definitions, Types of trips, Factors affecting trip generation, Methods of trip generation, Methods of trip distribution – Growth Factor methods, Synthetic methods, merits and demerits.	08
5	**Modal Analysis and Assignment:** Mode choice sets, Modal split models – First and second generation, Stochastic models, Choice theories, Discrete choice analysis, Logit models, Model specification, estimation and validation; Network analysis, Route or tree building algorithms, Network assignments methods.	08
6	**Sustainable Transportation:** Issues and Guidelines of sustainable transportation, Planning for Mass Transit systems, Planning for Non-Motorized vehicles.	06
	Total	**42**

11. Suggested Books:

S. No.	Name of Authors/Books/Publishers	Year of Publication/ Reprint
1	B. G. Hutchinson, "Principles of Urban Transport Systems Planning" Scripta Book Co., Washington	1974
2	Anthony J. Richardson, Elizabeth S. Ampt and Arnim H. Meyburg, "Survey Methods for Transport Planning" Eucalyptus Press, Australia.	1995
3	Roy Thomas, "Traffic Assignment Techniques", Avebury Technical, Aldershot, England	1991
4	C A O'Flaherty, ed , "Transport Planning and Traffic Engineering", Butterworth Heinemann, Elsevier, Burlington, MA	2006

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT/CENTRE : **Department of Civil Engineering**

6. Subject Code : **CEN -665** Course Title : **Road Traffic Safety**

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

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

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

10. Credits : **04** 6. Semester: **Spring** 7. Subject Area : **PEC**

12. Pre-requisite: **Nil**

13. Objective: To introduce the concepts of traffic safety on highways and to make students familiar with related analytical methods and remedial measures.

14. Details of course:

S. No.	Contents	Contact Hours
01	Introduction: Road traffic accidents scenario in India, characteristics of accidents, accident vs. crash, effect of human factors, planning for road network, land use and road environment for safety, designing for road safety – links and junctions, road safety engineering, road safety improvement strategies, elements of a road safety plan.	06
02	Crash investigation and analysis: Steps in treatment of crash locations, diagnosing crash problem and solutions, accident report form, storing of data, using and interpreting crash data, identifying and prioritizing hazardous locations, condition and collision diagrams; Vulnerable road users: crashes related to pedestrian and bicyclists, their safety, provision for disabled; Crash reconstruction: understanding basic physics, calculation of speed for various skid, friction, drag, and acceleration scenarios.	08
03	Statistical analysis of accidents: Descriptive statistics, confidence interval, hypothesis testing, models related to accident frequency, accident severity, accident duration, various methodological issues – over/under dispersion, time-varying explanatory variables, unobserved heterogeneity, endogeneity, under-reporting, spatial and temporal correlation, etc; Accident prediction model.	08
04	Before -after methods in crash analysis: Before and after study, before and after study with control sites, comparative parallel study, before, during and after study, Empirical Bayes method.	04
05	Economic analysis of accidents: Accident costing-economic appraisal, EUAC, PWOC, B/C ratio, IRR, NPV.	04
06	Traffic management system: Traffic flow improvements, expressway patrol, public transit, ridesharing, mobility rest areas, park-and-ride lots, bus bays, signage, markings; ITS applications - vehicular navigation, crash avoidance system, incident management, traffic management centre, highwayside communication.	06
07	Road safety audits: Procedure, aims and objectives, roles and responsibility, history of road safety audit, design standards, tasks, various stages of safety audits; common identifiable problems, structuring of report, identifying common problems.	06
	Total	**42**

11. Suggested books

S. No.	Name of Authors/Books/Publishers	Year of Publication/ Reprint
1	American Association of State Highway and Transportation Officials (AASHTO), "Highway Safety Manual", 1st Edition, AASHTO.	2010
2	Simon P. Washington, Matthew G. Karlaftis, Fred L. Mannering, "Statistical and Econometric Methods for Transportation Data Analysis", 2nd Edition, Chapman &Hall/CRC Press,	2010
3	Ezra Hauer, "Observational Before -After Studies in Road Safety", Pergamon Press.	1997

11 JUN 2019

4	Limpert, Rudolf. "Motor Vehicle Accident Reconstruction and Cause Analysis", 5th Edition, Lexas Publishing, Charlottesville, VA.	1999
5	Indian Roads Congress, "Highway Safety Code", IRC: SP-44:1996	1996
6	Indian Roads Congress, "Road Safety Audit Manual", IRC:SP-88-2010	2010

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT/CENTRE : **Department of Civil Engineering**

1. Subject Code : **CEN-666** Course Title : **Transport Economics**
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: **Spring** 7. Subject Area : **PEC**
8. Pre-requisite: **Nil**
9. Objective of Course: The course provides an outline of demand and supply side concepts and their application to transport policy and planning issues.

10. Details of the Course.

S. No.	Contents	Contact Hours
01	**Introduction and Overview: B**asic components of transport, economic development and urban development. Economic theory, transport as an economic activity, demand and supply issues in transportation sector, demand - supply equilibrium, cost and pricing of transport, law of diminishing returns, elasticity and consumer surplus, costs, pricing and subsidy policies, elements of engineering economics.	06
02	**Transportation Demand and Congestion:** Demand - Demand forecasting methods, factors influencing transport demand, direct and cross - price elasticity of demand, factors that cause shifts in demand function; Congestion - Main causes of traffic congestion, Mechanisms to deal with traffic congestion - congestion pricing, road space rationing, capacity expansion.	07
03	**Transport Supply and Regulation:** Supply - Supply of transport services, development of systems supply function; Regulation - Command and control type of regulation, fiscal measures such as road pricing and environmental taxation, safety and economic regulations in the context of transport services provided by public, issues of social, geographical and temporal equity.	06
04	**Transport Costs and Pricing:** Costs-Direct and external costs of transport, concept of generalized costs, social aspects of transport, joint and common costs of infrastructure, average and marginal cost principle, short-term and long-term costs of supply, congestion costs, external costs, Road User Cost and it's components; Pricing- Pricing principles, the marginal cost pricing rule, efficient pricing, cost complexities and cost recovery, peak-load pricing, second-best pricing, Transport subsidies, price discrimination.	10
05	**Appraisal and Evaluation of Transportation Projects:** Feasibility and evaluation, cost, impacts and performance levels, evaluation of alternatives, analysis techniques, cost-benefit analysis, social and financial benefits, Internal Rate of return method for economic and financial viability, valuation of time, measures of land value and consumer benefits from transportation projects, prioritization of projects, multi-criteria decision assessment.	08
06	**Funding and Financing of Transportation Projects:** Methods for raising funds for maintenance, improvement and expansion of transportation networks, taxation and user fee, financing through loans, bonds, PPPs and concessions.	05
	Total	**42**

11 JUN 2019

11. Suggested Books:

S. No.	Name of Authors/Books/Publishers	Year of Publication/ Reprint
1	Mccarthy, P.S., "Transportation Economics – Theory and Practice : A Case Study Approach", Blackwell Publishing.	2001
2	E. Quinet; R. Vickerman and R. W. Vickerman, "Principles of Transport Economics", Edward Elgar Publishing.	2004
3	Button, K. J., "Transportation Economics", 3rd Ed., Edward Elgar Publishing.	2010

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT: Civil Engineering

1. Subject Code: **CEN-667** Course Title: **Transportation Studies and Analysis Lab**
2. Contact Hours: **L:0** **T:0** **P:4**
3. Examination Duration (Hrs.): **Theory : 0** **Practical : 3**
4. Relative Weight: **CWS: 0** **PRS: 50** **MTE: 0** **ETE: 0** **PRE: 50**
5. Credits : **02** 6. Semester : **Spring** 7. Subject Area: **PEC**
8. Pre-requisite: **Nil**
9. Objective : To make students conversant with the analysis and design using traffic and transportation planning data, either manually or using a dedicated software
10. Details of the Course:

S.N.	Contents	Contact Hours
	Observational Studies	**24**
1	Traffic Volume and Intersection/ Turning Movement Study	
2	Spot Speed, Travel Time and Delay Study	
3	Origin Destination Study and Household Survey	
4	Parking and Pedestrian Study	
5	Accident and Traffic Noise Study	
	Software Based Analysis	**32**
6	Alignment and Profile Design	
7	Four-Step Travel Demand Estimation	
8	Video-metric Volume and Speed Analysis	
9	Logit Analysis and Modelling	
	Total	**56**

11. Suggested Books

S. N	Name of Authors/Books/Publishers	Year of Publication
1.	Roger P Roess, Elena S Prassas, William R McShane, "Traffic Engineering" 4th Ed, Prentice Hall.	2011
2.	May, A.D., "Fundamentals of Traffic Flow", Prentice Hall, Inc. 2nd Ed.	1990
3.	C Jotin Khisty and B Kent Lall, 'Transportation Engineering – An Introduction", Prentice Hall India	2006
4.	Kadiyali, L.R., "Traffic Engineering and Transport Planning", Khanna Publishers.	2008
5.	Relevant software available in IIT Roorkee	

11 JUN 2019

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Name of the Dept.: **Department of Civil Engineering**

1. **Subject code:** CEN-668 **Course Title:** Multi-agent transport simulation framework
2. **Contact hours:** **L: 0** **T: 0** **P: 4**
3. **Examination duration (hrs):** **Theory: 0** **Practical: 3**
4. **Relative weight: CWS: 0 PRS: 50 MTE: 0 ETE: 0 PRE: 50**
5. **Credits: 02** 6. **Semester: Spring** 7. **Subject area: PEC**
8. **Pre-requisite:** Nil
9. **Objectives of the course:** To Introduce agent-based simulation and its applications regarding co-evolutionary algorithms, dynamic traffic assignment, transport economics and travel behavior analysis, and policy inferencing.
10. **Details of the course:**

S. No.	Contents (Software)	Contact hours
1	**Scenario Generation: (MATSim, QGIS)** - Writing first program, basics of Java; coordinate system, MATSim controller, inputs - network generation, travel demand generation, facilities, behavioral parameters, GIS and importance in travel demand	12
2	**Network loading algorithm: (MATSim, VIA)** - queue model, kinematic wave model - mixed traffic simulation, - computational performance	12
3	**Analysis: (MATSim, VIA)** - understanding standard output - reading and analyzing events	08
3	**Re-planning: (MATSim, VIA)** - choice dimensions (e.g. time choice, route choice, mode choice etc.) - scoring (utility function) - impact of socio-demographic attributes	12
4	**Policy cases: (MATSim, VIA)** - user welfare, system welfare - pricing schemes - non-motorized modes	12
	Total	56

11. Suggested Books:

S. No.	Name of Books / Authors	Year of Publication
1	Stefania Bandini, Sara Manzoni, Giuseppe Vizzari, "Agent based modeling and Simulation"	2012
2	Klügl, Franziska, Bazzan, Ana, Ossowski, Sascha (Eds.), "Application of agent technology in Traffic and Transportation	2005
3	Andreas Horni, Kai Nagel, Kay W. Axhausen, "The multi-Agent Transport Simulation"	2016

11 JUN 2019

Name of the Department/Centre: **HYDRO AND RENEWABLE ENERGY**

1. Subject Code: **IAH-303** Course Title: **Solar Photovoltaic Technology and Applications**
2. Contact Hours: **L: 3** **T: 0** **P: 0**
3. Examination Duration (Hrs.): **Theory: 3** **Practical: 0**
4. Relative Weightage: **CWS: 20-35** **PRS: 0** **MTE: 20-30** **ETE: 40-50** **PRE: 0**
5. Credits: **3** 6. Semester: **Both** 7. Subject Area: **OEC**
8. Pre-requisite: **Nil**
9. Objective: To acquaint the UG students with various aspects of solar PV technology and its applications.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction to photovoltaic technology; Scenario and status of solar photovoltaic technology in India and the World; Solar energy mission, policies and financing.	6
2.	Solar radiation – basic concepts, assessment and variability; Photovoltaic meteorology	7
3.	Fundamentals of semiconductors; Structure and working of solar cells; Characteristics and electrical models of solar cells.	7
4.	Overview of solar cell technologies: Silicon solar cell and Thin-film solar cell: Amorphous silicon, Thin polycrystalline silicon, Copper indium, Cadmium telluride.	5
5.	Components of solar PV system: photovoltaic generator; battery; power conditioning and control; Characteristics of solar modules and solar PV systems.	5
6.	Types of photovoltaic systems: grid-connected systems, stand-alone systems, hybrid systems.	6
7.	Design of stand-alone PV plants and grid-connected PV plants: phase, frequency matching and voltage conditioning, power transfer, operation of grid interaction inverter; protection, Operation and maintenance of Solar PV systems.	6
	TOTAL	**42**

11. Suggested Books:

S. No.	Name of Authors/Books/ Publisher	Year of Publication
1.	Mertens, K., "Photovoltaics: Fundamentals, technology and practice", 1st edition, Wiley	2014
2.	Solanki, C. S., "Solar photovoltaics: Fundamentals, technologies and applications", 3rd edition, PHI Learning	2016
3.	Boxwell, M., "Solar Electricity Handbook – 2019 Edition", Greenstream Publishing	2019
4.	Waltz, C., "Photovoltaics: Engineering and Technology for Solar Power", Syrawood Publishing House	2017
5.	Kalogirou, S.A., "Solar Energy Engineering: Processes and Systems", Academic Press	2013
6.	Reddy, P. J., "Science and technology of photovoltaics", 2nd edition, CRC Press	2012

12. Suggested web references for policies: www.mnre.gov.in; websites of state renewable energy development authorities of various states of India

11 JUN 2019