QIP

QUALITY IMPROVEMENT PROGRAMME

Advance Admission to Ph.D. Programme for the
Academic year 2022-2023 (Final Admission: 2023-2024)
(for the full Time/Permanent Faculty of AICTE approved Degree Level Engineering Institutions)

INFORMATION BROCHURE

(PhD Programme)

All India Council for Technical Education

(A statutory Body of Government of India)
Admission coordinated by

Principal Coordinator QIP

Indian Institute of Technology Kharagpur
Kharagpur-721302, West Bengal
www.cep.iitkgp.ac.in/qip

DATES TO REMEMBER	
Opening of online Application Portal	1st March, 2022 (Tuesday)
Closing of online Application Portal	31st March, 2022 (Thursday)
Last date for receipt of duly forwarded Applications along with enclosures	11th April, 2022 (Monday)

Both online and hardcopy of the application are required for processing.
Single version of the application will not be considered.

Dear Prospective QIP Scholar,

Your interest in the Quality Improvement Programme (QIP) sponsored by All India Council for Technical Education (AICTE) is appreciated. The principle objective of this programme is to enhance and upgrade the expertise and capabilities of faculty members of the AICTE approved degree-level engineering institutions. The programme, launched by the Government of India in the year 1970, is now being implemented and monitored by the National QIP Coordination Committee (NQCC) funded through AICTE.

There are three main activities under QIP scheme for the faculty of degree-level engineering institutions:

- Providing opportunities to teachers of the degree-level engineering institutions to improve their qualifications by offering admissions to Master degree and Ph.D. programme.
- Organizing Short Term Courses at the QIP Centres for serving teachers in various emerging areas of technology and research.
- Curriculum Development Cell activities which helps to improve the classroom teaching and learning.

These activities are undertaken by eleven major QIP centres at IITs and IISc. Admission to Master degree and Ph.D. programme is also offered (in selected areas) in institutions recognized as Minor QIP centres. A large number of teachers from engineering institutions from all over the country have pursued Master degree and Ph.D. programme under this scheme. These activities are aimed at improving the standard and quality of technical education through improvement in the qualification of the faculty members of the various engineering institutions.

In the past, a Curriculum Development Cell was also set up at major QIP Centres for improving the effectiveness of technical education in the country. Its activities included curriculum development and revision or preparation of monographs, textbooks, teachers' manuals, teaching aids and other resource materials, examination reforms, organizing inter institutional programs, seminars, workshops and panel discussions, development of educational technology, creation of methodologies for formal and informal trainings, technical education of the handicaps, etc. A number of short term courses have also been organized by major QIP centres for the benefit of the faculty members of Engineering Institutions across the country.

The following QIP websites will give you necessary information about the programme as well as about the requirements and procedure to apply for admission in Master degree/Ph.D. programme: www.aicte-India.org, http://cce.iisc.ernet.in, www.qip.iitb.ac.in, http://cepqip.iitd.ac.in, www.iitg.ac.in/cet/qip.html, www.iitk.ac.in/qip, www.cep.iitkgp.ac.in/qip, www.iitm.ac.in/qip, www.iitr.ac.in/qip, www.iitbhu.ac.in/qip. The details of the disciplines and specializations available at various centres are listed on the website and are also available in the admission brochure to enable you to make appropriate choices. M.Tech. degree programmes are no more supported under QIP.

Access to the online portal for submission of application opens on **March 01, 2022 (Tuesday)**. The last date for online submission of the application is **March 31, 2022 (Thursday).** Please note that the last date for submission of the hard copy of the application (**only one original copy is to be submitted**) is **April 11, 2022 (Monday)**. Submission of online as well as hard copy of the application is mandatory. The hard copy should be sent to: **The Principal Coordinator QIP, Associate Dean, Outreach (CE&T/IoE), IIT Kharagpur-721302, West Bengal.**

The procedure of admission under QIP involves the following steps:

- Scrutiny of all applications in the office of the Principal Coordinator QIP.
- Shortlisting of candidates by the QIP centres for interview and dispatch of call letters (by emails) to the selected candidates.
- Conduction of online interviews of the shortlisted candidates by the QIP centres.
- Recommendations by the QIP centres to the National QIP Coordination Committee.
- Final selection by the National QIP Coordination Committee, and
- Offer of Admission by the Institution where the final selection has been recommended by the NQCC.

The schedule of ONLINE interview at various QIP Centres will be announced in due course of time. For further information about the QIP, the application form or any associated item, you may contact the Principal Coordinator QIP or any of the Coordinators of the QIP Centres listed in the QIP websites and the brochure.

For further information about a particular institution or a particular department there in, you may directly write to the Head of concerned department or the QIP Coordinator of the institution.

The website www.iitg.ac.in/cet/qip.html will be updated periodically at each of the timelines. Please visit this website periodically to check for updates in the application and selection process.

Wish you all the best!

Prof. Debjani Chakraborty
Principal Coordinator QIP
Associate Dean,
Outreach (CE&T/IoE)
Indian Institute of Technology Kharagpur
Kharagpur 721302, West Bengal
www.cep.iitkgp.ac.in/qip

I. GENERAL INFORMATION

1. The major QIP Centres at IITs and IISc offers admission to Ph.D. degree programme in several disciplines. In addition, institutions recognized as the minor QIP Centres, including some Central Govt. R&D Institutions (CSIR, DRDO, DAE, DOS), also offer admission to Ph.D. degree programme under QIP in some specific departments/research area.

2. Prior to regular admission to the Ph.D. programme at a QIP Centre, a candidate is required to complete a pre- Ph.D. contact programme (Advance Admission Scheme). The duration of the pre-Ph.D. programme is 60 (sixty) days and that of the regular Ph.D. Degree Programme is 3 (three) years.

3. Candidate should visit the website www.iitg.ac.in/cet/qip.html for submitting online application, updated information related to receipt of completed application, candidates called for interview, selected list of candidates and all other information pertaining to QIP admission.

4. Candidate should read the **brochure** thoroughly before **i)** filling the fields **in the online application** and **ii)** sending the final print-out of the Principal Coordinator's Copy (duly forwarded by the Head of Institution). **Please note that the candidates are required to send only one originalcopy to the Principal Coordinator. It is mandatory for the candidates to upload scanned copies of all the relevant certificates/documents while submitting the online application.**

5. Candidates must first submit their application form (along with all the relevant certificates/documents) online through **www.cep.iitkgp.ac.in/qip** (**applications without online submission of application as well as certificates/documents will not be considered**). Candidate should make sure that proper Institute/ Discipline codes are entered and all relevant details are duly filled in the respective fields. Access to the link for online submission of application opens on **March 01, 2022 (Tuesday)**. The last date for online submission of the application is **March 31, 2022 (Thursday).** and last date for receipt of duly forwarded application along with enclosures(only one Principal Coordinator's copy) is **April 11, 2022 (Monday).**

6. After filling the application online, candidates should send the print out of the Principal Coordinator's Copy (only one copy is required to be sent), duly forwarded by the Principal/ Head of the Institution, as instructed, along with all relevant enclosures and the to: **The Principal Coordinator QIP, Associate Dean Outreach (CE&T/IoE), IIT Kharagpur, Kharagpur-721302, West Bengal**.

7. The candidate and the Principal/Head of the Institution forwarding the application should ensure that the application is to be sent to **The Principal Coordinator QIP, Associate Dean Outreach (CE&T/IoE), IIT Kharagpur, Kharagpur-721302, West Bengal**, so as to reach **on or before April 11, 2022 (Monday). Applications received after this date will not be considered.** Acknowledgement of the receipt of the application will be sent by email.

8. Information given by the candidate in the application for all of the options chosen must be uniform and correct. In case of any difference observed in the data relating to experience, marks, designation, addresses, age, etc., his/her candidature is liable to be cancelled at any stage even after the selection/ admission.

9. **Applications submitted without the full support and recommendation by the appropriate authority (Head of the Institute) with seal, and/or without the required enclosures will automatically be rejected. Please note that no corrections/ additions/ deletions to the recommendation format is permitted. Changes to the format of the forwarding/ recommendation note will not be accepted.**

10. The application number allotted during the online registration should be quoted in all correspondences, and **such correspondences should be routed through the Principal/ Head of the candidate's parent institution.** If the application number changes due to some unavoidable circumstances, this change will be intimated through email to the candidate. The changed application number may be quoted in all cases.

11. Short-listed candidates will receive Interview Call/ Admission letter from the respective QIP Coordinator of the Institute, where they have applied to seek admission. The Principal Coordinator QIP will not send any Call letter to the candidate directly.

12. Though it is not mandatory to attend interviews at all the institutes the candidates opted for, it is recommended that the candidates attend all of them since a recommendation from one department does not ensure/authenticate final seletion in that institute. Moreover, as per the norms, the recommendation from a department is always confidential.

13. **Schedule of Online Interview will be announced in due course of time.** Candidates are required to appear in interview through virtual mode only.

14. While allotting the seats, the candidates' choices will be given the first preference rather than the ranks given by the institutes. The Ranks will be used as a tie-breaker to select the candidates if more than one candidate has given the first choice to an institute/program (if the number of seats is limited).

15. Concessions, relaxation, and reservation for candidates belonging to SC/ST/OBC/Physically Disabled (PD)/Female candidate are as per rules. The reservation rules of GOI will be applied to over all admissions by the NQCC. The selection of a candidate is considered only after the recommendation of the major/ minor QIP center.

II. INSTITUTIONS OFFERING Ph.D. DEGREE PROGRAMME UNDER QIP AND THEIR CODES

Sl. No.	Name of the Institute/ University	Code
Institutions that are Major QIP Centres: The QIP Centres of the following institutions offer admission to Ph.D. degree programme in several disciplines (available in those institutions):		
1	Indian Institute of Science Bangalore – 560 012	**BG**
2	Indian Institute of Technology Bhubneshwar (Orissa) – 751 013	**BH**
3	Indian Institute of Technology Bombay, Mumbai – 400 076	**BM**
4	Indian Institute of Technology Delhi, New Delhi – 110 016	**DL**
5	Indian Institute of Technology Guwahati, Guwahati – 781 039	**GW**
6	Indian Institute of Technology Hyderabad (Telengana) – 502 285	**HY**
7	Indian Institute of Technology Kharagpur, Kharagpur – 721 302	**KH**
8	Indian Institute of Technology Kanpur, Kanpur – 208 016	**KN**
9	Indian Institute of Technology Madras, Chennai – 600 036	**MD**
10	Indian Institute of Technology Roorkee, Roorkee – 247 667	**RR**
11	Indian Institute of Technology (BHU), Varanasi – 221 005	**VN**
Other Institutions that are Minor QIP Centres: The following recognized institutions also offer admission to Ph.D. Degree Programme under QIP insome specific departments as given below:		
12	Alagappa Chettiar Government College of Engineering and Technology Karaikudi, (Tamilnadu) - 630 003 (i) Civil Engineering (ii) Electrical and Electronics Engineering (iii) Mechanical Engineering.	**AC**
13	Government College of Engineering, Amravati (Maharashtra) – 444 604 (i) Electrical Engineering (ii) Mechanical Engineering (iii) Civil Engineering.	**AM**
14	Anna University, AC Technology Campus, Chennai (Tamilnadu) – 600 025 (i) Chemical Engineering (ii) Leather Technology (iii) Textile Technology (iv) Biotechnology.	**AU**
	Anna University, College of Engineering Campus, Guindy, Chennai (Tamilnadu) – 600 025 (i) Civil Engineering (ii) Electrical Engg. (iii) Information and Communication Engg. (iv) Mechanical Engineering.	
	School of Architechture and Planning, Guindy, Chennai (Tamilnadu) – 600 025 (i) Architechture Planning.	
	Anna University, Madras Institute of Technology, Chennai (Tamilnadu) – 600 044 (i) Aerospace Engineering (ii) Automobile Engineering (iii) Electronics Engineering (iv) Instrumentation Engineering (v) Production Technology.	
15	Basaveshwar Engineering College, (Autonomous), Bagalkot (Karnataka) – 587 102 (i) Civil Engineering (ii) Mechanical Engineering (iii) Electrical Engineering (iv) Electronics & Communication Engineering (v) Production Technology.	**BA**
16	Indian Institute of Engineering Science and Technology, Shibpur (West Bengal) – 711 103 (i) Civil Engineering (ii) Electrical Engineering (iii) Mechanical Engineering (iv) Mining Engineering (v) Aerospace Engg. & AppliedMechanics (vi) Information Technology (vii) Metallurgy & Materials Engineering	**BE**
17	B.M.S. College of Engineering, Bangalore (Karnataka) – 560 019 (i) Civil Engineering (ii) Electrical Engineering (iii) Mechanical Engineering (iv) Industrial Engineering & Management (v) Computer Science & Engineering.	**BS**
18	College of Technology & Engineering, MPUAT, Udaipur (Rajasthan) – 313 001 (i) Electrical Engineering (ii) Farm Machinery & Power Engineering (iii) Processing & Food Engineering(iv) Soil & Water Engineering (v) Renewable Energy Engineering.	**CA**
19	Coimbatore Institute of Technology, Coimbatore (Tamilnadu) – 641 014 (i) Civil Engineering (ii) Mechanical Engineering (iii) Electrical & Electronics Engg. (iv) Chemical Engineering.	**CC**
20	National Institute of Technology, Calicut (Kerala) – 673 601 (i) Civil Engineering (ii) Electrical Engg. (iii) Electronics & Communication Engg. (iv) Mechanical Engineering.	**CL**
21	College of Engineering, Pune (Maharashtra) – 411 005 (i) Civil Engineering (ii) Mechanical Engg. (iii) Production Engineering (iv) Electrical Engg. (v) Electronics & Telecommunication(vi) Computer Engg. (vii) Instrumentation & Control (viii) Metallurgy & Materials Science.	**CP**
22	College of Engineering Trivandrum, Thiruvananthapuram (Kerala) – 695 016 (i) Civil Engineering (ii) Mechanical Engg. (iii) Electrical Engg. (iv) Electronics & Communication Engineering.	**CT**
23	Delhi Technological University, Delhi – 110 042 (i) Civil Engineering (ii) Mechanical Engg. (iii) Electrical Engineering (iv) Polymer Science & Chemical Technology.	**DD**
24	Deenbandhu Chhotu Ram University of Science & Technology, Murthal, Haryana-131039	**DM**

25	Bannari Amman Institute of Technology, Erode (Tamil Nadu) – 638 401 (i) Biotechnology (ii) Computing Science & Engineering (iii) Electronics & Communication Engineering.	**ER**
26	Govt. College of Engineering, Aurangabad (Maharashtra) – 431 005 (i) Civil Engineering (ii) Electrical Engineering (iii) Electronics & Communication Engineering.	**GA**
27	G.B. Pant Institute of Engineering and Technology, Pauri-Garhwal, Uttarakhan-246194	**GB**
28	Govt. Engineering College, Salem (Tamil Nadu) – 680 009 (i) Civil Engineering (ii) Mechanical Engineering (iii) Electrical Engineering.	**GC**
29	Govt. Engineering College, Govt. of Kerala, Thrissur (Kerala) – 680 009 (i) Civil Engineering (ii) Mechanical Engineering (iii) Electrical Engineering.	**GK**
30	Guru Nanak Dev Engineering College, Ludhiana (Punjab) – 141 006 (i) Civil Engineering (ii) Mechanical Engineering (iii) Electrical Engineering.	**GN**
31	Shri G. S. Institute of Technology & Science, Indore (Madhya Pradesh) – 452 003 (i) Civil Engineering (ii) Electrical Engineering (iii) Electronics & Communication Engineering (iv) Computer Science & Engineering(v) Mechanical Engineering (vi) Industrial & Production Engineering	**GS**
32	Giani Zail Singh Campus College of Engineering & Technology, Bathinda (Punjab) – 151 001 (i) Computer Science & Engineering (ii) Mechanical Engineering (iii) Electrical Engineering (iv) Civil Engineering.(v) Electronics & Communication Engineering (vi) Textile Engineering.	**GZ**
33	Harcourt Butler Technological Institute, Kanpur (Uttar Pradesh) – 208 002 (i) Civil Engineering (ii) Mechanical Engineering (iii) Electronics Engineering (iv) Chemical Engineering.	**HK**
34	Indira Gandhi Institute of Technology, Sarang (Odisha) – 759 146 (i) Civil Engineering (ii) Mechanical Engineering (iii) Electrical Engineering.	**IO**
35	Indian Institute of Technology Indore (Madhya Pradesh) – 453 552 (i) Computer Science and Engineering (ii) Electrical Engineering (iii) Mechanical Engineering (iv) Civil Engineering (v) Bio-Sciencesand Bio-Medical Engineering.	**IR**
36	Indian Institute of Technology (Indian School of Mines), Dhanbad (Jharkhand) – 826 004 (i) Mining Engineering (ii) Mechanical Engineering (iii) Civil Engineering (iv) Electrical & Electronics Engineering (v) Electrical &Communication Engineering (vi) Computer Science & Engineering.	**IS**
37	Dr. B. R. Ambedkar National Institute of Technology, Jalandhar (Punjab) – 144 011 (i) Chemical Engineering (ii) Computing Science & Engineering (iii) Mechanical Engineering (iv) Electronics & CommunicationEngineering.	**JL**
38	Jamia Millia Islamia University, New Delhi – 110 025 (i) Electrical Engineering.	**JM**
39	Jadavpur University, Kolkata (West Bengal) – 700 032 (i) Electrical Engg. (ii) Electronics & Telecommunication Engg. (iii) Mechanical Engg. (iv) Production Engineering.	**JU**
40	Kamla Nehru Institute of Technology, Sultanpur (Uttar Pradesh) – 228 118 (i) Electrical Engineering.	**KS**
41	Indian Institute of Technology Mandi (Himachal Pradesh) – 175 005 (i) Computing Science & Engineering (ii) School of Engineering (iii) School of Basic Science.	**MA**
42	M. S. Ramaiah Institute of Technology, Bengaluru (Karnataka) – 560 054 (i) Mechanical Engineering (ii) Electrical & Electronics Engineering (iii) Civil Engineering.	**MB**
43	Madhav Institute of Technology & Science, Gwalior (Madhya Pradesh) – 470 005 (i) Civil Engg. (ii) Architecture. (iii) Electrical Engg. (iv) Computer Science & Engg. (v) Mechanical Engineering.	**MG**
44	Malaviya National Institute of Technology, Jaipur (Rajasthan) – 302 017 (i) Chemical Engineering (ii) Civil Engineering (iii) Electrical Engg. (iv) Mechanical Engineering (v) Metallurgical & Materials (vi)Electronics & Communication Engineering (vii) Computer Engineering (viii) Centre for Energy and Environment Engineering (ix)Management Studies (x) Architecture and Planning (xi) National Centre for Disaster Mitigation and Management.	**MJ**
45	Madan Mohan Malaviya University of Technology Gorakhpur (Uttar Pradesh) – 273 001 (i) Civil Engineering (ii) Electrical Engg. (iii) Electronics & Communication Engg. (iv) Mechanical Engineering.	**MM**
46	Motilal Nehru National Institute of Technology, Allahabad (Uttar Pradesh) – 211 004 (i) Applied Mechanics (ii) Biotechnology (iii) Civil Engineering (iv) Computer Science & Engineering (v) Electrical Engineering (vi)Electronics and Communication Engg. (vii) Mechanical Engineering (viii) Chemical Engineering (ix) Chemistry (x) Humanities &Social Sciences (xi) Physics (xii) School of Management Studis (xiii) GIS Cell.	**MN**
47	National Institute of Technology Agartala (Tripura) – 799 046 (i) Mechanical Engineering (ii) Electronics & Communication Engg. (iii) Electrical Engineering (iv) Production Engineering (v) CivilEngineering.	**NA**
48	National Institute of Technical Teachers Training & Research (NITTTR, Chandigarh-160019	**NC**
49	National Institute of Technology Durgapur (West Bengal) – 713 209 (i) Biotechnology (ii) Chemical Engg. (iii) Civil Engineering (iv) Computer Science & Engineering (v) Electronics & CommunicationEngg. (vi) Electrical Engg. (vii) Mechanical Engg. (viii) Metallurgical Materials Engineering.	**ND**
50	National Institute of Foundry and Forge Technology, Hatia, Ranchi (Jharkhand) – 834 003 (i) Manufacturing Engineering (ii) Materials & Metallurgical Engineering.	**NF**
51	National Institute of Technology Hamirpur – 177 005 (Himachal Pradesh) (i) Civil Engineering (ii) Mechanical Engineering (iii) Electrical Engineering (iv) Electronics and Communication (v) ComputerScience & Engineering (vi) Energy and Environmental Engineering.	**NH**

52	National Institute of Technology (NIT) Srinagar, (Jammu and Kashmir) – 190 006 (i) Civil Engineering (ii) Mechanical Engineering (iii) Electrical Engineering (iv) Electronics and Communication	**NJ**
53	National Institute of Technical Teachers Training & Research (NITTTR), Kolkata (West Bengal) – 700 106 (i) Electrical Engineering (ii) Mechanical Engineering (iii) Civil Engineering (iv) Computer Science & Engineering.	**NK**
54	The National Institute of Engineering, Mysore (Karnataka) – 570 008 (i) Civil Engineering (ii) Electrical Engg. (iii) Industrial & Production Engg. (iv) Computer Science & Engineering	**NM**
55	Netaji Subhas Institute of Technology, New Delhi – 110 078 (i) Electronics & Communication Engineering (ii) Computer Engineering (iii) Instrumentation & Control Engineering (iv) MechanicalEngineering (v) Bio-technology.	**NN**
56	National Institute of Technology Raipur – 492 001 (Chhattisgarh) (i) Civil Engineering (Water Resources Development and Irrigation Engineering).	**NR**
57	National Institute of Technology Silchar (Assam) – 788 010 (i) Civil Engineering (ii) Computer Science & Engineering (iii) Electrical Engineering (iv) Electronics & Communication Engineering(v) Mechanical Engineering.	**NS**
58	University College of Engineering, Osmania University, Hyderabad, (Telangana) – 500 007 (i) Civil Engineering (ii) Mechanical Engineering (iii) Electrical Engineering (iv) Electronics and Communication Engineering (v)Computer Science & Engineering.	**OU**
59	Indian Institute of Technology Patna (Bihar) – 801 103 (i) Mechanical Engineering (ii) Chemical & Biochemical Engineering (iii) Civil & Environmental Engineering(iv) ComputerScience & Engineering (v) Electrical Engineering.	**PA**
60	PDPM Indian Institute of Information Technology Design & Manufacturing, Jabalpur (Madhya Pradesh) – 482 005 (i) Computer Science & Engineering (ii) Electronics & Communication Engineering (iii) Mechanical Engineering.	**PD**
61	PSG College of Technology, Coimbatore (Tamil Nadu) – 641 004 (i) Mechanical Engineering (ii) Production Engineering (iii) Automobiles Engineering (iv) Electronics & Communication Engineering(v) Biotechnology (vi) Biomedical Engineering (vii) Instrumentation & Control System Engineering.	**PS**
62	Puducherry Technological University, Puducherry – 605 014 (i) Electronics & Communication Engineering (ii) Computer Science & Engineering (iii) Electrical & Electronics Engineering (iv)Mechanical Engineering (v) Civil Engineering.	**PY**
63	Rajasthan Technical University, Akelgarh, Kota, Rajasthan-324010	**RA**
64	Rajiv Gandhi Institute of Petroleum Technology, Bahadurpur, Amethi, Uttarpradesh-229304	**RB**
65	Rajiv Gandhi Institute of Technology, Govt. Engineering College, Kottayam (Kerala) – 686 501 (i) Electrical Engineering (ii) Mechanical Engineering (iii) Civil Engineering.	**RG**
66	National Institute of Technology Rourkela (Odisha) – 769 008 (i) Ceramic Engineering (ii) Chemical Engineering (iii) Electronics & Communication Engineering (iv) Electrical Engineering (v)Mechanical Engineering (vi) Metallurgical & Materials Engineering (vii) Mining Engineering.	**RK**
67	Indian Institute of Technology Ropar (Punjab) – 140 001 (i) Mechanical Engineering (ii) Computer Science and Engineering (iii) Civil Engineering (iv) Chemical Engineering (v) ElectricalEngineering, (vi) Metallurgical and Materials Engineering.	**RO**
68	Shri Guru Gobind Singh Institute of Engineering & Technology, Nanded (Maharashtra) – 431 606 (i) Electronics & Communication Engineering (ii) Instrumentation & Control (iii) Production Engineering (iv) Civil Engineering (v) Mechanical Engineering.	**SG**
69	National Institute of Technology Karnataka Surathkal (Karnataka) – 575 025 (i) Applied Mechanics & Hydraulics (ii) Chemical Engineering (iii) Civil Engineering (iv) Computer Engineering (v) Electrical &Electronics Engineering (vi) Electronics & Communication Engineering (vii) Humanities Social Science & Management (viii)Mechanical Engineering (ix) Metallurgical & Materials Engg. (x) Mining Engineering.	**SK**
70	Sardar Patel College of Engineering, Mumbai (Maharashtra) – 400 058 (i) Civil Engineering.	**SM**
71	Sant Longowal Institute of Engineering & Technology, (Deemed University) (Punjab) – 148 106 (i) Mechanical Engineering (ii) Food Engineering & Technology (iii) Electronics & Instrumentation Engineering(iv) ChemicalTechnology.	**SP**
72	SRM Institute of Science and Technology, Chengalpattu, Tamilnadu-603203	**SR**
73	S.V. National Institute of Technology Surat (Gujarat) – 395 007 (i) Civil Engineering (ii) Mechanical Engineering (iii) Electrical Engineering (iv) Electronics Engineering (v) Computer Engineering(vi) Chemical Engineering.	**SS**
74	Samrat Ashok Technological Institute, Vidisha (Madhya Pradesh) – 464 001 (i) Civil Engineering (ii) Computer Science & Engineering (iii) Information Technology (iv) Electrical Engineering (v) MechanicalEngineering.	**SV**
75	TKM College of Engineering, Kollam (Kerala) – 691 005 (i) Civil Engineering (ii) Mechanical Engineering.	**TK**
76	Thiagarajar College of Engineering, Madurai (Tamil Nadu) – 625 015 (i) Civil Engineering (ii) Electrical Engineering (iii) Mechanical Engineering (iv) Electronics & Communication Engineering (v)Computer Science & Engineering.	**TM**

Sl. No.	Name of the Institute/ University	Code
77	National Institute of Technology Tiruchirappalli (Tamil Nadu) – 620 025 (i) Electrical & Electronics Engineering (ii) Metallurgical & Materials Engineering (iii) Production Engineering (iv) ChemicalEngineering (v) Civil Engineering (vi) Computer Science & Engineering (vii) Instrumentation & Control (viii) MechanicalEngineering.	**TR**
78	Tezpur University, Sonitpur, Tezpur (Assam) – 784 028 (i) Computer Science & Engineering (ii) Electronics and communication Engineering (iii) Energy (iv) FoodEngineering andTechnology.	**TU**
79	University of Hyderabad, School of Computer and Information Sciences, Hyderabad (Telengana) – 500 046 (i) Computer and Information Science.	**UH**
80	University Visveswaraya College of Engineering, Bengaluru (Karnataka) – 560 056 (i) Civil Engineering.	**UV**
81	Veer Surendra Sai University of Technology, Burla (Orissa) – 768 018 (i) Civil Engineering (ii) Electrical Engineering (iii) Electronics & Communication Engineering (iv) Mechanical Engineering (v)Production Engineering.	**VB**
82	Veermata Jijabai Technological Institute (VJTI), Mumbai (Maharashtra) – 400 019 (i) Civil Engineering (ii) Electrical Engineering (iii) Electronics & Communication Engineering (iv) Mechanical Engineering (v)Production Engineering.	**VM**
83	Visvesvaraya National Institute of Technology Nagpur (Maharashtra) – 440 011 (i) Electrical Engineering (ii) Metallurgical Engineering.	**VR**
84	National Institute of Technology Warangal (Telangana) – 506 004 (i) Chemical Engineering (ii) Civil Engineering (iii) Mechanical Engineering (iv) Mathematics & Humanities.	**WR**
85	Walchand College of Engineering, Sangli (Maharashtra) – 416 415 (i) Civil Engineering (ii) Mechanical Engineering (iii) Electrical Engineering (iv) Electronics Engineering, (v) Computer Science &Engineering.	**WS**
86	Bhabha Atomic Research Centre (BARC), Department of Atomic Energy (DAE)	**DA**
87	Indian Space Research Organisation (ISRO), Department of Space (DoS)	**DO**
88	Defence Institute of Advanced Technology (DIAT), Defence Research and Development Organisation (DRDO)	**DR**
89	Academy of Scientific and Innovative Research (AcSIR), Council of Scientific and Industrial Research (CSIR)	**CS**

III. CODES FOR DEPARTMENTS OFFERING ADMISSION TO Ph.D. DEGREE PROGRAMME AT VARIOUS INSTITUTIONS

Department/Centre	Code	Institution(s) Offering Ph.D. Degree Programme
Aerospace Engineering	AE	**BG, BM, KH, KN, MD, AU**
Aerospace Engineering and Applied Mechanics	AE	**BE**
Advance Technology Development Centre	AT	**KH**
Agriculture & Food Engineering	AG	**KH**
Hydro and Renewable Energy	HR	**RR***
Applied Mechanics	AM	**DL, MD, MN**
Applied Research In Electronics	AL	**DL**
Applied Science & Engineering	PP	**RR**
Architecture & Planning	AR	**RR, AU, MJ**
Architecture	AR	**MG**
Architecture & Regional Planning	AP	**KH**
Atmospheric & Oceanic Sciences	AS	**BG**
Atmospheric Sciences	AS	**DL**
Automobile Engineering	AU	**AU, PS**
Bio-chemical Engineering & Bio-technology	BC	**DL**
Bio-chemical Engineering	BC	**VN, CS**
Bio-medical Engineering	BM	**DL, VN, PS**
Bio-technology	BT	**KH, MD, ND, NN, RR, AU, MN, PS, HY, ER**
Bio-sciences & Bio-Engineering	BT	**GW**
Bio-sciences & Bio-medical Engineering	BB	**IR**

Department/Centre	Code	Institution(s) Offering Ph.D. Degree Programme
Ceramic Engineering	CM	**RK, VN**
Centre of Excellence in Disaster Mitigation & Management	DM	**RR**
National Centre for Disaster	DM	**MJ**
Centre of Nanotechnology	NT	**RR**
Centre for Studies in Resources Engineering	SR	**BM**
Centre for Sustainable Technologies	ST	**BG**
Chemical Engineering	CH	**AU, BG, BM, CC, DL, GW,HK, KH, KN, MD,MJ, ND,RK, RR, SK,SS, WR, TR, VN, MN, RO, JL, RB, CS**
Chemical & Biochemical Engineering	CB	**PA**
Chemistry	CY	**BM, DL, GW, KH, KN, MD,MN, RR, VN, DR**
Civil Engineering	CE	**AM,AU, BA, BE, BG, BM*, BS, CC, CL, CP, CT, DD, DL*, GA, GC, GK, GN, GS, GW,GZ,HK,IO, KH, KN*, MD*, MG, MJ, MM,MN,NA,ND, NM,NS,PY,RG, RR*, SG*, SK*,SM,SS, SV, TK,TM, UV, VB,VM, WR, WS, VN,AC,NK,OU,NH,NJ, IS, HY*, IR, RO, MB, GB, NC, TR, CS**
Civil & Environmental Engineering	CE	**PA**
Computer Science & Automation	CS	**BG**
Computer Science & Engineering	CS	**BM, BA, DL, GS, GW,GZ, KH, KN, MD, MG, MN, ND, NM, NS, PD, PY, SV, TM, TR, WS, RR, VN, NK, TU, OU, NH, IS, HY, PA, IR, RO, MA, JL, ER, GB, NC, DR, CS**
Computer and Information Science	CS	**UH**
Computer Engineering	CS	**MJ, SK, NN, CP, SS**
Computational and Data Sciences	CD	**BG**
Cryogenic Engineering	CR	**KH**
Centre for Educational Technology	ET	**KH**
Centre for Oceans, Rivers, Atmosphere and Land Sciences	EV	**KH**
Design	DE	**GW**
Earth Sciences	ES	**BM, RR, BG**
Earthquake Engineering	EQ	**RR**
Electrical & Electronics Engineering	EE	**GW, TR, CC, SK, PY, AC*, MB, RB**
Electrical Communication Engineering	EC	**BG**
Electrical Engineering	EE	**AM, AU, BG, BM*, BA, BS, CL, CP, CT, DL, DD, GA, GC, GK, GS, GN,GZ, JU*,IO, KH, KN*, KS, MD*, MG, MJ, MM, MN, NA, ND, NM, NS, NJ, RG, RK, RR, SS, SV, TM, VB, WS, VM, VR, BE, VN*, NK, CA, JM, OU, NH, IS, HY, PA, IR, RO, GB, NC, CS**
Electronics & Communication Engineering	EC	**BA, BS, CL, CT, GS , MM, PD, RK*, SG*, SK, TM, VB, PY, NN, ND, TU, MJ, RR*, GZ, MN, NA, OU, NH, NS, NJ, PS, JL, ER, NC, TR**
Electronics & Electrical Communication Engineering	EC	**KH**
Electronics & Telecommunication Engineering	EC	**JU*, CP, GA**
Electronics Engineering	EC	**AU, VM, WS, HK, VN, SS, IS, CS**
Electronic, Systems Engineering (Centre)	ED	**BG**
Electronics & Instrumentation Engineering	IE	**SP, NS, CS**
Energy (Centre)	EN	**GW,TU, RB,**
Energy Studies (Centre)	EN	**DL**
Energy Science & Engineering	EN	**BM, KH**
Engineering Design	ER	**MD**
Environment (Centre)	EV	**GW, CS**
Environmental Science & Engineering	EV	**BM, CS**
Environmental Engineering	EV	**CS**
Energy & Environment Engineering	EN	**NH**
Energy & Environment Engineering	CE	**MJ**
Food Processing Engineering	FP	**CS**

Department/Centre	Code	Institution(s) Offering Ph.D. Degree Programme
Food Engineering & Technology	FE	**SP,TU**
Food Technology	FE	**CS**
Geology and Geophysics	GG	**KH**
G.S. Sanyal School of Telecommunication	GT	**KH**
Humanities & Social Sciences	HS	**BM, DL, GW, KH, KN, MD,MN, RR**
Humanities, Social Science & Management	HS	**SK**
Hydrology	HY	**RR**
Industrial Tribology, Machine Dynamics Maintenance Engineering	TR	**DL**
Industrial & Management Engineering	IM	**KN**
Industrial Design Centre	ID	**BM**
Industrial Engineering & Operations Research	IO	**BM**
Industrial and Systems Engineering	IM	**KH**
Industrial & Production Engineering	IP	**GS, NM**
Industrail Engineering & Management	IE	**BS**
Information & Communication Engineering	IC	**AU**
Information Technology	IT	**SV, BE**
Instrumentation & Control	IC	**CP, NN, TR, SG***
Instrumentation & Control Systems Engineering	IC	**PS**
Design	ID	**DL**
Instrumentation Engineering	IN	**AU**
Instrumentation Centre	IC	**RR**
Instrumentation and Applied Physics	IN	**BG**
Infrastructure Design and Management	ID	**KH**
Medical Science and Technology	MB	**KH**
Leather Technology	LT	**AU**
Management Studies	MS	**MD, BG, RR, DL, MJ, RB**
Material Research Centre	MR	**BG**
Materials Science & Engineering	MT	**KN**
Materials Science	MS	**KH, KN**
Materials Science & Technology	MS	**VN**
Mathematics	MA	**BG, BM, DL, GW, KH, MD, RR**
Mathematical Sciences	MA	**VN**
Mathematics & Humanities	MH	**WR**
Mathematics/Statistics	MA	**KN**
Manufacturing Process & Automation	MP	**NN**
Mechanical & Industrial Engineering	ME	**RR***
Manufacturing Engineering	ME	**NF**
Mechanical Engineering	ME	**AM, AU, BA, BG, BM*, BS, CC, CL, CP, CT, DD, DL, GK, GC, GS, GN, GW,GZ, HK, IO, KH, KN, JU*, MD, MG, MJ, MM, MN,NA, ND, PD, PS, PY, RG, RK*, SG*, SK, SP, SS, SV,TK, TM, TR, VB, VM, WR, WS, BE, VN*, AC, NK, OU, NH, NJ, NS, IS, PA, IR, RO, JL, MB, RB, GB, NC, DR**
Metallurgical & Materials Engineering	MM	**MD, MJ, RK, KH, SK ,TR, NF, ND, RR, RO**
Metallurgical Engineering & Materials Science	MM	**BM**
Metallurgical Engineering	MT	**VN,VR, DA, CS**
Materials Engineering	MT	**BG, CS**
Materials Science & Engineering	MS	**DL, RB**
Metallurgy & Materials Science	MT	**CP**
Metallurgy & Materials Engineering	MT	**BE**
Mining Engineering	MI	**IS, RK, SK ,VN, BE**
Mining Engineering	MN	**KH**
Nuclear Engineering and Technology	NE	**KN**

Department/Centre	Code	Institution(s) Offering Ph.D. Degree Programme
Ocean Engineering	OE	**MD***
Ocean Engineering & Naval Architecture	OE	**KH**
Pulp & Paper Engineering	PP	**RR**
Product Design	PD	**BG**
Physics	PH	**BG, BM*, DL, GW, KN, MD,MN, RR,KH, VN**
Photonic Science & Engineering	LS	**KN**
Polymer Science & Chemical Technology	PS	**DD**
Polymer Science & Engineering	PL	**CS**
Production Engineering	PE	**CP, JU*,NA, PS, SG*,TR, VB**
Production Technology	PT	**AU**
Polymer & Process Engineering	PP	**RR**
Reliability Engineering	RE	**KH**
Rubber Technology	RT	**KH**
Rural Development & Technology	RD	**DL**
Rural Development	RD	**KH**
School of Bio-sciences & Bio-engineering	BS	**BM***
School of Basic-sciences	BS	**BH, MA**
School of Engineering	SE	**MA**
School of Earth, Ocean, and Climate Sciences	CG	**BH**
School of Electrical Sciences	ES	**BH**
School of Infrastructure	IF	**BH**
School of Management	MG	**BM, KH, SK**
School of Management & Studies	MG	**MN**
School of Mechanical Sciences	ME	**BH**
School of Metallurgical and Materials Sciences	MM	**BH**
School of Humanities Social Sciences and Management	HS	**BH**
School of Water Resources	WR	**KH**
Systems & Control Engineering	SC	**BM**
Textile Engineering	TX	**GZ**
Textile Technology	TX	**DL, VM, AU**
Centre for Transportation Systems (CTRANS)	TS	**RR**
Water Resources Development & Management	WR	**RR**
Water Resource Development & Irrigation Engineering	WI	**NR**
Farm Machinery & Power Engineering	FM	**CA**
Processing & Food Engineering	PF	**CA**
Soil & Water Engineering	SW	**CA**
Renewable Energy Engineering	RE	**CA**
GIS Cell	GI	**MN**
Chemical Technology	CT	**SP**
Petroleum Engineering & Geosciences	PG	**RB**
Chemical Engineering & Engineering Sciences	CL	**RB**
Water Resources and Ocean Engineering	WO	**SK**
Structural Engineering	ST	**CS**
Design	DE	**RR**
Mehta Family School for Data Science and Artificial Intelligence	MF	**RR**

*Specialization have to be indicated while opting for a particular department. Codes for the Specializations are given along with the details corresponding to the particular institution **(Depts. & Field of Specialization).**

IV. ELIGIBILITY CRITERIA

1. **Only candidates (such as Assistant Professors, Associate Professors, Lecturers, Readers, Workshop Superintendent and Professors) with** a **minimum** of **three-years** teaching experience as full-time regular/permanent teachers of AICTE approved Degree level Engineering Institutions as on **September 30, 2021** are eligible to apply. Admissions to Ph.D. degree programme under QIP are open only to candidates with a basic degree in Engineering or Technology or Architecture or such other qualification.

2. **Additional Eligibility Requirements for candidates applying in Central Govt. R&D Institutions (BARC, CSIR, DRDO & ISRO)**: The age of the candidate should be 35 years or below on January 01, 2022 for advance admission in the academic session 2022-23.

3. The candidate should satisfy the minimum eligibility criteria prescribed by the individual Department (and/or the Institution) to which admission is sought.

4. Computer Programmers, Systems Programmers, Workshop Staffs, Guest Lecturers, Visiting Lecturers, Teaching Assistants, Ad-hoc/ Contract or Part-time Teachers, Research Engineers, Scientific Officers, Technical Assistants, and other such categories of staff **are not eligible.**

5. Teachers of the Major QIP Centres **are not eligible.**

6. Teachers of the Minor QIP Centres **are eligible to apply to Major QIP Centres.**

7. Teachers of the minor QIP Centres are permitted to apply for a field of specialization, available in another minor QIP centre, which is not available in their parent department, on the specific recommendations of the Department's and Institute's Head stating that a faculty in the particular specialization is required for their Institution. **Candidates who has completed M.Tech. under QIP programme can not apply before completion of the bond period at their parent Institute.**

V. ADVANCE ADMISSION SCHEME

As per the advance admission scheme for Ph.D. degree programme under QIP, a candidate will receive advance admission during 2022-23 session to the Pre-Ph.D. programme and on successful completion (offline/online) of this programme, he/she will be offered admission to the regular Ph.D. programme during 2023-24. During the one-year period of the Pre-Ph.D. programme, the candidate is required to make maximum of **four visits** to the institution to which he/she is offered admission for a total period of **sixty days**, to decide on the area of research, to identify guide, and to start preliminary work. During this period, the candidate is to be treated as on deputation by the sponsoring/parent institution. TA/DA as per AICTE norms for the visits would be borne by the Institute where the admission is offered, subject to the receipt of the grants from the AICTE. The question of final offer for admission will be considered during May-July 2023, based on the performance of the candidate during the period of the advance admission.

VI. LIVING EXPENDITURE ALLOWANCE, CONTINGENCY GRANT, AND INTERNATIONAL EXPOSURE

The candidates admitted for the regular Ph.D. degree programme under QIP will receive a sum of Rs. 15,000/- per month as Living Expenditure allowance and a Contingency Grant of Rs. 15, 000 per annum for three years. All QIP PhD scholars are eligible to carry out research activities for one complete semester (preferably third or fourth semester) in a foreign university/institute with which the host institute, in which the scholar has taken admission, has an MoU. INAE will provide funding of upto Rs. 3 lacs to all such scholars to support their travel, accommodation, food, VISA, insurance, etc. In addition, the scholars will continue to receive all the other allowances.

VII. CONDITIONS FOR ADMISSION

1. Admission is possible only to the **Institutions** and the **Departments** listed in the Information Brochure.
2. The **final admission of the candidate will be subject to the clearance and approval by the Admission Wing (Section)** of the **concerned institution** as per its rules and regulations in force at the time of admission.
3. The candidate, if selected, should be relieved from the parent Institution to join the programme in time for the session to which he/she is admitted.
4. The candidate joining the Ph.D. degree programme under QIP on deputation would be entitled to receive his/her salary and allowances, which must be paid by the parent institution sponsoring him/her. Sponsoring institutions / directorates may kindly note that any other alternate form of deputation / study leave that does not provide for full salary and allowances for the full period of 3 years, is not permissible as per AICTE norms.
5. **Conditional recommendation by the Principal/Head of the Institution will not be accepted.**
6. The Principal/Head of the Institution of a candidate, who is selected for admission, should ensure that **the sponsorship certificate** is produced by the candidate at the time he/she joins the course.
7. If a QIP scholar discontinues Ph.D. programme, the scholar has **to refund the scholarship and contingency** received to AICTE through the QIP Centre, and the parent institution may **seek refund of the salary and allowances paid to him for the period he/she attended the programme.**

VIII. INSTRUCTIONS FOR COMPLETING THE ONLINE APPLICATION

General Instructions

1. The website link for application is: www.cep.iitkgp.ac.in/qip. Click on **"QIP Admission 2022-23"**.

2. The candidate should first register by clicking "New Registration". An email confirming the registration will be sent by assigning the Application Number and a Password. The application number and the password are required for subsequent operations. Hence, the candidate should remember both of them or keep them at a safe place.

3. Candidate can start filling up the online application by logging in through "View/Edit Application".

4. Online application can be completed in one or more sessions by revisiting the website using the assigned application number and password.

5. The candidate should enter all required information correctly in all fields of the **online** application.

6. After filling the fields, the candidate can save the information in between by using the SAVE button.

7. **It is now required that the candidates upload soft copy (scanned copy) of their stamp size photo, signature and all relevant certificates/documents on the online portal**.

8. The candidate can edit data in any field till the final submission and printout is taken. The last date for online submission of the application is **March 31, 2022 (Thursday).**

Personal Information

9. Provide all the personal information carefully: Name, Designation, Department and Address fields (using the pull-down menu), Date of Birth, Gender, Category, Physically Disabled Category (Yes/No), and Married (Yes/No).

Educational Qualifications and Academic Data

10. During the process of entering the application details, additional sub-links are provided in appropriate places. For example, while entering the overall performance of the candidate under 'Educational Qualifications', there will be a link through which the candidate can furnish the semester wise / year wise particulars.

11. For filling academic data and additional qualification, if the absolute marks are awarded, then fill, e.g. 650/800 where the total marks obtained is 650 out of total of 800. If the Grade Point Average (GPA) is awarded, fill, e.g. 6.7/10 where 6.7 is GPA obtained on a scale of 10. If the candidate has failed in any subject during any semester examination and cleared that subject in a later semester, the marks obtained in that subject should be added back to the semester in which it was supposed to have been cleared and then the total marks is to be calculated. **Candidate should take the marks of all the semesters for calculating the overall percentage or CGPA (irrespective of the methodology adopted by the university/college in awarding final class/division).**

12. During the entry of details like detailed semester wise / year wise information, detailed teaching experience etc., the candidate has to enter the details for which **documents of proof are to be uploaded**.

Institute and Department Preferences

13. A candidate can apply to a maximum of three institutions and a maximum of two departments in each of the chosen Institutes (i.e., maximum of total six options only).

14. Select the Institution by using the pull-down-menu as per the order of your preference. Then enter the programme code desired as per preferred choices with valid code.

15. Appropriate list of 'valid codes' can be viewed using links provided. The Programme code contains 6 characters; the first 2 alphabets identify the Institute, the next 2 alphabets identify the department within the Institute, and the last 2 digits identify the field of specialization. For example, a code 'KNAE01' represents a particular field of specialization in the Department of Aerospace Engineering at IIT Kanpur.

Preview of Application

16. Once the complete details about the candidate are entered and saved, and all the relevant certificates/documents along with the photo and signature are uploaded, the online application can be printed. To preview the completed application, the candidate can print a draft copy of the application. He/she should check the completeness and correctness of the information; if needed, corrections can also be made before the final submission.

Final Confirmations and Printouts

1. After finalizing the contents of the application, the candidate should invoke the FINAL version of the application by clicking on: Click here forprinting the FINAL version of the application. **Once the FINAL version option is chosen, the candidate will not be allowed to modify the contents of the application. The FINAL version should be printed only on A4 sheet with the print orientation as 'portrait'**, and margins **as 20 mm (left, right, top and bottom).** Take a **print for the Principal Coordinator QIP**, and the same must be sent to: **The Principal Coordinator QIP, Associate Dean, Outreach (CE&T/IoE), IIT Kharagpur, Kharagpur-721302, West Bengal**. ONLY ONE COPY IS REQUIRED TO BE SENT.

2. The candidate should **affix his/her recent stamp-size photograph** in the space provided.

3. The candidate should thoroughly verify the contents of the printed documents and sign at the appropriate places.

4. In the "**Forwarding Note" of the Application Form, the space provided for the Name of the Candidate and Teachingexperience must beduly filled in and signed by the Principal / Head of the Institution along with full contact details Name, Designation, Contact No., E-mail and AICTE affiliation No., etc., and Office Seal.**

5. Applications submitted without signatures of the candidate and the appropriate authorities with seal, and/or without the required enclosures will **automatically be deemed invalid.**

IX.DETAIL OFAPPLICATION FEE

Online Payment Receipt of Rs 1000/-for General/OBC Category and Rs. 500/-for SC/ST/PwD/ Female Candidate should be attached with the formmarked as, **Copy for Principal Coordinator** on top of the form. Candidate should write their application number, name, address and courses applied on back side of the receipt. Candidate should note that the fee paid by other means, i.e., by DD, IPO, cheques, etc. **are not acceptable. Applicationfees once paid cannot be refunded.**

Procedure for Payment of Application Fee:

An online payment portal is created within the application process for payment of Application Fee. The candidates should first follow the registration steps as mentioned above. The fee will be required to be paid using the online portal just before printing the final version of the application.

X. CHECKLIST FOR THE APPLICATION FORM

- ***In Forwarding Note;*** **the candidate should check his/ her name, years and months of experience, signature, date, and and signed bythe Principal / Head of the Institution along with contact details Name, Designation, Contact No., E-mail and AICTE affiliation No. and office seal.**
- ***Photographs:*** Affix recent stamp size photographs at the space provided on the **Principal Coordinator's Copy**.
- ***Signatures of the Applicant:*** The candidate should sign in all the print-outs at relevant places.
- Candidate should ensure that all information are properly filled in, and the print out of the Principal Coordinator's Copy along with all relevant enclosures are sent to the following address: **The Principal Coordinator QIP, Associate, Dean Outreach (CE&T/IoE), IIT Kharagpur, Kharagpur-721302, West Bengal**.

Enclosures:

All the certificates/documents along with photo and signature are required to be uploaded on the online portal. Attested hardcopies of all these certificates/documents are also required to be sent along with the application form to the Principal Coordinator (only one copy is required to be sent).

1. **Application Fee: Online Payment Receipt** of Rs 1000/-for General/OBC Category and Rs. 500/-for SC/ST/PwD/ Female Candidate.
2. Candidates belonging to SC/ST/OBC category must attach an attested copy of the **caste certificate** issued by a **competent authority** as per the Government of India rules.
3. **Physically Disabled** candidates must attach a copy of the **certificate** issued by a **competent authority** as per Government of India rules.
4. **Checklist**: Enclose attested copies of all the relevant certificates
   - Certificates of the Qualifying Examination (Bachelor and Master) and other Degrees
   - Age proof Certificate
   - Mark Lists of all years/semesters of qualifying examination (mark sheets clearly showing total marks obtained out of maximum marksaccording to semester or year)
   - Teaching Experience
   - Industrial/Research Experience Certificates
   - Certificates of Short Term Courses attended
   - All Research Publications
   - Any other Academic qualifications/Awards etc.

Please note that the candidates must upload soft copy (scanned) of all these certificates on the online portal during the registration.

XI. INSTRUCTIONS FOR DESPATCHING

1. For the convenience of the candidate, a check list is also provided under point No. X. One can use this list and ensure the completeness of application. Once completed, the entire bunch is to be dispatched ONLY to **The Principal Coordinator QIP, Associate Dean, Outreach (CE&T/IoE), IIT Kharagpur, Kharagpur-721302, West Bengal** along with the copy of Online Payment receipt. The envelop containing the Principal Coordinator's Copyand enclosures should preferably be sent by Speed Post or a Courier Service so as to reach **on or before April 11, 2022 (Monday)**. **Applications received after this date will not be considered.** For any clarification contact us: Phone: 03222-282033/282112; Email:qip@iitkgp.ac.in

   Candidates are required to post only one copy of the printed copy of the application form along with the relevant documents/certificates to the Principal Coordinator.

2. **Before mailing the completed form, please ensure that the application form and all the enclosures are properly fastened with a tag separately at the left-hand top corner.**

3. In case, your applications are submitted by your sponsor, it is your responsibility to ensure that the application is forwarded to the above mentioned address so as to reach **on or before April 11, 2022 (Monday)**. **Applications received after this date will not be considered.**

4. In case, the candidate has forgotten the password, the candidate should send an email (using the email ID mentioned in the online application) to **qip@iitkgp.ac.in** furnishing the following details: Application Number, Name of the Candidate, Date of Birth, and Address for correspondence, Gender and Category. After verification, the candidate will be informed the password through email only.

XII. LAST DATE

The last date for online **submission of applicaion is March 31, 2022. (Thursday).** Print-out of online filled-in application along with its enclosures should reach to: **The Principal Coordinator QIP, Associate Dean, Outreach (CE&T/IoE), IIT Kharagpur, Kharagpur-721302, West Bengal on or before *April 11, 2022 (Monday)*. Applications received after this date will not be considered.**

XIII. PROCEDURE FOR ADMISSIONS UNDER QIP

1. **Short-listing** of the candidates will be done first by the office of the Principal Coordinator QIP, then finally at the Department/Institute concerned. Interview letters will be sent to the short-listed candidates by the Department/Institute concerned.

2. **ONLINE Interviews** will be conducted in the Departments at the individual Institutions where the admission is sought by the candidate. **Schedule of online interviews** will be declared in due course of time.

3. **Selections** will be made by the National QIP Coordination Committee (NQCC) based on the recommendations of various Institutions.

4. **Final Results** will be available at the web site: www.cep.iitkgp.ac.in/qip

5. **Admission** letters will be issued to the selected candidates by the respective QIP centres or Academic sections of the Institutions offering admission.

XIV. SCHEDULE OF INTERVIEWS FOR ADMISSION TO Ph.D. DEGREE PROGRAMMES UNDER QIP

Interview will be conducted in **ONLINE mode** only. The final schedule will be announced in due course

XV. DEPARTMENTS & FIELDS OF SPECIALIZATION AT VARIOUS INSTITUTIONS

- The department offering admission to Ph.D. degree programme at various Institutions and the fields of specialization in the department/centre are listed in the Tables.
- Specializations mentioned indicate only areas of interest and are not exhaustive. There may not be admissions open to all the areas indicated, and candidates, if found suitable, may be admitted to related areas also.

The details given are subject to variation and change from time to time and only those operating in the respective Institutions at the time of actual admission are applicable. Candidates desirous of more information on the matter may write to the individual Institution or visit their website.

1. Indian Institute of Science, Bangalore- 560 012 – BG

In all cases the minimum eligibility is second class or equivalent grade in the Bachelor's as well as in the Master's degree.

Code	Department	Fields of Specialization	Minimum Qualification
BGAE01	Aerospace Engineering	Theoretical and Experimental Fluid Mechanics Applied Aerodynamics Hypersonic and High Enthalpy Flows, Computational Fluid Dynamics Flight Mechanics of Aircraft and Helicopters Dynamics and Control of Aerospace Vehicles, Orbital Mechanics, Space Robotics, Guidance Parallel/Distributed Processing and Neural Networks Applications Optimization & Estimation Techniques in Aerospace Systems; Aerospace Propulsion, Basic and Applied Combustion, Experimental and Computational Studies on Reactive Flows, Combustion of PropellantsComposite Structures, Smart structures, Non-destructive Evaluation, Finite Element Methods, Fracture Mechanics, Structural Integrity and Reliability, Structural Dynamics and Aeroelasticity, Rotorcraft Dynamics	M.E. /M.Tech or equivalentdegree in Aerospace, Mechanical, Electrical, Electronics, Chemical, Computer Science, Civil.
BGAS01	Centre for Atmospheric & Oceanic Sciences	Monsoon Dynamics, Tropical Convection, Satellite Meteorology, Dynamicsof Oceans, Coupled Ocean-atmospheric Systems; Climate Modeling, Boundary Layer, Dynamics of Atmospheres, Aerosols and Climate	M.E./M.Tech or equivalent degreein Mechanical, Civil/Aerospace/ Chemical Engineering, Atmospheric and Oceanic Sciences
BGCH01	Chemical Engineering	Nanostructures and nanotechnology for sensors, flexible electronics andenergy applications; Flow batteries and super capacitors; Nanomaterials forgas separations, methane storage and carbon capture; Mechanics anddynamics of granular materials, suspensions, soft solids, living matter andstructured fluids; Interfacial engineering for process modelling and process intensification; Reaction kinetics, catalysis, and bioengineering forenvironmental and energy sector. Thermodynamics and molecular simulations of interfaces and soft matter. Systems biology and singlemolecule methods for therapeutics and disease detection; Microfluidics forpoint of care diagnostics, cancer therapeutics; Treatment of Drinking water	M.E./M.Tech or equivalent degree
BGCE01	Civil Engineering	**Geotechnical Engineering**: Earthquake Geotechnical Engineering, Geoenvironmental Engineering, Physico-chemical Aspects and Constitutive Modeling of Soil Behavior, Foundations, Earth and Earth Retaining Structures, Ground Improvement Techniques, Geosynthetics, Mechanics of Granular Media, Nuerical Modelling of Soils and rocks, Risk and Reliability Assessment of GeohazardsSoil Dynamics, Rock MechanicsExperimental Mechanics **Water Resources and Environmental Engineering**.: Water Resources Systems, Climate Hydrology, Surface and Ground WaterHydrology, Vadose Zone Hydrology, Open Channel Flows, Urban Water Distribution Systems, River Mechanics, Environmental Hydraulics, Water QualityModeling, Contaminant Transport in Surface and Ground Water Flows. **Structural Engineering**: Structural Mechanics, Finite Element Analysis, RC and Prestressed Concrete, Masonry Structures, Structural Dynamics, Non-Linear and Stochastic Dynamical Systems, Earthquake Engineering, Structural Safety, Fracture Mechanics of Concrete, Materials in Civil, Engineering, Low Carbon Materials, Structural Health Monitoring, Contact Mechanics, Computational Plasticity. **Transportation Systems Engineering**: SustainableTransportationPlanning; Modeling and Optimization of Transportation Systems; Travel Behaviour, and Travel Demand Analysis; Network Modeling; PublicTransport and Non-Motorized Transport Planning and Management; Intelligent Transport System (ITS); Traffic Management; Road Safety;Freight and Logistics; Air and Rail Transport; Electric, Connected,Automated, and Shared Mobility	M.E./M.Tech or equivalent Degree in Civil
BGCS01	Computer Science and Automation	**Theoretical Computer Science** - Algorithms; Complexity Theory; Combinatorial Optimization; Graph Theory; Information and Coding Theory; Cryptography; Cryptology; Security; Secure Distributed Computing; Computational Geometry; Computational Topology; Algorithmic Algebra; Computational Biology; Automata Theory; FormalVerification. **Computer Systems and Software** - Computer Architecture; Multi-CoreComputing; Parallel and High Performance Computing; Operating Systems; Storage Systems; Computer Systems Security; Database Systems; Cloud Computing; Distributed Computing; Modeling and Simulation; Compiler Design, Program Analysis, Programming Languages, Software Engineering Adhoc Mobile and Sensor Networks, Graphics and Visulaization. **Intelligent Systems** - Data Mining; Data Analytics; Deep Learning;Information Retrieval; Machine Learning; Pattern Recognition;Reinforcement Learning; Convex Optimization; Stochastic Control and Optimization; Game Theory; Auctions and Mechanism Design; Electronic Markets; Social Network Analysis; Cognitive Systems; Natural Language Processing; Computational Neural Modeling, Computational Brain Imaging	M.E/M.Tech or equivalent Degree in Computer Science and /or Engineering or Electronics or Electrical Communication Engineering or Electrical Engineering or Information Technology or Information Sciences or allied disciplines.

BGEC01	Electrical Communication Engineering	**Communication and Networking:** Information Theory, Source coding MIMO Systems, Spce-Time and LDPC Codes, Coding for Distributed Storage and Coded Modulation, Error-Control Coding, Coding for StorageMedia, Information Theoretic Security, Power Control and Scheduling,Wireless Mobile Communication, Multiple Access Protocols, CellularMobile Radio, DMA, Multiuser/MIMO Detection, Large-MIMO systems,Cooperative Communications, MIMO-OFDM, Spatial Modulation, Visiblelight wireless communication, Communication Networks: Modeling,Analysis, Optimization and Control of the Internet, wireless access networks, wireless ad-hoc Networks, Wireless Sensor Networks and thenetworks, wireless ad-hoc Networks, Wireless Sensor Networks and theInternet of Things. Learning & Decision-Making, Research at the interfaces of various Networks: Wireless, Social Transportation, Neuronal etc. Network Management, Multimedia communication Protocols, ubiquitous Computing. Cognitive Radio Communication, WDM Optical Network Computing. Cognitive Radio Communication, WDM Optical Networks Optical Communications. Green Communications **Nanoelectronics and VLSI**: Nano-CMOS Technology, Non-Classicial Transistor Design, Transistor Variability in Nanoelectronics, Adaptable Circuit Design, Integrated MEMS Sensors, Low Power Techniques inHardware and Software. Communication circuits and Architectures. Analog Mixed-Signal & RF circuits, Embedded Systems, Cyber Physical Systems. **Applied Photonics**: Photonic Integrated Circuits, Micro-Opto-Elecro- Mechanical systems (MOEMS), Photonic Bandgap Structures, Quantum Photonics. Biomedical Optics, Biophotonics. Optics and Fluid Dynamics of Nanostructures, Plasmonics. **Signal Processing**: Spatial Signal Processing, Speech and Audio, Speech Recognition and Enhancement. Music Content Classification, AuditoryModel and Hearing Aids. Compressive Sensing. Sparse Signal Recovery.Statistical Signal Processing: Signal Detection and Estimation, Space-Time (MIMO) Signal Processing Algorithms with applications to Wireless Communications, Acoustic Signal Separation using Microphone Arrays, Indoor Positioning and Navigation. Microwave Engineering: Passive and Active Circuits (RF and Microwave), Microwave Imaging Antennas, FractalDesigns in Electromagnetics, MEMS and Micromachining (RF MEMS), Terahertz devices for antennas, scattering and imaging. Composite Materialsfor Microwave Applications, Computational Electromagenetics	M.E/M.Tech or equivalent Degree Electrical / Electronics /Electronics and Communication, Telecommunicaiton / Instrumentation / Biomedical Engineering / Computer Science and / or Engineering or M.Sc in Physics / Mathematics / Electronics / Statistics / Computer Science/ Phtonics or Master's in Computer Application or Graduates of 4-years Bachelor of Science Program.
BGEE01	Electrical Engineering	**Power Systems and Power Electronics:** Power system dynamics, Development of stabilizing controls for power system, Smart Grids, Power System Protection, High performance computing applications in power systems, Power electronics applications in power system, Integration of renewables in weak power grid, Wind-Solar integration, Distributed Generation, Micro-grids, Power quality, Harmonic suppression, Reactivepower control, Power Electronics and Drives, Electric Machines, Pulsewidth Modulation, Switch mode power supplies, High frequency isolated inverters, soft-switched converters, Digital control of power converters. **High Voltage Engineering** EHV Power Tansmission, Overvoltage Protection, Lighting Protection, Computational Electronmagnetic, GasInsulated Systems, Partial Discharges, Insulation Engineering, Condition Monitoring and Diagnostics for HV Power Apparatus, Nanodielectrics, Environmental applications of electrical discharges. **Systems Science and Signal Processing**: Pattern Recognition, Data Mining, Machine Learning, DSP Theory and Applications, Sparse Signal Processing & Compressive Sensing, Image and Video Analysis, Computer Vision,Medical Imaging and Analysis, Optimization, Speech Processing, Sensor Networks, Event-triggered control, Distributed Systems and Networked Control Systems.	M.E./ M. Tech or equivalent degree in Electrical, Electronics Communication, High Voltage Engineering, Instrumentation, Computer Science, Information Technology or Biomedical Mechanical Engg., Mechatronics, Aerospace Engineering or related dsiciplines.
BGED01	Electronic Systems Engineering	**Power Electronics & Drives**: Control of inverters, multi-level inverters for drives, renewable energy, power supplies **Signal and Information Processing**: Information theory, coding and signalprocessing for magnetic and optical nano- memories, mathematical biology and applications, quantum information processing and system sarchitecture. **Communication Networks**: Physical layer security, network science, datacenter networking, information centric networking, network economics, function computation on networks, optimization and learning over networks, optimal data transport in sensor, wireless and mesh networks, energy harvested networked embedded and cyber physical systems, Internet toThings, smart grids. **Micro and Nano Electronics**: Modeling of carrier transport in nano-scale electron devices at atomistic, device and circuit level, reliability study ofstate-of-the-art MOSFET, fabrication of 2D material based transistors, GaNand other power semiconductor devices. **Brain-inspired Computing**: Neuromorphic Engineering,	M.E./ M. Tech or equivalent degree in Electrical, Electronics Communication, High Voltage Engineering, Instrumentation, Computer Science, Information Technology or Biomedical Mechanical Engg., Mechatronics, Aerospace Engineering or related dsiciplines.

		ASIC/FPGAVLSI design, analog IC design, brain-inspired algorithms, machine learning, neuromorphic sensors and their applications and compressive sensing. **Microsystems and Biomedical Devices**: Microengineering for clinicalresearch, Advanced fabrication of micro engineering devices using glass, silicon, polymers and integrate with unusual classes ofmicro/nanomaterials. Integration of biology/medicine with microtechnology, nanotechnology Integration of biology/medicine with microtechnology, nano technology and additive manufacturing, Fabrication of flexible sensors, micro sensors microfluidic devices, and microelectromechanical systems with an emphasis on cancer diagnosis, therapeutics, e-nose, and biomedical device technologies.	
BGIN01	Instrumentation and Applied Physics	Nanoelectronic devices; Quantum Dots (QD); Quantum computation; Graphene Electronics; Micro and nano systems; Layered 2D materials; Sensors and related Instrumentation; QD containing optical fibers; Nanoscale Imaging; Super-Resolution Microscopy and Imaging; Fluorescence Microscopy;Precision Motion Control; Microfluidics and Devices Nano-metrology; Atomic Force Microscopy, Semiconductor Devices and Circuits, Electrrical transprot studies in low-dimentsional materials, QD laser, Quantum measurement and control, Bioinstrumentation, Materials Science, Electrical and Thermal Contacst Resistance, Fibre-Bragg Grating Sensors, Phase Change Memories, Energy Systems, Image Processing Microfluidics and Lab-on-a-Chip, Interferometry, Computational Imaging, Image Processing, Biomedical Instrumentation, Optofludics and Point-of-Care Diagnostics, Optical metrology, Optical Microscopy.	M.E/ M.Tech in any discipline OR M.Sc ord equivalent degree in Physics / Applied Physics / Engineering Physics / Bio-Physics / Materials Science.
BGMG01	Management Studies	Applied Statistics, Business Analytics, Energy and Environmental Policy and Management, Entrepreneurship, Finance, Industrial Economics, Logistics and Supply Chain Management, Operations Management, Operations Research, Organizational Behaviour, Public Policy, Technology & Innovation Management.	B.E/ B.Tech or equivalent degre in any discipline of Master's degree in Economics, Policy studies, Commerce, Mathematics, Statistics, Psychology, Social Work, Operationa Research, Computer Science / Application or MBA post MSc/ BE/ BTech or equivalent degree.
BGMR01	Materials Research Centre	Preparation of Advanced Materials by Physical, Chemical and Non equlibrium Routes Feroelectric and Semiconducting Thin Films, Multilayers and Hard Coatings, Nanomaterials's and Composites, Self Assembly and Nanopatternings, Theoretical and Computational Materials Science Ferric materials, glasses and glass-ceramics, Electro and Nonlinear Optics. Magnetic materials, Biomaterials.	M.Sc or equivalent degree in Materials Science Chemistry or Physics or M.E.MTech/M.Sc (Engineering or equivalent degree in materials Science Engineering, Ceramic Engineering and Technology
BGME01	Mechanical Engineering	Experimental Stress Analysis and Fracture Mechanics, Tribology, Mechanisms,Robotics and CAD, Fluid Mechanics, Turbulence, Heat Transfer, Combustion, Laser Diagnostics applied to Thermo-fluid Science, Refrigeration and Air Conditioning, Dynamics, Micro Electro-Mechanical Systems (MEMS), Nano Tribology, Structural Optimaization and Design, Mechanical Properties of Materials, Bio-mechanics, acoustics and noise control, Computational Mechanics	M.E/M.Tech in Mechanical / Aerospace / Civil / Materials / Chemical Engineering / Bio- Technology
BGMT01	Materials Engineering	Mechanical Behavior of Metals, Ceramics, Polymers Glasses and Thin Films Biomaterials Engineering Polymer Nano-composities Organic Electronics Sensors Mineral Processing Bio-hydrometallurgy. Extractive Metallurgy Process Modeling Physical Metallurgy Phase Stability and Transformation Diffusion, Solidification Li-ion batteries. Electro-catalysts. Printed Electronics.	M.E / M Tech or equivalent degree in Metallurgical, Mineral, Chemical, Ceramics or Mechanical, Electrical, Electronics or Materials Science / Engineering or Biotechnology, Polymers
BGPD01	Product Design	Computer Aided Engineering Tools for Product Design, Vehicle Crash worthiness and occupant Safety, Occupational Health and Safety, Product Safety, Computer Aided Ergonomics, Human Engineering, Digital Human Modelling, Biomechanics, Kinesiology, Biosensors, ComputerAided Design and Usability Studies, Haptics Integrated Design interfaces, knowledge Management, Product Life Cycle Management, Artificial Intelligence in Design, Design for Environment, Design Creativity Collaborative Design, Design Synthesis, Requirements Engineering, Design Methodology, Clinical and Rehabilitation Engineering, Human-Machine Interaction, Smart Manufacturing, Sustainability, Medical diagonistics / therapeutics, Eco-Design, Life Cycle Assessement, Sustainbiligy Analysis, Bio-composite, Additive Manufacturing, Sustainable Manufacturing, Computational Metrology, Human Computer Interaction, Multi Model Interaction, Automotive User Interface Assistive Technology, Bio-Medical Devices, Co- Design, Collobaration and Open Source Design.	M.E / M Tech or equivalent degree in Design, any branch of Engineering Architectura, Instrumentation and medicine or Master's degree in physics, Mathematics, Computer Sciences, Physiology Psychology or B.E / B Tech or equivalent degree in Design, any branch of Engineering ARchitecture Instrumentation.
BGMA01	Mathematics	Partial Differential Equations, Homogenization, Controllability, NonlinearDynamics and Chaos, Time Series Analysis with Applications toNeuroscience, Probability and Stochastic Processes, Stochastic Control,Stochastic Dynamic Games, Random Matrix Theory, Functional Analysis,Operator Theory, Algebraic Topology, Differential Topology, Commutative Algebra, Algebraic Geometry, Harmonic Analysis, Several Complex variables, Differential Geometry, Mathematical Finance, Low Dimensional Topology, Numerical Analysis, Number Theory, Combinatiorics, Statistical Mechanics, Representation Theory, Combinatorial Topology.	M.Sc or equivalent degree in Mathematics, Statistics, Physics or any branch of Mathematical Sciences or BE / B Tech or equivalent degree (provided they have good aptitude for Mathematics).
BGST01	Centre for Sustainable Techologies	Water quality and sustainable supply; Water and sanitation; Renewableenergy; solar, biomass combustion and gasification, biomethanation, bio- fuels, etc. Energy planning, demand side	M. Arch. or M.E / M Tech / M.Sc (Engg.) / Architecture, in Mechanical, Civil, Chemical including Renewable Energy,

		management, energy efficiency;Alternative building technologies and materials, energy efficient andenvironmentally sound technologies; Climate- responsive architecture/building technology; Building Integrated Photovoltaics (BIPV) and GreenBuildings; Building-comfort studies in tropical regions; Waste management;reuse and recycling; Natural Resources Management; Climate change mitigation, Smart / efficient Turbines for renewable energy applications. Waste to Energy.	Environmental Engineering, Energy Studies or MSc (Environmental Sciences).
BGPH01	Physics	**(A) Experimental studies in** I. **Condensed Matter Physics** II. **Atomic, Optical Physics, and Specific areas include**: Raman and other Spectroscopy, Fast Ionic Conductivity, Manipulation of Matter by Light, Laser Cooling and trapping of atoms, Ion trapping, Precision Laser Spectroscopy, Magnetism, Spintronics, Magnetic thin films, Magneto- transport, quantum transport in low- dimensional and disordered materials, the metal-insulator transition, Magnetic Resonance Phenomena, Nanoscience and nanomaterial's, Superconductivity in bulk as well as thin films,Semiconductors, Ferro electricity, Crystal Growth Studies, NonlinearOptical Materials, Phase Transition Studies, High Pressure and LowTemperature Studies, Study of Low Dimensional Materials, Amorphous Systems, Soft Condensed Matter: colloids, surfactants and biologicalmaterials, Polymer Physics, SurfaceX-ray scattering, surface phasetransitions, Thermoelectrics. **(B)**Theoretical Studies on a variety of aspects of condensed matter physics, in particular; Strongly Correlated Systems, Quantum many-body theory and magnetism, exotic order and quantum criticality; Phase transitions, equilibrium statistical physics; Disordered and Amorphous Systems, the glass transition, neural networks, Spatiotemporal Chaos and Turbulence in fluids, plasmas and cardiac tissue; Soft condensed matter: colloids, surfactants, membranes, liquid crystals, vortex lattices; biological physics: the mechanics of living matter; Molecular modeling of soft and bio- materials.	ME / M.Tech./ M.Sc. (Engineering or quivalent degree or M.Sc. orequivalent degree in Physics, Biophysics, Biotechnology,Mathematics, Chemistry or Polymer Science or B.E./ B.Tech. or quivalent degree or B.Sc. or equivalent degree followed byAMIE, Grad, IETE, MII ChE, AMIIM, AMAeSI.
BGCD01	Computational & Data Sciences	Bio-molecular Computation, Computationa l Electrodynamics, Computational Photonics, Computational Material Physics, Computational Fluid Mechanics, Computational Mathematics / Scientific Computation, Finite Element Analysis, High Performance Computing (HPC), MedicalImaging, Numerical Linear Algebra, and Structural Biology &Bio- Computing, Genomics.Computer Aided Design, Cloud Computing Systems, Distributed Systems,Data Sciences, Big Data Platforms, Computer Vision and Image/ Video Analytics, Database Systems, Embedded System-On-Chip Architectures, High Performance Computing Systems, Machine Learning, Natural Language Processing, Deep Learning for Vision and Language, Paral	M.E./ M.Tech./ M.Sc.(Engg.) or equivalent degree in any discipline.
BGES01	Centre for Earth Sciences	Application of major & trace element, radiogenic and stable isotope geochemistry to modern day and early Earth processes; paleoclimate reconstsruction, Seismic inversion and signal processing, Geochronology, Petrology, Mantle convection, Planetary magnetism - models and experiments.	B.E./B.Tech or equivalentdegree in any discipline,M.E./M.Tech. or equivalent degree, MSc.or equivalent degree in any branch of Science.

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Code	Department	Fields of Specialization	Minimum Qualification
BHBS01	School of Basic Sciences	Basic Science Chemistry Mathematics Physics	☐ Minimum 60% marks or 6.5 CGPA (in a 10-point scale) in the Master's or equivalent degree in appropriate discipline with consistently good academic record. ☐ Minimum 55% marks or 6.0 CGPA (in a 10-point scale) in the Bachelor of Science or equivalent degree in appropriate discipline with consistently good academic record. ☐ Minimum 60% marks or 6.5 CGPA (in a 10-point scale) is required in all other examinations. A single relaxation up to 10% marks either at Xth or XIIth level examination or equivalent is permitted.
BHHS01	School of Humanities Social Science and Management	Economics English Psychology	☐ Minimum 55% marks or 6.0 CGPA (in a 10-point scale) in the Master's degree in appropriate discipline.

			☐ Minimum 60% marks of 6.5 CGPA (in a 10-point scale) is required in all other examinations. A single relaxation up to 10% marks either at Xth or XIIth level examination or equivalent is permitted. ☐ The candidate must be UGC-NET (JRF and LS) qualified.
BHCG01	School of Earth, Ocean and Climate Science	Climate Science Geosciences	**Cllimate Science** Minimum 60% marks or 6.5 CGPA (in a 10- point scale) in the Master's or equivalent degree in Physics/ Chemistry/ Mathematics /Oceanography / Meterology / Marine Science /Earth Science/ Mechanical/ Civil/ Electrical/ ECE/ Geoinformatics/ Remote Sensing/ Computer Science. Minimum 55% marks or 6.0 CGPA (in a 10-point scale) in the Bachelor of Science or equivalent degree in appropriate discipline with Mathematics as a compulsory subject. **Geosciences** ☐ Minimum 60% marks or 6.5 CGPA (in a 10- point scale) in the Master's or equivalent degreein Geology/Geophysics/Earth Science. ☐ Minimum 55% marks or 6.0 CGPA (in a 10-point scale) in the Bachelor of Science orequivalent degree in appropriatediscipline with consistently good academic record. ☐ Minimum 60% marks or 6.5 CGPA (in a 10- point scale) is required in all otherexaminations. A single relaxation up to 10%marks either at Xth or XIIth level examinationor equivalent is permitted.
BHES01	School of Electrical Science	Computer Science & Engineering Electrical Engineering Electronics & Communication Engineering	☐ Minimum 60% marks or 6.5 CGPA (in a 10- pointscale) in M.Tech/ M.E. or equivalent degree in appropriate discipline. OR B.Tech/ B.E. or equivalent degree in appropriate discipline with minimum 70% marks or 7.5 CGPA (in a 0-point scale) OR Minimum 60% marks r 6.5 CGPA (in a 10-point scale) in Master of Science or equivalent degree and appropriate discipline with consistently good academic record. ☐ minimum 60% marks or 6.5 CGPA (in 10 pointscale) is required in all other examinations. Asingle relaxation up to 10% marks either at Xthor XIIth level examination or equivalent is permitted.
BHIF01	School of Infrastructure	Civil Engineering	
BHME01	School of Mechnical Sciences	Mechanical Engineering	
BHMM01	School of Metallurgical and Materials Sciences	Metallurgical and Materials Engineering	

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In all cases, the minimum elegibility is a First class or equivalent (Min. 60%) Master's Degree in Engineering / Technology (55% for SC/ST) OR a First class or equivalent (Min 60%) Master's degree in Science (55% for SC/ST) or a first class or equivalent (Min 60%) in Bachelor's degree Engineering/ Technology (55% for SC/ST),.

Code	Department	Fields of Specialization	Minimum Qualification
BMAE01	Aerospace Engineering	Aerodynamics Dynamics and Control Aerospace Propulsion Aerospace Structures	**(i)**M.Tech./M.E. or equivalent degree in Aerospace Engineering OR in other branches of engineering relevant to the research areas in the department **(ii)**B.Tech./B.E. or equivalent degree in Aerospace Engineering OR in other branches of engineering relevant to the research areas in the department. **OR** M.Sc. or equivalent degree in Mathematics OR Physics OR in other specializations relevant to the research areas in the department.

BMCE01	Civil Engineering (Code no. of specialization to be indicated in the datasheet)	Transportation Systems Engineering	For all, minimum eligibility is a First class or equivalent (Min. 60%) in Master's degree in Civil Engineering (55% for SC/ST), OR, a First class or equivalent (Min. 60%) in Bachelor's degree in Civil Engineering (55% for SC/ST) with a valid GATE score of Minimum 600 out of 1000
BMCE02		Geotechnical Engineering	
BMCE03		Water Resources Engineering	
BMCE04		Structural Engineering	
BMCE05		Ocean Engineering	
BMCE06		Remote sensing	
BMCE07		Construction Technology & Management	
BMES01	Earth Sciences	Active Tectonics and Tectonics, Cooperative and Joint Inversion of Geophysical Data, Electromagnetism, Economic Geology, Earthquake Seismology, Engineering Geology, Geochronology and Thermochronology, Exploration Seismology, Geochemistry, Geomagnetism, Geomechanics, Geophysical Signal Processing, Geostatistics, GPS and Geodesy, Gravity and Magnetics, Ichnology, Igneous Petrology, Isotope Geology, Metamorphic Petrology, Micropalaeontology, Mineralogy, Numerical modeling in Geophysics, Ore Petrology and Ore Deposit Modeling, Organic Geochemistry, Petroleum Geology, Petrophysics, Remote Sensing and GIS, Sedimentology, Stratigraphy, Structural Geology, Volcanology.	1) M. Tech. /M.Phil. (2-year degree) or equivalent degree in Geology, Geophysics or in any other related Geosciences field. 2) M.Sc. or equivalent in Geology, Geophysics, or in any other related Geosciences field. 3) M.Sc. or equivalent degree in Physics, Chemistry, Mathematics, Oceanography, Life Sciences, Marine Sciences, Atmospheric Sciences or equivalent and having Geology/Physics/Mathematics/Chemistry at the Bachelors level as principal subjects.
BMCS01	Computer Science and Engineering	Computer Graphics, Computer Vision, Image Understanding and Retrieval, Database and Information Systems, Hypertext Mining and Information Retrieval, Data Dissemination Networks, Programmeming Languages and Compilers, Computer Networks, Performance Modeling and Distributed Systems, Algorithms, Combinatorics, Graph Theory, Artificial Intelligence, Natural Language Processing, Machine Learning, Software Engineering, Formal Specification, Design and Verification of Biologically Inspired Computing, Logic and Automata Theory, Real Time and Embedded Systems, Computer Security and Cryptopgraphy	M.E / M.Tech. in CS&E with at least 60% marks or M.E /M.Tech. in any branch with 5 years teaching experience in CS&E.
BMCY01	Chemistry	Theoretical/ Computational Chemistry – Main Group - Transition Metal Chemistry. Organometallics – Electrochemistry/ Conducting Polymers – Ultrafast Spectroscopy – Organic Synthesis – Peptide Synthesis, Enzyme Mechanism = Homogeneous/ Heterogeneous Catalysis – Physical inorganic Chemistry – Protein Folding. Theoretical Organic Chemistry – Photochemistry, Photobiology – Statistical Mechanics – Chemical & Biosensors, Single Molecule Spectroscopy, Structural Biology, Bioorganic, Bioorganic and Biophysical chemistry. Biological Thermodynamics.	M.Sc. or equivalent degree in Chemistry/ Bio-chemistry/ Bio-technology.Candidates with Master degree in science must have valid GATE score to become eligible for the Teaching/ Research Assistantship provided by the Institute.
BMCH01	Chemical Engineering	**Process Systems Engineering:**Process Simulation, Optimization, Process Integration and Scheduling, Energy Conservation and Optimal Resource Management. Artificial Intelligence and Mathematical Modelling, Multi-scale Modelling, Systems Identification and Process Safety Analysis, Nonlinear control, fault diagnosis. **Biotechnology & Bio-Systems Engineering:**Metabolic& Genetic Engineering, Bio-separations, Bio-informatics, Systems Biology, Drug Discovery, Enzymology, Bioprocess Development, Bio-fuels. **Materials Engineering:**Polymer materials, Polymer Reaction Engineering Polymer Processing, Polymer Physics, Polyurethane, Rubber, Polymer Rheology, Ceramics, Polymer Biomaterials, Drug Deliver, Food Engineering Microscopy Nano-composites, Statistical Thermodynamics, and Supercritical Fluids. **Catalysis & Reaction Engineering:**Catalysis, Multiphase Reaction, Bio-reaction Engineering and Reactor Modelling. Process intensification & reactive distillation, micro-reactors. **Transport, Colloids & Interface Science:** Granular flows, Power Mixing, Membrane Separations, Rheology of Complex Fluids, Colloids, Sol-gels Emulsions & Foams, Paints and Coatings, Microstructural Engineering, Aerosols, Electro-hydrodynamics, Fluid Mechanics & Stability, Computational Fluid Dynamics, Heat & Mass Transfer, Porous media and Surfactants, micro-fluidics. **Energy and Environment:** Climate change, Coal Gasification, Energy Integration, Green Engineering, Renewable Resources, Waste Management, Pollution Control, Air Pollution Prediction & Control, sustainability studies. **Thermodynamics and Molecular Simulations:** Properly prediction through molecular simulation, fuel cell, catalytic properties, biological systems, polymers.	Master's degree in Engg./ Technology or Bachelor's degree in Engg./ Tech. or Master's degree in Science disciplines consistent with the research areas of the departments.
BMEE01	Electrical Engineering	**Communication Engineering**: Communication Systems, Communication Networks and Internet, Computational Electromagnetics, Image Processing and Computer Vision, Microwaves, RF and Antennas, Multimedia Systems, Optical Communication and Photonics, Signal Processing, Speech Processing, Wireless and Mobile Communication, Information Theory and Coding, Magnetic Resonance Imaging, Machine Learning and Data Science	I. For General category students and/ or concession in academic performance is called for eligibility requires meeting ANY ONE of the following critera as regards performance in the qualifying degree. 1. a minimum of 60 percent marks in the final academic year of the programme
		Control & Computing: Linear systems Theory, Optimal Control	

BMEE02		&Optimization, Modeling and Identification of Dynamical Systems, Control of Distributed Parameters Systems, Non-Linear Systems, Modern Filter & Network Theory, Behavioral Systems Theory, Computational Methods in Electrical Engineering Software and System Reliability Cryptography and Security, GPU-based Computing.	2. a minimum of 60 percent marks in aggregate or as specified by the university (any one of them) 3. a first class as specified by the University. 4. a minimum CPI of 6.0 on the scale of 10; with corresponding proportional requirements when the scales are other than on 10 – for example, one a scale of 8, the minimum will be 4.8 For SC/ST category students the following critera as regards performance in the qualifying degree. 5. a minimum of 55 percent marks in the final academic year of the programme 6. a minimum of 55 percent marks in aggregate or as specified by the university (any one of them) 7. a first class as specified by the University. 8. a minimum CPI of 5.5 on the scale of 10; with corresponding proportional requirements when the scales are other than on 10 – for example, one a scale of 8, the minimum will be 4.4 **II**. The qualifying degrees are as followingB.E/B.Tech/M.E./M.Tech. in Bioedical Engineering, Computer Science, ComputerScience and Engineering, Computer Engineering, Eletrical Engineering, Electronics Engineering, Telecommunications Engineering, Instrumentation Engineering,Engineering Physics, Materials Science and Engineering. Master of Science (M.Sc) or quivalent degree in Mathematics, Physics, Electronics/Electronic Sciences **III.** The admission of a student as a Ph.D Candidate shall be confirmed only after he/she has successfully completed the prescribed coursework with CPI 8.00 and above.
BMEE03	Electrical Engineering	**Power Electronics & Power Systems**: FACTS, HVDC and Power Quality, Distributed Generation, Power System Restructuring, Wide Area Measurements and System Protection, EMI/ EMC, Coupled Field computations, Electrical Machines; Modeling, Analysis, Design and Control, Special Machines, Power Electronic Converters, Electric Drives, Power Electronics for Non-Conventional Energy Sources, Reliability in Power Systems and Power Electronic Systems, Smart Grids for Energy Harvesting,Electric Vehicles	
BMEE05		**Electronics Systems:** Electronic Instrumentation, Signal Processing Applications, Speech and Audio Processing, Bio-medical Electronics, Embedded System Design.	
BMEE06		**Integrated Circuit & System:** . **Secured microprocessors, GNSS receivers, Software defined networkingand radio, high performance computing** . **Integrated Circuits (ICs) & Systems for AI/ML, IoT sensor networks,sensing and control for quantum systems** . **Algorithmic digital design and synthesis tools, algorithm to RTL and algorithm to layout** . **Analog/Mixed-Signal ICs and Systems for Wireless and Wireline communications** . **RF/Microwave ICs and Silicon Photonics for 5G and Beyond** . **High-Speed ICs for Optical Data Centre Interconnects**	
BMEE07		**Solid State Devices** ● Non-volatile memory technologies (Flash, RRAM, FERAM, MRAM, etc.) ● Device Fabrication (CMOS, Solar cells, Detectors, etc.) ● Theory, modeling, and simulation of Electronic devices ● Novel materials and devices (III-V, Graphene, 2D, etc.) ● Spintronics, Quantum Computing, Quantum sensing, and related technologies ● Photonics, MEMS, Neuromorphic Engineering ● Photovoltaics - c-Si, Organics, Perovskite, quantum dots, etc. ● Reliability of semiconductor devices and systems (e.g., Solar panels, PV systems) ● Nanoscale energy conversion ● Flexible devices and sensors (bio, chemical, and quantum) ● Light emitting diodes (III-Nitride UV) and photodetectors (quantum dot, etc)Wide Bandgap Power Devices	Master of Science (M.Sc) or equivalent degree in Mathematics, Physics, Electronics/Electronic Sciences **III.** The admission of a student as a Ph.D Candidate shall be confirmed only after he/she has successfully completed the prescribed coursework with CPI 8.00 and above.
BMMA01	Mathematics	**Algebra:** Commutative Algebra, Hilbert functions, Blowup algebras, Local cohomology, Hopf, Algebras, Coxter Groups. Homological algebra, Gorenstein rings. **Analysis:** Functional Analysis, Operator Theory, unbounded subnormals, Hilbert modules, Numerical Functional Analysis, Approximate Solutions of operator equations and eigen value problems, Spline Theory, Numerical Functional Analysis, Real Analysis, Mean periodic functions, Generalized integrals. Several Complex Variables. Harmonic Analysis on LIE Groups **Combinatorics:**Combinatorics, Posets, Generating functions, Polyhedral Combinatorics.,ExtremalCombinatorics, Probabilistic methods, Design theory, Arithmetic and Boolean circuit complexity, Randomness and Lower bounds, Explicit constructions of pseudorandom combinatorial objects.**Geometry and Topology:** Algebraic Geometry and	First class Master degree in Maths/Statistics/Computer Science.

		Combinatorics, Schubert varieties, Linear codes, Varieties over finite fields, Algebraic Topology, Operads, Differential Geometry, Harmonic Manifolds, Algebraic & Differential Topology, Topology of Matrix varieties. Stable homotopy theory, Algebraic -theory, Combinatorial Topology. **Number Theory:** Number Theory, Automorphic Forms, Representation theory of p-adic groups. Representations of Algebraic Groups, L-functions, Converse Theorems. **PDE and Numerical Analysis:** Numerical Analysis, Applied Mathematics, Finite Element Methods, Finite volume methods. Hyperbolic systems of quasilinear partial differential equations, Non-linear waves, Partial Differential Equations, Shock waves in hyperbolic systems of conservation laws, partial integro-differential equations, Visco-elastic fluid-flow problems, Control of PDEs **Statistics and Probability:**Statistical Data mining, Computational Biology, Biostatistics, Bioinformatics, Probabilistic optimization problems in Molecular Biology, Reliability Theory, Industrial Statistics, Construction of reliability test plans, Statistical Inference, Geostatistics, Modeling bivariate distributions, Stochastic Differential Game Theory, Risk-sensitive control theory, Stochastic control Mathematical Finance, Applied Probability, Poisson and compound Poissonapproximations, Estimation after selection, Reliability test plan. Statistical signal processing, Time series analysis, Reliability analysis, High dimensional multivariate analysis, Non-Parametric curve estimation, Statistical machine learning. Large dimensional random matrices, Free probability, Extreme value theory and Statistics.	
BMME01 BMME02 BMME03	Mechanical Engineering	**Thermal and fluid Engineering**: Convective and Radiative Heat Transfer, Two-Phase Flow, Bio-heat transfer, Whole-field optical measurements, Heat transfer enhancement, Electronic cooling, Numerical Techniques, Combustion and Flames, Petrol and Diesel Engines, Gas Turbine, Nuclear Engineering, Reactor Neutronics Reactor Heat Transfer, Fluid Mechanics, Fluid Machinery, Turbulence, Compressible flows, Geo-physical flows, Micro Fluidics, Rarefied gas flow, Porous media, Fluid-structure interaction, Fuel Cells, Computational Fluid Dynamics, Refrigeration, AC Systems, Cryogenics, Heat Pumps, Cryogenic heat exchangers, cryocoolers, green transport refrigeration, Non-equilibrium thermodynamics, Bio-microdevices. **Design Engineering:** Stress Analysis using Analytical and Numerical Methods, Studies of Failure Due to Fatigue and Fracture, Fracture Mechanics, Application of Finite and Boundary Element Methods, System Modeling, Control and Automation, Kinematics, Machine Dynamics, Synthesis of Mechanisms, Robotics, Mechatronics, Tribology Design of Elements and Systems, Optimization, CAD, Interactive Graphics, Vibration, Noise and Acoustics, MEMS, Vehicles Dynamics, Smart Materials and Structures, NDT. **Manufacturing Engineering:** Machining, casting, Welding, Forming, Tool design, Modeling and Simulation of Manufacturing Processes and Systems, Manufacturing Automation and Control, CAD/CAM/CIM, Feature Based Modeling, Computer Aided Process Planning, Intelligent Product Design and Manufacturing, Application of AI in Manufacturing, Supply Chain Modeling, Manufacturing Analytics, Reliability Engineering, Maintenance Planning, Logistics, Micromachining, Microsystems Fabrication, Sensors and Actuators, Packaging, Deformation Science, Computational Mechanics, Integrated Computational Materials Engineering, Multiscale Modeling, Additive Manufacturing, Sustainable manufacturing, Powder Metallurgy, Electric Vehicles, Modeling and simulation of multi-scale phenomena in materials processing, Experimental studies of materials (nano and micro scale involving advanced microscopy).	First Class (or 60% minimum) and (55% for SC / ST) in the qualifying degree in the various branches of Engineering such as Mechanical Engg./ Production Engineering/ Industrial Engineering./ Aerospace Engineering/ Chemical Engineering., Metallurgical Engg, Civil (Structural) Engineering/ Automobile Engineering/ Applied Mechanics.Engineering/MechatronicsEngg./ Instrumentation & Controls.Engg./ Laser Technology, Engineering, Materials Technology, Biomechanics. M.Tech from IITs with CPI >= 8.5 can be directly called for the interviews. The candidate must satisfy the eligibility criteria in either one of the following qualifying degree.
BMMM01	METALLURGICAL ENGINEERING AND MATERIALS SCIENCE (MM)	**i. Metals:** Process analysis, instrumentation and control, Iron and Steel Making, deformation behavious and microstructure evalution during creep and superplasticity, mineral. Processing and extractive metallurgy, metal forming, mechanical behavior, welding, physical metallurgy, phase transformation, structure property relationship, thermomechanical processing and texture analysis. **ii. Ceramics:** Electronic ceramics, bioceramics, glasses and glasscermics-electrical and optical properties, magnetic materials, dielectric and piezoelectric ceramics and devices, ceramic foams, industrial ceramics, high temperature ceramics, near net shape forming, gel casting, rheology of suspensions. **iii. Semiconductors and magnetic materials:** Devices of thin film elemental semiconductors and alloy systems, surface treatment and surface engineering, chemical vapor deposition, structure property correlation in nanocrystalline	The general eligibility criteria prescribed by IIT Bombay are bare minimum and mere possessions of same will not entitle the applications to be called for written test/interview, The Department may restrict the number of applicants to be called for written test/interview to a reasonable limit, on the basis of qualifications and experience higher than that of the minimum prescribed in The advertisement. The candidate must satisfy the eligibility criteria in either one of the following qualifying degree. i. M.Tech/ M.E or equivalent degree in Engineering /Technology. ii. B.Tech./B.E or equivalent degree in Engineering/Technology. iii. M.Sc. or equivalent degree in Chemistry, Materials Science, Physics

		magnetic materials, magnetoresistor materials in addition, research into materials for sensors and batteries, superconductors, thermoelectric materials, organic semiconductors, solar cells, nanophotonics, synthesis and processing of ion conductors, materials for energy generation and storage materials for quatum computing and ultrahigh vaccum systems for thin film systems is going on in the Dept. **iv. Polymers and Composites:** Polymer blends, Polymercarbon nanotube composites, polymer thin films, polymer nanocomposites, thermodynamic, mechanorheological, mechanical properties of polymers, responsive, functional and conjugated polymers, metalmatrix composites, structure property relations. **v. Wear and Corrosion:** Fracture and failure, nondestructive evaluation, aqueous corrosion, metallurgy of corrosion, oil and gas corrosion, and protective coatings (paints, high temperature coating etc.)	and related science streams. Mathematics as a subject at the B.Sc. Level is mandatory. See http://www.iitb.ac.in/mems/en/phd-admissions for additional details.
		vi. Modeling and Simulations: Modeling of metallurgical processes, heat and mass transport, modeling of metal forming, Optimization, Monte Carlo simulations, Dislocation dynamics simulations, molecular dynamics simulations, phase field modelling, first principle calculations, crystal plasticity. **FACILITIES AVAILABLE** • Basic XRD with Xcelerator and thin film attachment • 1600 Degree Horizontal Single Sample Dilatometer with Accessories • Image Intensifier System and ExRay Source • High Temp. Attachment and Texture and Stress Attachment Unit • Air Vacuum Induction Melting System • Hitachi Scanning Electron Microscope • Simultaneous Thermal Analysis System • R/S SST Plus with Coaxial Cylinder Rheometer • Atomic Absorption Unit AVANTAP • Carbon Sulphur Analyser • High Temp. Furnances 1700 Deg C. • UV Visible Spectrophotometer • Thin Film Processing Units • MTS machines • Vibrating sample magnetometer • National facility on OIM and stress determination by XRD • Electrochemical Measurement Systems The State of the art Model PAR 338 • Potentiostat model Wenking PSG581 • Automated 10 Ton/SCC systems • Thermogravimetry analysers. • Computer Facilities • Optical & Stereo microscopes • Acoustic Emission Systems • Wear and Corrosion Machines • Facilities for testing Paint and Other Coatings • Dynamic loop system • High temperature high pressure autoclaves • DSTFIST High Performance Computing facility, along with CALPHAD and standerd open Source Scientific Software. • DST FIST SNOM and FID-SEM facilities.	The general eligibility criteria prescribed by IIT Bombay are bare minimum and mere possessions of same will not entitle the applications to be called for written test/interview, The Department may restrict the number of applicants to be called for written test/interview to a reasonable limit, on the basis of qualifications and experience higher than that of the minimum prescribed in The advertisement. The candidate must satisfy the eligibility criteria in either one of the following qualifying degree. iv. M.Tech/ M.E or equivalent degree in Engineering /Technology. v. B.Tech./B.E or equivalent degree in Engineering/Technology. vi. M.Sc. or equivalent degree in Chemistry, Materials Science, Physics and related science streams. Mathematics as a subject at the B.Sc. Level is mandatory. See http://www.iitb.ac.in/mems/en/phd-admissions for additional details.
BMPH01	Physics	Condensed Matter Physics (Experimental and Theoretical)	In all cases the minimum eligibility is a First Class or equivalent (Min. 60%) Master's Degree in Engineering/ Technology (55% for SC/ST) OR a First Class or equivalent (Minimum 60%) Master's degree in Science (55% for SC/ST) or a First Class or equivalent (Min.60%) in Bachelor's degree in Engineering/ Technology (55% for SC/ST).
BMPH03		Photonics and Spectroscopy (Experimental and Theoretical)	
BMPH04		High Energy Physics (Experimental and Theoretical)	
BMPH06		Statistical Physics (Theory) Biophysics / Non Linear dynamics / Soft matter Physics (Experimental and Theoretical)	
BMPH07		Astronomy / Cosmology / Gravity (Experimental and Theoretical)	
BMHS01	Humanities and Social Science	**Economics:-** Applied Microeconomics, Open-economy Macroeconomics & International Finance, Applied Econometrics, Environmental Economics, Energy Economics, Empirical International Trade and Strategic Trade Theory and Policy, Evaluation of Economic Policies with Special Reference to India, Productivity Estimation: Measurement Issues, Comparisons and Determinants, Empirical Development Economics, Industrial Economics, Industry-Environment Linkages, Socio-Economic Impacts of Climate Change, Green Accounting, Natural Resource and Water Resource Economics, Climate Change: Impacts and Policy, Financial Economics, Monetary Economics, Corporate Investment: Theory and Econometric Applications, Health	

		Economics, Corporate governance, Labour Economics, Applied Game Theory, Behavioural Economics, Experimental Economics, and Agricultural Economics.	
		English:- Narratology; Intertextuality; Victorian Novel; Indian Writing in English; Films and Disnarration; Women's Studies; Autobiography Studies; "Crisis" in English Studies; African American Writing; Morpho-Syntax; Linguistic Theory; First Language Acquisition; Endangered Languages Documentation; The Partition of 1947; the 'Turbulent 40s' in Bengal; South Asian Fiction-in English; and in Translation; Postcolonial Theory and Literature; Feminist Theory and Women's Writing; Cultural Studies; Feminist Theory; Literary Theory; Film Studies; Regional Literatures; and Cultures in India; Environmental Sociology; Social and Environmental Movements; Environmental Politics with a focus on Social inequality and Natural Resource Conflicts especially in Rural India; Issues of Livelihood and Problems of Marginalized Class and Political Ecology; Adaptation Studies; Shakespeare and Renaissance Drama; European Literature; 19th Century Bengali Literature; Literature and Other Arts; Translation Studies; World Literature; Historical Musicology& Ethnomusicology, Theatre Historiography, Performance Philosophy, Colonial Theatre, Performance and Ethnography, Aesthetics, Critical Theory, Ecocriticism **Philosophy:-** Metaphysics, Philosophy of Science, Philosophical Logic, Philosophy of Language, Professional Ethics, Philosophy of Wittgenstein, Sartre, Kripke, Quine, Moore, Hare, Bhartrahari, Philosophy of Mind, Philosophy of Education and Environmental Ethics, Indian Philosophy and Comparative Philosophy, Buddhist Philosophy, Sankhya Philosophy and Vedanta Philosophy, Philosophy of Artificial Intelligence, Philosophy of Mind, Cognitive Science, Analytic Philosophy, Twentieth Century European Philosophy; Moral, Social and Political Philosophy, Social Epistemology, Moral theory, Alfred Korzybski- 'General Semantics' and related areas, Philosophy of Language, Wittgenstein, Culture and Value, Ethics/Moral Philosophy, Social and Political Philosophy, Classical American Pragmatism, Feminist Philosophy, Twentieth century Continental Philosophy 20th Century Continental Philosophy: Heidegger, Foucault, Husserl, Gadamer, Phenomenology and Hermeneutics, Epistemology: Implications of the Historicity of Knowledge for its Universal Validity Metaphysics: Implications of an Ontology of Events for Political Philosophy History of Western Philosophy **Psychology:-** Psychological Perspectives and Theory, Organizational Behaviour, Personality Studies, Qualified MBTI user, Organizational Culture and Values, Role of Psychology in Development - Health and Contraceptive Use, Developmental Neuropsychology, Education and Child Development, Eyewitness Testimony, Cognitive Ergonomics, EEG / Event Related Potential, Working Memory and Prospective Memory and Developmental Dyslexia, Organization behavior, HRM,Culture and Values in organizations, Personality studies, Positive organization behavior and well-being.**Sociology:-**Urban Studies, Development Studies, Rural/Agrarian Sociology, Law and Governance Legal Pluralism, Vulnerability and Adaptation to Climate Change, Gender and Development, Disaster Studies, Ethnicity and Multiculturalism, Urban Studies, Sociological Theory, Sociology of Development, Anthropology of corruption, constitutional law, sociology of higher education, sociology of religion and kinship, conversion, Christianity in India. Caste today, religious institutions, hierarchy/stratification, sociology in/of India, contemporary Karnataka, Sociology of Development and Environment, Natural Resource Conflicts, Issues of livelihoods and problems of marginalized class, resource rights, subaltern resistance and movements and Political Ecology, Sociology and political economy Of finance, Political economy of development, Indian political economy, Theories of money, Classical political economy, New and old Institutionalism and History of economic thought, Issues of gender and sexuality, medical anthropology, anthropology of the body and embodiment, post- colonial studies, post-modern feminist studies and Southern theories, Caste, Civility and Democracy, Civil Society Ethnography Studies, Inclusion and Exclusion. **Cell for Indian Science and Technology in Sanskrit: -** Indian Science and Technology, Indian Philosophy, Logic and Epistemology, Sanskrit language, Paninian Grammar, Philosophy of Language. **History**: Archeology, Ancient history, Medieval history & Modern history	i) Master's degree in Arts / Commerce or equivalent degree in allied subjects with a minimum of 55% marks (50% for SC /ST) **OR** ii) Master's Degree in Engineering / Technology or equivalent degree with First class or 60% marks (55% marks for SC/ST) **OR** iii) Bachelor's degree in Engineering / Technology with First class or 60% marks (55% marks for SC/ST) **OR** iv) Master's degree in Scinece or equivalent degree, with First class or 60% marks (55% marks for SC/ST) **OR** v) M.Phil (awarded by IIT Bombay or equivalent 2 year degree) in any of the disciplines pertaining to the research areas in the Department with First Class or 60% marks (55% marks for SC/ST)
BMBS01	Bioscience & Bioengineering	**BIOTECHNOLOGY (BT)** (A) **Biophysics and Computational Biology**: Bioinformatics, Glycobiology, Computational Biology, Protein crystallography, NMR based Structural Biology, Physics of Biological system	First Class or 60% marks (55% marks for SC/ST), as specified in the General Eligibility Criterion, in the qualifying degree: i. M.Tech. or equivalent degree in

		and Computational Modeling of biomolecules, Dynamics of cytoskeletal filaments and Chromatin remodelling, physical properties of the extracellular matrix, protein folding/misfolding, aggregation and neurodegeneration, Single particle cryo-EM, Time- resolved techniques. (B) **Biochemistry**: Enzyme kinetics and enzyme secretion, microbial metabolism and regulation, aromatic hydrocarbon metabolism and genetic engineering, enzyme inhibitor design, molecular mechanisms of DNA replication, repair and packaging in double stranded DNA viruses, Molecular Enzymology. (C) **Microbial Biology**: Fungi, Viral assemblies, Bacterial Pathogenesis, Host Pathogen Interactions, molecular parasitology. (D) Cell Biology: Cellular Biophysics, microtubule dynamics, bacterial cell division, Chromosomal and extra chromosomal segregation in fungi, Neurobiology. (E) **Immunology**: Molecular immunology and cell signaling, Cellular Immunity, Tumor Immunology, Cancer biomarker. (F) **Genetics and Molecular Biology**: Functional Genomics, Epigenetic Regulation, Fungal Molecular Genetics. (G) **Proteomics**, System Biology and Biomarkers of infectious diseases	Biotechnology, or Bio-related engineering subjects ii. M.Sc. or equivalent degree in subjects related to Life Sciences/Physics/ Chemistry/Mathematics iii. B.Tech. in Biotechnology, Chemical Engineering, Computer science and Engineering, Electrical Engineering/ Electronics and Telecommunications, Mechanical engineering, Engineering Physics. iv. MD/MS in Health Sciences including AYUSH First Class or 60% marks (55% marks for SC/ST), as specified in the General Eligibility Criterion, in the qualifying degree: i. M.Tech./M.E. or equivalent degree in Biomedical Engineering, Chemical Engineering, Computer Science & Engineering, Electrical Engineering, Electronics/Telecommunications Engineering, Instrumentation Engineering, Mechanical Engineering and Engineering Physics. ii. MBBS with MD/MS, BVSc with MVSc, BDS with MDS, BPTh with MPTh, BOTh with MOTh, MS/MD Health sciences AYUSH as well as MBBS /BDS /BPTh /BOTh /BVSc (4 year degree) or equivalent degree in appropriate branch. iii. M.Pharm. iv. B.Tech./B.E. or equivalent degree in Biomedical Engineering, Chemical Engineering, Computer Science & Engineering, Electrical Engineering, Electronics/Telecommunications Engineering, Instrumentation Engineering, Mechanical Engineering and Engineering Physics. v. M.Sc. or equivalent degree in Biochemistry, Biophysics, Biotechnology, Ceramics, Chemistry, Electronics, Ergonomics, Material Science, Mathematics, Molecular Biology, Physics and Physiology. vi. B.Pharm. (with entrance examination)
BMBS02		Sensors and Devices: Bioinstrumentation for diagnostics and therapeutics, early detection of carcinoma and tropical diseases, bioMEMS devices, Fluorescent Biosensors, Nanoengineered Sensors, Layer by Layer Self Assembly, Microfluidics for biomedical applications. Biomaterials, Drug delivery and tissue engineering, Nano-biotechnology, Design of scaffolds for tissue engineering, Controlled Release technologies, Neuroprosthetic devices including aids for the handicapped, Signal processing, Telemedicine and knowledge based systems. Microfibrication for immunotherapy, Computational physiology, Cardiac electrophysiology and muscle mechanics, Computational Neurophysiology, Movement Neuroscience, Rehabilitation technology Medical Optics – Optical tomography, Blood flow measurements, Computational Imaging	
BMEV01	Environmental Science & Engineering	Air Quality Management and Polluting Control, Enviornmental & Water Resources Systems Modelling, Solid and Hazardous Waste Management, Water and Wastewater Treatment, Reuse and Management	i. M.Tech./M.E. or equivalent degree in Aeronautical/Aerospace Engineering, Agricultural Engineering, Atmospheric Science, Chemical Engineering, Civil Engineering, Energy Science & Engineering, Biotechnology, Environmental Science & Engineering, Mechanical Engineering, Metallurgical Engineering & Materials Science, Mining Engineering. ii. B.Tech./B.E. or equivalent degree in Aeronautical/Aerospace Engineering, Agricultural Engineering, Atmospheric Science, Chemical Engineering, Civil Engineering, Energy Science & Engineering, Biotechnology, Environmental Science & Engineering, Mechanical Engineering, Metallurgical Engineering & Materials Science, Mining Engineering. **OR** M.Sc. or equivalent degree in Atmospheric Science, Biochemistry, Biotechnology, Chemistry, Earth Sciences, Environmental Toxicology, Environmental Science, Meteorology, Microbiology, Physics, Public Health & Statistics. ***Mathematics at 10+2 level is a mandatory requirement***
BMIO01	Industrial Engineering and Operations Research	The group is interested in research related to modeling, quantitative analysis and optimal resource allocation from decision problemsindeterministicandstochasticcontexts.Broadareas of application are in supply chains, logistics, transport including railways,manufacturingsystems, finance, services, infrastructure and other industrial systems;application of quantitative methodsinqualityandmaintenance management	a) Firstclass Master's degree in any branch of Engineering with adequate exposure to Industrial Engg. and Operations Research. b) First class M.Sc. in Mathematics, Statistics or OperationsResearchwith excellent academicrecord.

		systems;development and application of decision support, intelligent andknowledge-basedsystems. Thespecificproblemsofresearchinterests include: productionplanning, schedulingand control systems; management of inventories inproduction,distributionand service systems; industrial scheduling,facilitiesplanning,projectmanagement, qualitymanagement,materials management and productivity management; Data Analytics & Data ManagementSupplychainanalysis, reverse logistics, closed-loop supply chainsand RFID applications, product varietymanagement. OperationsResearchapplicationsinmanagementoftechnologyand resource allocation; Convex optimization; mixed-integerprogrammeming; Markov decisionprocesses; optimal control in deterministicand stochasticsystems;(differential) gametheory; applications ofgame theory; modeling and simulation of supply chains, manufacturingand servicesystems; theoryandapplicationsof distributed and hybrid simulations,discrete eventandsystem dynamicssimulations;appliedstochasticmodels;schedulingandcontrolofrailwaysandothertransportoperations;time tablingofservices,crewandvehicleschedulingfor transport operations; optimization anddesignproblemsarisingfrome-commerce, includingauctions and mechanism design for electronic exchanges; risk analysis and contract design; revenuemanagement; quantitative models for financial engineering. Supervised learning & Unsupervised Learning; Online & reinforcement Learning. Development and applications of moderninformationsystems for managing manufacturing, supply chain and service organizations. Deep Learning, Longitudinal data analysis, Kernel methods. The IEOR programmeisuniqueinits contemporaryflavor,withnew courses in Financial Engineering, Supply Chain Management, GameTheory,Markovdecisionprocess,System Dynamics, Machine Learning.Services Management, Manufacturing systems to namea f e w . The programmeisequallystronginbackgroundbuilding,withupdatedcoursesin Optimization Techniques, StochasticModels, Simulation, and Knowledge-based systems.	c) FirstClassBachelor'sdegreein anybranchofEngineering with an excellentacademicrecord.
BMSC01	Systems and Control Engieering	• Geometric mechanics, differential geometry, nonlinear control, satellite and space-craft dynamics, robotics • Higher order sliding mode control and observation, adaptive sliding mode control for discrete-time system • Optimization-based control, control under communication constraints, stochastic control, switched and hybrid systems • Game theory, optimization, economics, information theory and combinatorics, systems biology • Global optimization, GPU supercomputing, fractional order differentiation and applications • Cooperative control, guidance of autonomous vechicles, resource allocation • Adaptive control, decentralized adaption, multi-agent systems, time-varying feedback • Embedded control systems, path planning of autonomous vehicles, vision based navigation, hardware/software co-design Distributed parameter systems, output regulation, periodic systems, parameter identification in PDEs, hardware/software co-designControl theory, nonlinear and geometric control, NMR spectroscopy, quantum control.	First class M.E. or M.Tech. in Aerospace/Chemical/Electrical/Electronics/ Instru-mentation/Mechanical/Metallurgical Engg./ Systems & Control Engineering. Candidates interested in pursuing a Ph.D. should identify and communicate with atleast a couple of faculty members of the group with whom their research interests match. The names of these faculty members should preferably be mentioned in the application form. This is a pre-requisite for short-listing.
BMEN01	Energy Science and Engineering	**Energy Efficiency/ImprovingConventionalEnergySystems:**heat pumps, energy integration, process integration for resource optimization, population balance modeling, pinch analysis development of techniques for optimization of utility systems, demand side management/load management in the power sector, variable speed drives, power generation and systems planning, energy management and auditing, efficient motor drive systems, electronic ballasts, static var compensators, illumination control, power electronics in energy efficient systems, electric vehicles, boilers and fluidised bed combustion, exhaust heat recovery, cogeneration, building energy management, efficient air conditioning systems, IC engines, combustion, exhaust after-treatment systems, oil-water separation and wax deposition in petroleum flow, pipeline shut-in and restart processes, bulk and interfacial rheology, gas hydrates, thermal management of living spaces **Renewables:**coal gasification, biomass gasifiers: design, development and testing, liquid fuels from biomass, industrial solar thermal concentrators, Stirling engine systems, testing of	M.Tech. Degree in any of the following branches of Engineering: Aeronautical/ Aerospace, Chemical, Civil, Electrical, Mechanical, Metallurgical, Energy Studies. M.Sc. in Chemistry/ Physics/ Mathematics with a good academic record

		solar collectors and systems, passive solar architecture, development of PV cells, thin film solar cells, perovskite solar cells, flexible PV devices, reliability and performance of PV, characterization, modelling, and simulation of defects and degradation in solar cells and modules, thermal non-destructive evaluation by infrared thermography, grid integration of distributed and decentralized energy resources, smartgrids, microgrids, converter topologies and control, hybrid systems for rural electrification, wind energy, low cost solar driers, fuel cells, solar photovoltaic concentrator, development of engines for SVO, biodiesel, dual fuelling etc., biodiesel manufacturing processes, complex fluid dynamics for granular materials and multiphase flows, molecular dynamic simulation of particulate flows **Energy Storage Devices and Systems:** Li-ion and Na-ion batteries: electrode materials, electrolyte, fabrication, metal sulfur batteries for EVs and stationary applications, commercial scale battery prototyping research and analysis, thermal management of batteries, flow battery modelling and design, supercapacitors, materials for hydrogen storage, hydrogen storage systems, thermal management in metal hydride beds, applications of metal hydride based hydrogen storage systems, carbon nano-tubes for hydrogen storage **Nuclear:**nuclear safety, nuclear waste management, thermal hydraulics research, computer simulation models for analysis of transients in pressurized heavy water reactor, advanced numerical methods for neutron diffusion and fluid flow, two phase flow modeling, nuclear thermal hydraulics and safety, analytical solution of multilayer heat conduction problems	
BMID01	IDC School of Design	**Some of the specific areas include:** · Design theory · Design tools · Design management · Typography, script, calligraphy, lettering, type design · Interaction design · Visual language & Storytelling · Film-making and Cinema · Information design · Sustainability · Human Computer Interaction · Product semantics · Biomimetics · Cognitive & Physical ergonomics · Human Factors and Socio-technical systems · Systems thinking and design · Design for development · Game Design · Design for X (children, elderly, people with special needs…)	1)Master's Degree in Engineering / Technology or equivalent degree, with First class or 60% marks (55% marks for SC/ST) as described later in A.5.4. 2) One of the following: (i) Bachelor's degree in Engineering / Technology with First class or 60% marks (55% marks for SC/ST/PwD) as described later in A.5.4. (ii) Master's degree in Science or equivalent degree, with First class or 60% marks (55% marks for SC/ST/PwD) as described later in A.5.4. (iii) Master's degree in Arts/Commerce or equivalent degree in allied subjects with a minimum of 55% marks (50% for SC/ST/PwD), only for admission to the Ph.D. programmes offered by the Industrial Design Centre and Department of Humanities &Social Sciences. **Candidates must also fulfill ONE of the following additional requirements:** **i.** Valid GATE/CEED Score. **ii.**Junior Research Fellowship (JRF) of CSIR/UGC/NBHM/DBT/ICAR/ICMR/ICPR or DST INSPIRE Fellowship. **iii.** Candidates having UGCNET Lectureship (LS) are also eligible for TeachingAssistantship in addition to other academic qualifications in Humanities & Social Sciences Department. **iv.** Minimum of 2 years of professional experience (acquired after obtaining the qualifying degree and completed before the starting of the semester in which admission is sought).In addition to general eligibility criterion, the applicants must satisfy the eligibility criteria specified for the respective Departments/ Centres/ Schools/ Interdisciplinary Groups. Further, for financialsupport the eligibility criteria for specificcategory has to be satisfied.
BMMG01	School of Management	i. Accounting ii. Corporate Competitiveness iii. Decision Sciences iv. Economics & Policy v. Entrepreneurship vi. Finance vii. General Management viii. Human Resource Management ix. Information Systems x. Intellectual Property Rights xi. International Business	At least one of the following criteria must be met: (i) B.E/B.Tech or equivalent degree with 60% marks/6.5 CPI (55% marks/6.0 CPI for SC/ST) and at least two years of work experience and qualified in GATE/UGC NET(Lectureship)/UGCJRF/CSIRNET (Lectureship/ CSIRJRF or having CAT/ GMAT/GRE score within the last five years. (ii) Master of Management /ME /M.Tech / M.Pharma/ M.Phil/2 years MBA or 2 year PG Diploma in Management from any institute recognized by a Government body (AICTE /UGC/AIU) with 60% marks/6.5 CPI (55% marks/ 6.0 CPI for SC/ST).

		xii. Management of Information Technology xiii. Marketing Management xiv. Operations Management xv. Organization Behaviour xvi. Project Management xvii. Quality Management xviii. Statistics and Operations Research xix. Strategy and Business Policy xx. Technology Management	(iii) Executive MBA of at least one year duration from IITs/IIMs or any institute recognized by a Government body (AICTE/ UGC / AIU) with 60% marks/6.5 CPI (55% marks/ 6.0 CPI for SC/ST) (iv) M.Sc/M.A/ M.Com/LLM/MCA or equivalent degree with 60% marks/6.5 CPI (55% marks/6.0 CPI for SC/ST) at post graduation level and qualified in GATE/UGCNET (Lectureship)/UGCJRF/CSIRNET Lectureship/CSIRJRF or having CAT/ GMAT/ GRE taken within the last five years (v)CS/CA with 60% marks/6.5 CPI (55% marks/ 6.0 CPI for SC/ST) in the preceding degree. Criteria for awarding Teaching Assistantship and other application categories are as per the guidelines mentioned in section A.6 of this Brochure. Note : You are required to submit a research proposal (1500 words) on a topic of your interest in place of Statement of Purpose. The proposal should contain a) problem identification, b) brief review of literature, and c) methodology. Applications without research proposal will not be considered.
BMSR01	Centre for Studies in Resource Engineering	**I) Application Area** a) Water Resources b) Terrain Evaluation, Land-use planning and monitoring c) Digital Agriculture d) Minerals Exploration e) Natural Hazard of Droughts, Desertification, Landslide, Avalanche, Earthquake, Tsunami etc. f) Marine Resources and Ecology g) Snow, Glaciers and Atmosphere h) Applications of Microwave Remote Sensing **II) Theoretical Areas** i) Digital Image Processing ii) Digital Photogrammetry and Cartography iii) Geospatial Technologies iv) SAR Inter ferometry and Polarimetry v) Mineral Systems Studies vi) Global Positioning Systems vii) Climate Change Studies **1) The actual available Ph.D. topics for a particular round of admissions and the corresponding preferred engineering/science disciplines for each topic specified by the concerned faculty members will be posted on CSRE webpage http://www.csre.iitb.ac.in and applicants may visit the same to identify the matching topics at the time of submitting the application.** **2) The application should include the following in addition to what is already included in the standard application form:** a) Applicant's Statement of purpose stating at least one topic from list of topics offered. b) Applicant's Curriculum vitae covering • List of courses taught by the applicant during the last three years relevant to the research topic of his/her interest • List of M.E./M.Tech. projects supervised by the applicant during the last three years relevant to the topic of his/her interest • List of training programmes attended by the applicant in the last three years relevant to the topic of his/her interest • List of publications of the applicant in peer refereed journals / refereed conferences relevant to his/her topic of interest. • Any awards / recognition won by the applicant for work in areas relevant to his/her topic of research • Title of applicant's M.Tech./ME dissertation topic	Candidates M.Tech/ ME or B.Tech/ B.E. or M.Sc. First Class or 60% marks (55% for SC/ST) in any of the following branches: • Agricultural Engineering • Civil Engineering • Computer Science and Engineering • Electronics & Communication Engg. • Electrical Engineering • Geology & Geophysics • Information Technology • Mathematics • Mining Engineering • Physics • Environmental Engg. • Architecture and Town Planning • Geoinformatics Geomatics (GI)

		or B.Tech./BE/M.Sc. Final year project topic and abstract Applicants with M.Sc. must have studied Mathematics at least till 10+2 level; Mathematics during B.Sc. desirable.	
BMUS01	Centre for Urban Science and Engineering	**Architecture, Urban Design & Planning:** Housing, Land Use Policies, Public Space, Sustainable Urbanism, Contemporary Architecture. **Urbanization Policy & Governance:** Housing Economics, Water & Sanitation, Climate Change, Circular Economy **Infrastsructure:** Transporation and Land Use, Public health, Water and Wastewater, Waste Management, Smart Energy **Informatics:** Cyber-Physical Systems, Geo-Spatial Technologies, Network Analysis	First Class or 60% marks (55% marks for SC/ST), as specified in the General Eligibility Criterion of IIT Bombay's PhD admission Information Brochure, in the qualifying degree. The qualifying degree can be any one of the following: M.Tech./M.E. or equivalent degree in any branch of Engineering OR Master's degree in Architecture, Urban Design/Planning, Environmental Sciences, Energy Sciences, Geography, Social Sciences, Economics, Applied Mathematics, Statistics, or related disciplines.

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In all cases, the minimum eligibility is Master's degree in Engineering/Technology or Master's degree in Science/Humanities with aminimum of 60% (6.00 CGPA) marks in aggregate (of all the year/ semesters of the qualifying examination) or equivalent grade point average (as determined by IIT Delhi). For SC/ST/PHcategory candidates, the minimum performance in the qualifying degree is relaxed from 60% to 55% (from 6.00 to 5.5 CGPA).

Code	Department	Fields of Specialization	Minimum Qualification
DLAM01	Applied Mechanics	**(a) DesignEngineering:**Design Engineering, Design Method and Engineering alternatives, Reliability Engineering, Computer Aided Design, Ergonomics, Reverse Engineering, Design and Analysis of Biomedical Devices, Complaint Mechanisms and Smart Instrumentation, Bio-inspired Engineering. **(b) Fluid Mechanics:**Bio-fluid mechanics, Computational Aerodynamics, CFD- Computational Fluid Dynamics (includes DNS-Direct Numerical Simulation, LES-Large Eddy Simulation, DES-Detached Eddy Simulation, RANS-Reynolds Averaged Navier 0-Stokesetc.), Internal Flows, Hydrodynamic stability theory, Low-dimensional models and chaos, Micro-air Vehicles. Optical flow diagnostics (PIV-Particle Image Velocimetry and Micro PIV), Pipeline Engineering, Pollution Dispersion, Supersonic andHypersonic Flows, Turbulence, Turbulent boundary-layer stability and control, twophase flows, Aerodynamics; Turbulent heat transfer compressible flows, Fluid-structure interaction. **(c)Solid Mechanics:**Large deformations, Impact mechanics, Elasticity, Piezothermoelasticity, Composite materials and structures plates and shells, Non-linear dynamics and chaos, Off-shore structures, Smart structures, Structural stability, Snow mechanics, Dynamic plasticity, Nano composites, Damage mechanics, Soft Materials, Structural health monitoring, Functionally graded structures, Multi-Scale modeling of nano-structures, Bio-mechanics/ cell mechanics, Cardiovascular biomechanics, Brain biomechanics, Computational surgery.	Master's Degree in Mechanical, Civil, Chemical, Aeronautical, Naval Architecture, Applied Mechanics, Engineering Mechanics, Engineering Analysis & Design or Design Engineering.

Code	Department	Fields of Specialization	Minimum Qualification
DLAS01	Centre forAtmospheric Sciences	Numerical Modeling of the Atmosphere; General circulation; Tropical Meteorology and Indian Monsoon; Land-Surface Process Modeling; Land- Atmosphere Interaction; Ocean Modeling; Coastal Processes; Ocean State SimulationsandForecasting;StormSurgesandinundation;ClimateDynamics; Climate Variability and Changes; Climate Change Detection &Attribution; GlobalandRegionalClimateModeling;ClimateProjections;ClimateChange Impacts; Urban Climate; Chemical Transport Modelling and Air Quality Prediction,AirPollutionandHealth;Aerosol-ClimateInteractions;HeatIsland Effect: Modelling and Measurements; Fog Prediction; Numerical Methods; Renewable Energy Meteorology; ResourceAssessment.	M.Tech./ M.Sc./B.Tech. (with valid GATE Score/CSIR/UGC-NET/NBHM/ICAR/ICMR/DST INSPIRE fellowship) degree in Mechanical, Civil, Chemical &Computer Science &Engineering, Physics, Chemistry, Mathematics, Statistics, Oceanography, Environmental Science, Engineering Physics, Atmospheric Science, Meteorologyand related fields. For B.Tech.orequivalent the minimum eligibility is 80% marksor 8.0 CGPA. For those with M.Sc. as qualifying degree (or previous degree for those with M.Tech. as a qualifying degree), Physics/Mathematics must be studied as a subject in the bachelor's degree.The requirement of GATE/national level exam is waived for M.Sc. graduates from IITs or integrated M.Sc. programmes of CFTIs with a CGPA of 8.0 or above.
DLAL01	Centre for Applied Research in Electronics	(a) Biosensors, Microelectronics and MEMS. (b) Microwave Circuits, Antennas, RF MEMS, MMICS, Device Modeling. (c) Signal Processing, Underwaterand Air Acoustics Signal Processing, Speech and Audio Signal Processing, Communications, Multi-Sensor fusion.	Master's degree with the Preceding degree in appropriate area with first class throughout. Master's degree in Electrical, Electronics, or Communication Engineering or equivalent, with minimum marks: GEN: 75%, OBC: 70%, SC/ST/PH: 65%.
DLBM01	Centre for Biomedical Engineering	Biomaterials, Biomechanics, Medical Imaging, and Bioinstrumentation.	Master's degree in any branch of Engineering/ Science/ Pharmacy/ Mathematics/ M.B.B.S. with 60% MD/MS with first class and B.Tech. or equivalent having above 70% are also eligible to apply for Ph.D.
DLBC01	Biochemical Engineering & Biotechnology	**Bioprocess Engineering**: Engineering analysis of enzymatic, cellular, metabolic processing involving bioprocess kinetics, Modeling for development of reactor operation strategies & process optimization, Use of Innovative bioreactor designs, Process integration & scale-up for economic production of metabolites, Monitoring and control of process parameters, Animal cell technology, Plant cell/hairy root cultivation in bioreactors for strategic metabolite production, Metabolic flux analysis, Bioenergetics, Biotransformation. **Downstream Processing**: Novel product separation strategies based on sorption, Liquid-liquid extraction, Ultra-filtration, Affinity methods. **Molecular Biology and Recombinant DNA Technology**: Development of recombinant cultures for hyperproduction of metabolites and commercially important enzymes (β glycosidase, laccase, protease) Protein engineering, Heterologous protein production (including therapeutics in Escherichia coli, Pichia pastoris), Cancer molecular biology, micro RNA research and RNA technology, Bioinformatics and Genomics. **Bioremediation and Environmental Biotechnology**: Prospecting of microbes & their application in wastewater treatment and agriculture. **PharmaceuticalBiotechnology and Industrial Biotechnology.**Bionanotechnology:Lab-on-a-chip devices, drug delivery and diagnostics devices.	M.Tech./ M.S. degree in Chemical/ Biochemical Engineering, Bio-technology, Food Technology, Environmental Bio-technology, Pharmaceutical Bio-technology, Industrial Bio-technology, Applied Microbiology.
DLEN01	Department of Energy Science and Engineering	Internal Combustion Engines, Thermal Engineering, Solar Thermal, Power Systems, Power Electronics, Machine Drives, Control System and Devices, Instrumentation and Control, Solar Photovoltaics, Wind Energy, Hydro Power, PlasmaScienceandTechnology,NuclearEngineering,EnergyConservationand Management, Bio Energy, Turbo Machinery,Building Energy Management, Computational Fluid Dynamics (Thermal Fluids), Fuel Cells, and Electrical, Thermal and Electro-Chemical EnergyStorage.	Bachelor's degree in Mechanical, Chemical, Electrical, Electrical and Electronics, Energy, Physics and Master Degree in the preferred research areas mentioned.

Code	Department	Fields of Specialization	Minimum Qualification
DLMG01	Management Studies	General Management, Economic Development, Indian Financial System, International Business, Competitiveness, Corporate Planning, Corporate Governance, Organization Management and Development, Organizational Behavior, Organizational Studies, Human Resources Management, Organizational Culture, Leadership and Business Ethics, Financial Management, Corporate Finance, Portfolio Management, Security Analysis, Corporate Governance & CSR, Management of Investment, International Finance, Production and Operations Management, Optimization Techniques, Facility Layout/ Location Problems, Manufacturing Systems, Project Management, Risk Management, Infrastructure Projects, Mergers and Acquisitions, Productivity and Efficiency Analysis, Marketing Management, Sales Management, Strategic Marketing Management, IPR Management, Information Systems & Technology, E- Business, E-Governance, Telecom Systems Management, International Telecom Management, Flexible Systems Management of Change, Entrepreneurship Management & Development, Creativity and Innovation Management, R&D Management, Managerial Ethics, Environment Management, Management of Technology, Management of education and academic leadership, Logistics & Supply Chain Management, Social Media & Business Practices, Social Media Analytics, Cyber Security, Business analytics, Big Data/ Natural Language Processing/ Deep Learning/AI, Platform business/ economy, digital transformation-IoT/Blockchain/Information Security Management, Banking and Financial Institutions, Data science, Machine learning, Digital transformation and smart cities.	Master's degree in any branch of Engineering/ Technology or Master's degree in Science, Commerce, Economics, Social Science with MBA, or Graduate in any branch of Engineering/ Technology with MBA or equivalent with CGPA 6.75 on a 10 point scale or 60% in aggregate for general category.
DLMS01	Department of Materials Science & Engineering	Synthesis of polymers, Structure-property correlation in polymers, Rheology and processing of polymers, polymers, polymers matrix composites, tribology and mechanical behavior of polymers, membranes for various applications, antifouling and ant biofouling materials. Polymer blends and alloys, biodegradable polymers, nanocomposites, hydro/cryogels for bio medical applications, surface functionalization. Structure-property correlation in advanced materials, Metal matrix composites, 3D printing, nano-scale friction and wear, Auxetic materials, Materials characterization using advanced microscopy, phase transformation, tools, functionally graded materials, nanomaterials, Advanced ceramics, high entropy alloys, materials for extreme environments, thermal barrier coatings, Alloy processing and properties, refractory metals and compounds, First principle Density Functional Theory (DFT) based material design, Micro magnetic simulations, Semiconductor nanostructures and device applications, Magnetic nanowires and magnetic tunnel junctions for spintronic device applications; Organic electronics.	M.Tech. in Polymer Science and Engineering or Plastic & Rubber Technology or Chemical Engineering, Chemical Technology or Fiber Science & Technology or Materials Engineering, Metallurgical Engineering, Ceramic Engineering, Mechanical Engineering, or M.Sc. in Chemistry, Physics, or Materials Science.
DLRD01	Rural Development & Technology	Artisanal technologies and rural industries, Biogas Production and enrichment and animal power, Renewable energy technologies, Rural energy systems, Agricultural machines and power, Biomass and Environment, Microbial Biotechnology, Ecological Sanitation. Bioremediation, Waste Management, Bio fertilizers and Biopesticides, Tissue culture, Mushroom technology, Algal Biofuels, Food Quality & Safety, Rapid Composting, Waste water treatment and Bioenergy generation, Dairy and Food Engineering, Rural Development Planning, Panchgavya scientific validation, phytochemistry, Governmentality studies, Social Exclusion, Public Policy, Indigenous communities, Bio-char & its valorization, LCA, Block chain and nanotechnology in rural perspective, Isolation Encapsulation and value addition of food bioactives, Food printing,	Master's degree in any discipline of Engineering/ Technology or Science.
DLCH01	Chemical Engineering	All areas of Chemical Engineering	M.Tech. in engineering or M.Sc. in Science/B.Tech. with GATE Score
DLCY01	Chemistry	Physical Chemistry, Organic Chemistry, Inorganic Chemistry, Analytical Chemistry, Bio-chemistry, Theoretical Chemistry, Materials Chemistry.	M.Sc. or M.Tech. with M.Sc. in Chemistry/Biochemistry/Biotechnology/Life Sciences/Material Science/Chemistry related discipline with at least 60% marks or CGPA of 6.00 on a ten-point Scale.
DLCE01	Civil Engineering (code numberof the specialization To be indicated in the data sheet)	ConstructionEngineeringandManagement	Master's degreeinCivil EngineeringorArchitecture orequivalent or relevant Master's degree in Engineering.
DLCE02		EngineeringGeology	Master's degreeinCivil EngineeringorinAppliedGeology or relevant Master's degree in Engineering.

Code	Department	Fields of Specialization	Minimum Qualification
DLCE03		Environmental Engineering	Master's degreeinCivil orin EnvironmentalEngineeringor ChemicalEngineeringorBiochemical&Biotechnology or relevant Master's degree in Engineering.
DLCE04		OffshoreStructures	Master's degreeinCivil Engineering or relevant Master's degree in Engineering.
DLCE05		Rock Engineering	Master's degreeinCivil orMiningEngineeringorinAppliedGeology or relevant Master's degree in Engineering.
DLCE06		GeotechnicalandGeo-environmentalEngineering	Master's degree in Civil Engineering or Materials Science & Engineering relevant Master's degree in Engineering.
DLCE07		StructuralEngineering	
DLCE08		Remote Sensing	Master's degreeinCivil, Agricultural or Mining Engineering or relevant Master's degree in Engineering.
DLCE09		TransportationEngineering	M.Tech. in Civil Engineering/ Transportation Engineering/ Transportation Planning, Masters in Planning (including City/ Urban/ Regional Planning).
DLCE10		WaterResources Engineering	Master's degreein CivilEngineering or relevant Master's degree in Engineering.
DLCS01	ComputerScience and Engineering	Computer Architecture, Design Automation and VLSI, HW-SW Co-Design, Embedded Systems Design, Parallel Processing, Image Processing, Artificial Intelligence, Location Based Services, Computer Vision, Computer Graphics and Animation, Semantics of Programming Languages Machine Learning, Databases, Information Retrieval, Data Mining Social Network Analysis, Computer Networks, Wireless Networks, Systems and Network Security, Design and Analysis of Algorithms, Optimization, Computational Geometry, Computational and Systems Biology, Computational Logic, Operating Systems, IT for Development, Mobile Computation, Verification, Concurrency, Complier Design, Virtualization and Cloud Computing.	Master's degree in Computer Science, Electronics Engineering, Mathematics or Physics with formal background in Computer Science or MCA Excellent academic record i.e. ≥ 80% or 8.0 CGPA in qualifying degree.
DLEE01	Electrical Engineering	Computer Architecture, Parallel Processing, Multimedia, Embedded/ Cyber Physical Systems Medical and Public Health Informatics, Computational Linguistics, Systems Biology, Cognitive Science, Computer and Communication Networks, Communications, Signal Processing, Image Processing, Computer Vision, Pattern Recognition, Machine Learning, Bio-metrics, Bio-informatics Optical Communications, Control Systems, Bio-molecular Circuits and Systems, Adaptive and Robust Control Learning Control, Intelligent Control, Nonlinear Control, Robotics, Systems Theory, Integrated circuits and devices, semiconductor devices, VLSI Design, Photonics, Mixed-Signal/Analog/Digital/RF Circuit design, quantum computing, Memory Technologies, Spintronics, MEMs, Artificial Neural Networks, Neuromorphic Computing, Circuit Testing, Fault-Tolerance, Fail-safe Design, Microelectronics and Power Devices, Biological Neural Networks Analog and RF integrated circuits, Device, Physics and photonics, Electrical Machines and Drives, Power Electronics, Electric Vehicles, Wireless Power Transfer, Power Systems, Electricity Markets, Power Quality Generation, Distributed generation & Power generation from renewable sources.	Master's degree in an appropriate discipline with excellent academic record.

Code	Department	Fields of Specialization	Minimum Qualification
DLHS01	Humanities and Social Sciences	**Psychology** Positive Psychology, Social Psychology, Intergroup relations, Social identity, Group based emotions, Intergroup contact and social change, Stigma and wellbeing, Leadership, Cognition, Emotion, Judgement and Decision Making. **Sociology** Agrarian Studies, Anthropology of the State, Dalit and Tribal Studies, Development Studies, Environmental Sociology, Globalization, Migration, New Media Studies, Political Sociology/Anthropology, Sociology of Culture, Sociology of Food and Nutrition, Sociology of Movements, Sociology of Religion, Sociological Theory, Urban Sociology, Sociology of Gender. **Philosophy** Moral, Political, and Legal philosophy, Metaphysics of the Self, Philosophy of Mind, Philosophical Aesthetics, Philosophy of Mind and Cognition, Philosophy of Culture and History, Contemporary Thought and Intellectual History, Deep Ecology, Buddhism/and Politics, Exile and Travel, Religion and Politics, Peace Studies, Tibetan Literature and Politics, Ethnicities and Margins, Children and Literature. **Literature** Culture Studies, Gender Studies, Performance and Theatre Studies, Digital Humanities, Modernist and Postmodernist Literature, Indian English Theatre, Indian Writing in English, Contemporary Fiction, Postcolonial Literature, Philosophy of Literature **Linguistics** Phonology, Language Education, Language Variation, Formal Syntax and semantics, Language Acquisition, Cognitive Studies, Computational Linguistics, Psycholinguistics, Neurolinguistics. **Economics** Microeconomics theory, Game theory, Mechanism design, Decision theory, Structural changes and aggregate productivity, Endogenous growth, Public good provision and income inequality, Development Economics, Issues in India's economic development, Issues in India's Macroeconomy.	M.A. with 1st Class in the relevant subject for English it is 55%.
DLDD01	Department of Design	Industrial Design, Product Design, Engineering Design, Computer Aided Design and Manufacturing, Design for Product Life Cycle, Usability, User Experience, Design for Wellness, Design for Sustainability, Design for Environment, Packaging Design, Visual Communication, Visual Narratives, Comics Studies, Design for Children Education, Healthcare Design, Design of Sustainable Habitats, Data Science and Design, Design of Assistive Technologies, Design for Industry 4.0., Human Factors and Ergonomics, Universal/ Inclusive Design; Social and Cultural Factors in Design; Design Research, Filmmaking, Animation, Digital Media, Game Design, Cultural Construction, Design Research.	Master's Degree in Design/ Architecture/ Engineering.
DLID01	Centre for Sensors, Instru-mentation and Cyber Physical System Engineering (SeNSE) (previously IDDC)	Sensors and Transducers, Instrument Design and Simulations, Optical Components and Basic Instruments, Laser Based Instrumentation, Precision Measurement Systems, Electronic Components and Circuits, Electronic Techniques for Signal Conditioning and Interfacing,Material and Mechanical Design, Optical Material and Optical Techniques, Display Devices and Technology, Instrument Organization and Ergonomics, Selected Topics in Instrumentation	Master's Degree in Instrument Technology (JID)

Code	Department	Fields of Specialization	Minimum Qualification
DLTX01	Textile Technology	Textile Engineering: Design and analysis of yarn and fabric formation systems: ring spinning, rotor spinning, friction spinning, air jet spinning, weaving, knitting, braiding, nonwovens; Structural mechanics of textile materials; Apparels and garments; comfort, handle and other functional aspects of textiles; Design and development of technical textiles; agro-textiles, geo-textiles, home-textiles, textiles for filtration, medical textiles, automotive textiles, textiles for environmental protection, packaging textiles, protective textiles, sport textiles, textiles for building & construction; Fibrous composites; Textile machine design; Textile instrumentation; Modeling and simulation of textile processes and products;Management in textiles; project formulations, project appraisals, operations management, supply chain management, quality management. Fibre Science & Technology: Synthesis and characterization of advanced polymeric materials; Fibre formation processes; Modelling and simulation; Structure-property correlation; Functional and responsive polymers, smart & intelligent textiles; Modification of natural and synthetic fibres; Nanotechnology in Textiles; synthesis and applications of nanofibers and nanomaterials; Coated textiles; Polymer nanocomposites; Green composites; Medical textiles; Tissue engineering; Sustainability; Polymer recycling. Textile Chemical Technology: Textile chemical processing; preparatory processes, dyeing, printing and finishing; Surface functionalization; Micro and nano encapsulation; Conducting textiles; Natural dyes; Bio-active textiles; Textile ecology and environment.	M.Tech. or Equivalent in Textile Technology, Textile Engineering, Fiber Science and Technology, Textile Chemistry/ Computer Science & Engineering/ Electronics Engineering / Electrical Engineering/ Mechanical Engineering/ Chemical Engineering/ Civil Engineering/ Biochemical Engineering/ Materials Science & Engineering/ Production Engineering/ Industrial Engineering / Biotechnology/ Apparel Engineering/ Fashion Technology/ Microbiology, Nanotechnology/ Polymer Science/ Rubber Technology.M. Sc. in Physics/ Chemistry.
DLMA01	Mathematics	Pure Mathematics, Applied Mathematics, Statistics, Operational Research, Theoretical Computer Science.	Master's Degree in Mathematics, Statistics, or Operational Research or Computer Science, MCA, B.Tech. in Computer Science, or Mathematics and Computing. For B.Tech. degree the minimum eligibility is 70% marks or 7.0 CGPA in 10-point scale. For B.Sc. and M.Sc. degrees, the minimum eligibility is 60% or 6.0 CGPA in 10-point scale in both the degrees.
DLME01	Mechanical Engineering	Design, Production, Thermal Engineering	Master'sDegree in Mechanical Engineering/ relevant Engineering discipline to be approved by the department.
		Industrial Engineering	Master'sDegree in anyEngineering discipline/ any relevant non- engineering disciplinee.g. MBA, PGDM, MCA, M.Stat., etc., as approved by the department. Any other relevant PG degree with focus of Industrial engineering to be approved by the department.
DLTR01	Centre for Automotive Research and Tribology (CART) (Formerly Industrial Tribology Machine Dynamics & Maintenance Engineering)	**Tribology:** Tribology of Polymers & composites, nano-composites, ceramics and metals. Wear Mechanisms and modeling of metallic and non- metallic materials and surface engineering. Boundary and Hydrodynamic lubrication, E-HD lubrication, lubricant characterization and analysis, tribology of bearings and other machine elements. Pneumatics, conveying of bulk solids, operational problems like erosion and degradation. **Maintenance Engineering and Machine Dynamics:** Condition based maintenance, signature analysis, vibration, acoustic emission, temperature and wear debris monitoring techniques, maintenance planning and control, computer aided maintenance audit, reliability, availability and maintainability (RAM) engineering, vibration & noise analysis and control, risk analysis and safety, non-destructive testing, residual life estimation, failure analysis, performance and dynamic study of machine elements and equipment like pumps, compressors, turbines, design for maintenance, etc. turbines, etc., Design for maintenance etc.	Master's Degreein Engineering (Mechanical, Chemical, Industrial).
DLPH01	Physics	**Condensed Matter Experiments:**The research activity of condensed matter experimental (CME) group at the Physics department covers a wide range of topics such as (i) nanostructured materials, thin films and devices, (ii) novel magnetic multifunctional and topological materials, (iii) spintronics and magnetism, and (iv) wide band gap semiconductors such as GaN and Ga2O3, AlGaN/GaNheterostructures, 2D quantum materials like graphene and transition metal dichalchogenides, Growth and nanoscale devices based on semiconductor nanowires, and (v) optical properties of condensed matter e.g., ultrafast dynamics of	M.Sc. in Physics/ B.Tech. in Engineering Physics/ M.Tech. in Applied Optics/ Solid State Materials/ Opto-electronics/ Photonics.

Code	Department	Fields of Specialization	Minimum Qualification
		condensed matter with femtosecond laser. CME grouphouses several specialized laboratories as well as several departmental facilities. The CME group has close links with Central Research facilities (CRF) and Nanoscale Research Facility (NRF) of the Institute. NRF houses Class 100 and 1000 clean rooms as well as several characterization facilities. At present, the department has an X-Ray diffractometer, an X-ray photoelectron spectroscopy, a SQUID magnetometer, a physical property measurement system (PPMS), ultrafast-optics laboratory (also housing a Raman spectrometer and a photoluminescence set-up), a pulsed laser deposition (PLD) system and an atomic force microscope as departmental facilities. Individual research labs also have several state-of-the-art facilities, the details of which can be found by visiting the corresponding laboratory web pages. **Condensed Matter Theory:** The CMT group has an interdisciplinary focus with broad research interest spanning form first principles based simulation of designing new materials and understanding their properties using "state-of-the-art density functional theory (DFT) and beyond methods" to the theoretical modelling transport and other properties of various condensed matter systems. Using DFT we probe the fundamental physics and related technological applications for atomic and many-atomic complex systems. Some properties of our interest include electronic and band structure, electric and magnetic properties, phonons, magnons and electromagnons in complex (anti)ferroic oxides bulk and nanostructures. We also use ab initio calculation to explore the viability and rational design of real-world functionalized CNT metastable photo switches and single-photon emitters (SPEs). We also theoretically model transport in quantum Hall systems, graphene, and topological insulators. Quantum simulation of exotic condensed matter phases with ultra-cold atoms is another area of expertise. Our research also aims to theoretically discover and characterize different topological phases consisting of fraction fermions and Majorana fermions with features uniquely advantageous for topological quantum computing. **Statistical and Computational Physics:**Statistical Physics is devoted to understanding macroscopic assemblies of identical particles. Such systems appear over a wide range of length scales in many different fields. We study diverse systems of contemporary interest, ranging from classical solids, exotic liquids, soft materials, mesoscopic systems and active matter to name a few. Broadly, our research encompasses the following themes: (i) emergent phenomena in complex spin systems with disorder and long-ranged interactions; (ii) non-equilibrium properties of complex fluids such as liquid crystals, ferronematics and patchy colloids; (iii) miniature heat engines, and particle and heat transport in mesoscopic systems; (iv) motility of micro-organisms on surfaces and micro-swimmers in Newtonian and non-Newtonian fluids; (v) pattern formation in granular materials; and (vi) mechanics of extremely flexible structures such as thin films. We use a variety of analytical techniques from equilibrium and non-equilibrium statistical physics, computational techniques such as Monte Carlo, parallel tempering, molecular dynamics and graph cuts along with experiments involving state-of-art imaging techniques and sensitive mechanical characterization. **High Energy Physics:**High energy physics encompasses both the very small and the very large distance scales — of elementary particles (femtometer scale) and of the observed universe (cosmology)! It iswell described by the standard model, which brings together three fundamental interactions — electromagnetic, weak and strong. Collider physics is a tool which combines both perturbative and non-perturbative aspects of these interactions. We study particle production in collider interactions in an attempt to understand both. In particular, strong interaction, described by quantum chromodynamics, is per se notoriously difficult. We employ effective field theoretical techniques to understand its non-perturbative aspects — to study low energy properties of hadrons and quark gluon plasma. We also use them to study particle production in gravitational fields, and also some aspects of quantum gravity. Standard model, though stupendously successful, is still incomplete which makes HEP even more exciting. There are several theoretical problems; even more, there are experimental hints for rich physics beyond the standard model. We study this in the context of topics such as neutrino physics and dark matter.	

Code	Department	Fields of Specialization	Minimum Qualification
		Optics and Photonics: Historically the Physics Department at IIT Delhi has a strong background in broad areas of Optics and Photonics. IIT Delhi started the first Optics Master's program in the country in 1960's. At present the Physics Department has approximately 15 faculty members engaged in Optics and Photonics related research. Current research activities span a wide ranging topics that include areas of fundamental importance (e.g. Physical Optics, Statistical Optics, Singular optics and inhomogeneous polarization states, quantum photonics, non-linear optics, nano-photonics/metamaterials, light propagation in random media) as well as cutting edge applied research areas (e.g. integrated optics and optical communication, holography, microscopy/nanoscopy, optical metrology, computational imaging, green photonics, illumination engineering, bio-photonics including applications to medical diagnostics, THz optics, ultrafast optics, spectroscopy, optical tweezers, beam engineering, atmospheric optics and development of optical sensors). Optics and Photonics faculty have number of collaborations across different disciplines within IIT Delhi (electrical engg, biosciences/biomedical engg, material science, chemistry), as well as outside IIT Delhi with DRDO, ISRO and other national research facilities like CSIR labs, as well as medical schools/hospitals (e.g. AIIMS), and industry. The department hosts a DST-FIST facility on ultrafast optics that has state-of-the-art instrumentation enabling collaborative work with various disciplines. **Physics of Quantum Materials & Information Systems:** The 3 focussed attempts in quantum computation (QC) are- (i) Majorana-based topological quantum computation (TQC) (ii) superconducting qubits based QC and (iii) trapped ion based QC. Importance of the field is evident from the fact that Google and IBM have invested heavily in superconducting qubits while Microsoft has invested in Majorana qubits. The focus of our Department are towards (i) cold atom-based quantum technologies, (ii) quantum photonics and (iii) general Quantum Materials like Topological Insulators, quantum well based semiconductor technologies, spintronics related research etc. The atoms are cooled to million times colder than room temperature using precisely frequency tuned lasers. The inherent quantum nature of atoms and photons allows one to design versatile quantum systems and fully control their properties by simple and clever approaches. These technological and conceptual developments will lead us to build large scale quantum information processing network, quantum computation protocols for solving industry and society relevant problems. Some other group of researchers are putting their efforts in the direction of studying Topological semi-metals, a quantum phase of matter that host Dirac and Weyl fermions. They study the transport properties of these exotic materials under very low temperature, high magnetic field and high pressures and realise the exotic quantum features in the laboratory scale. **Plasma Physics:** Plasmas are known to be the fourth state of matter. These contain large number of positive ions and electrons in almost equal number along with some neutral particles. Negative ions can also occur in plasmas and also there can be dust particles, referring to them as multi-component / dusty plasmas where the charge neutrality holds good. However, the dynamics of plasma greatly alters due to the presence of such additional charges. Each plasma species can contribute to different application of plasma. For example, electrons are responsible for high frequency phenomena including EM radiation generation, whereas the ions contribute to the synthesis of materials, surface hardening, sputtering, deice fabrication etc. We are primarily working in the broad research areas of intense laser-plasma interaction, plasma-material interaction, plasma propulsion, plasma based radiation sources, and dusty plasmas. We employ theoretical approach including nonlinear physics as well as numerical methods, namely, hydrodynamics, molecular dynamics and particle-in-cell (PIC) techniques to investigate some of the above areas and also perform experiments. **Atomic and Molecular Physics:** Our area of interest is ion-atom/molecule/cluster/ices collisions. Heavy ion impact Ionization and fragmentation of the molecules of biological and	

Code	Department	Fields of Specialization	Minimum Qualification
		astrophysical interest are studied. Our area of expertise includes secondary electron spectroscopy, recoil-ion-momentum spectroscopy and Infrared spectroscopy. We are also interested in development of equipments which are useful in atomic physics experiments and our aim is to collaborate with the industry to make them commercially available. **Astrophysics:** Research in the Astrophysics group at the Physics Department, IIT Delhi revolves around open questions such as (i) What is the small scale structure of space time? (ii) How do the matter and gravity interact in the quantum picture? (iii) What leads to the emergence of "classical" reality? (iv) What are the quantum effects in gravity and how to test them? In tandem with this, we also make contact with observations in Astronomy and Astrophysics, especially employing Optical and Radio data. In an ongoing effort in this direction, we are involved in mapping the magnetic field of our galaxy, the Milky way, through pulsar observations.	

5. Indian Institute of Technology Guwahati, Guwahati 781 039 – GW

Relaxation of SC/ST/PD candidates: Eligibility criteria will be relaxed by 5% in percent marks or 0.5 point in CPI in all cases.

Code	Department	Fields of Specialization	Minimum Qualification
GWBT01	Bio-sciences & Bio-engineering	All areas of Bio-sciences and Bio-engineering.	M.Tech. degree or equivalent in an appropriate area with minimum CPIof 6.5 or 60% marks or MSc DegreeinBiotechnology/LifeScience/AgriculturalSciences/RelatedDisciplineswithminimumCPI7.5/10 or 70% marks.
GWCH01	Chemical Engineering	All areas of Chemical Engineering	M.Tech. degree or equivalent in anappropriate area with minimum CPIof 6.5 or 60% marks.
GWCY01	Chemistry	Inorganic Chemistry, Organic Chemistry, Physical Chemistry & Theoretical Chemistry	Masters degree in the relevant discipline with minimum of CPI 6.5/10 of 60% marks
GWCE01	Civil Engineering	Construction Management, Construction Materials, Infrastructure Engineering and Management, Environment Engineering, Geotechnical Engineering, Structural Engineering, Transportation Systems Engineering, Water Resources Engineering and Management, Earth Science, Remote Sensing and Geology.	M.Tech. degree or equivalent in an appropriate area with minimum CPIof 6.5 or 60% marks.
GWCS01	Computer Science & Engineering	Artificial Intelligence, Interpretability of AI and ML Models, Online Learning, Evolving and Adaptive Intelligent Systems, Data Mining, NLP, Speech processing, Computer Vision and Deep Learning, Nature-inspired Algorithms, Intelligent andNetworked Robotics, AR/VR, Human-Computer Interaction, Distributed Systems, Edge and Cloud Computing, Wireless Networks, Software-defined Networking, IoT, Smart Grid, IntelligentTransportation Systems, Network Security, Controller Synthesis and Games, Formal Verification, Logic in Computer Science, High-level Synthesis, Electronic Design Automation, Hardware Acceleration, Embedded and Cyber-physical Systems, System-on-chip validation, Multicore Architecture, Memory Systems, Near-memory Computing, Disaggregated Compute Systems, Approximate Computing, Autonomous Vehicles, Hardware Security, Data Structures, Algorithms, Distributed Algorithms, Randomization and Approximation Algorithms, Optimization, Computational Geometry.	M.Tech. degree or equivalent in an appropriate area with minimum CPIof 6.5 or 60% marks.
GWDE01	Design	Industrial Design, Product Design, Communication Design (Including art &VisualCulture) Interaction and Usabilityengineering (Including HCL),Design Management , Ergonomics (Including Occupational health andsafety), Environment Design, Animation.	M.Des/ M.Arch or M.Tech/ ME degree in relevant area with a minimum CPI 6.5/10 or 60% marks. Master's degree in Applied Arts/ Ergonomics/ Fine Arts/ Psychology/ Physiology with minimum CPI 6.5/10 or 55% may also be considered.
GWEE01	Electronics and Electrical Engineering	All areas of Electrical, Electronics and Communication Engineering	M.Tech. degree or equivalent in an appropriate area with minimum CPIof 6.5/10 or 60%marks.
GWEN01	Energy	Screening and Genetic improvement of Bio-fuel crops, Glycerol, bioconversion and synthesis of alcoholic biofuels, Biodiesel frommicroalgae, oilseeds, Bioelectronics for bio-fuel cell, Biogas, Combustion and detonation, Wind energy, Waste heat recovery, Biohydrogen, bioethanol, biobutanol and microbial fuel cell, Thermal energy storage, electrochemical energy storage, hydrogen storage, solar driven cooling system, porous medium	M.Tech. degree or equivalent in an appropriate area with minimum CPIof 6.5/10 or 60% marks, OR M.Sc.in Physics, Chemistry, Bio-technology, Environmental Scienceor in relevant field with minimum ofCPI 6.5/10 of 60% marks.

		combustion and hydrogen energy, Solar cells.	
GWEV01	Centre for Environment	Environmental Chemistry/Biotechnology/Economics/Engineering; WasteWaterTreatmentand Supply, CO2Capture/storage;AtmosphericChemistry; AirQuality monitoring;EnvironmentalHydraulics;Environmental Genomics; and Other emerging areas of environment withinterdisciplinary application of science, technology, arts and humanities.	M.Tech. degree or equivalent in an appropriate area with minimum CPIof 6.5/10 or 60% marks, OR, M.Sc.in Physics, Chemistry Bio-technology, Environmental Science or in relevant field with minimumCPI of 6.5/10 or 60% marks.
GWHS01	Humanities and Social Sciences	All areas of Humanities and Social Sciences	Masters Degree in the relevant discipline with a minimum of 55% marks or equivalent.
GWMA01	Mathematics	All areas of Mathematics, Probability, Statistics, Theoretical Computer Science, Network Security, and Computer Networks	Masters degree in the relevant Discipline with a first class or a minimum CPI 6.0/10 or 60% marks.
GWME01	Mechanical Engineering	Stress Analysis; Experimental and Computational Fracture Mechanics; Composite Materials and Structures; Smart Materials and Smart Structures;Materials Characterization; Dynamics and Controls; Electro-Mechanical Systems; Robotics; Nonlinear Vibration; Bio-Mechanics; Noise; Tribology; Condition Monitoring; Experimental Fluid Dynamics; Computational Fluid Dynamics (CFD); Bio-MEMS and Micro Fluidics, Heat Transfer; Low Speed and High Speed Acrodynamics; Multiphase Flow; Hydrogen Energy; Metal Hydride Based Thermal Machines; Energy Storage and Fluidization; Bio-fuels; Metal Cutting; Micro Machining and Micro Fabrication; Unconventional Machining; Mechatronics; CAD/CAM/CAE; Materials Processing and Heat Treatment; Metal Forming; Welding; Bio-Nano Composites and Nanofluids.	M.Tech. degree or equivalent in an appropriate area with minimum CPIof 6.5 or 60% marks.
GWPH01	Physics	**Condensed Matter Physics -** biomaterials, cold atoms, energy materials, quantum computation, computational materials physics, materials for energy and environmental applications, ferroelectric and oxide materials, Graphene and analogue atomic thin materials, organic semiconductors, semiconducting materials, smart magnetic materials, Multiferroics, Luttinger liquids, soft condensed matter, spintronics, statistical physics, Percolation, Network, Self-organization, Active matters and collective motion, Quantum turbulence and non-linear instabilities in BEC, strongly correlated systems, superconductivity, topological insulators, quantum turbulence, quantum phase transitions, ultracold atoms in optical lattices, nanomaterials and nanotechnology, polymer physics, AdS/CMT, Magnetohydrodynamics. **Laser and Photonics** – Super resolution microscopy, optical tweezer, free space communication, Fiber Optics, Laser Matter Interaction, Nonlinear Optics, Quantum Optics, terahertz plasmonics and metamaterials, Quantum optomechanics. **High Energy Physics**– Theory and phenomenology: Dark matter phenomenology, Neutrino physics, Heavy flavor physics, Collider physics, Standard Model Precision calculations, aspects of CP violation, Matter-antimatter asymmetry, Astro-particle physics/Cosmological connections, Inflation, Effective Field Theory in particle and nuclear physics, Physics of exotic hadrons. Experimental particle Physics: B-Physics and neutrino Physics **Astrophysics, Gravity & Cosmology**-Classical & quantum aspects of gravity, Cosmology and Astrophysics – Black hole Physics, Theoretical Cosmology, Phenomenology of AdS/CFT, Astrophysical flows, Ultra high energy cosmic rays, Black hole thermodynamics, Quantum field theory on curved spacetime.	Master's degree in the relevant discipline with a first class or a minimum CPI 6.5/10 or 60% marks.

5. Institute of Technology, Hyderabad, Telengana 502285 - HY

Code	Department	Fields of Specialization	Minimum Qualification
HYCE01	Civil Enineering	Environmental Engineering	First class Master's degree in Biotechnology/Chemical Engineering/Environmental Engineering/ Environmental Sciencefrom a recognized university.

HYCE02		Geotechnical Engineering	First class Bachelor's degree in Civil Engineering from a recognized university AND • First class Master's degree in Geotechnical (or, al-lied) Engieering from a recognized university.
HYCE03		Structural Engineering	First class Bachelor's degree in Civil/Aerospace/ Mechanical Engg. from arecognized University AND • First class Master's degree in Structural (or, allied) Engineering from a recognized university.
HYCE04		Water Resources Engineering	• First class Master's degree in Agricultural Engineering/ Earth Sciences /Geophysics / Hydrology / Meteorology/ Remote Sensing and GIS/ Water ResourcesEngineeringfrom a recognized university.
HYCE05		Transportation	First class Bachelor's degree in Civil Engineering from a recognized university AND •First class Master's degree in Engineering from a recognized university.
HYBT01	Biotechnology	Biochemistry, Molecular Biology, Cell biology, ComputationalBiology,Structural Biology, Biophysics, virology, Protein misfolding diseases, cellsignaling in diseases.	M.Tech or M.Sc. degree in any alliedarea of Life Sciences.
HYCS01	Computer Science and Engineering	Theoretical computer science, networks, machine learning, data science,computer architecture, parallel and distributing computing, and otheremerging areas in computer science and engineering.	Candidates with a B.Tech./ B.E./B.S./M.Sc./MCAdegreeinany Discipline and havingaM.Tech/ M.E./ M.S. degree in CSE/ IT/ ECE/EE.
HYEE01	Electrical Engineering	Communication Systems including RF and Photonics, Image, Speech and Signal Processing, ArtificialIntelligence andMachineLearning**, Bioinformatics, Computer vision**, Wireless Communication, **Analog,Mixed Signal VLSI Design, RFIC Design, PMIC Design,** Power Systems,Machines**, Renewable Energy Interface, Smartgrid, Microgrid, Machine Control, Power Converter Control, Control Engineering, SystemsTheory**, Microelectronics, NanoDevices, MEMSand Sensors, OrganicElectronics, Power Electronics, Biomedical Devices.	Master'sdegree in Electrical orElectronicsandCommunicationEngineering,InstrumentationEngineering,NanotechnologyorMaster's degree in Physics followed byaMaster'sdegreeinEngineering in anarea of relevanceto the area of research.

6. Indian Institute of Technology Kharagpur, 721 302 – KH

In all cases the minimum qualification for admission is a Master's degree in Engineering/Technology or its equivalent with minimum 60% marks or Master's degree in Sciences, Humanities or Social Sciences with minimum of 55 % marks (or equivalent grade point average).

Code	Department	Fields of Specialization	
KHAE01	AerospaceEngineering	Fluid dynamics and Aerodynamics, Computational fluid dynamics, Experimental methods,Aircraft structuresComposite structures and Smart structures, Structural dynamics and aeroelasticity, Aircraft propulsion, Thermalsciences and Engineering, Combustion, Flight mechanics and control.	
KHAG01	Agricultural andFoodEngineering	**Farm Machinery and Power**: Farm Machinery Design, Farm Power, Tractor hydraulic systems, Soil Dynamics inTillage and Traction, Ergonomics, Biofuels, Solar and Wind Energy, Agricultural Mechanisation, Precision farming,Electronics and Computer application in Agriculture.	
		Land and Water Resources Engineering: Watershed Modeling and Management, Irrigation Systems Management;Groundwater Modelling; Rainwater Harvesting, Flood Modeling, Non-point Source Pollution, Climate Change, GreenHouse Technology.	
		Food Process Engineering: Dairy and Food Engineering, High Pressure Processing, non-thermal processing of foods,Mechanised Processing of Food, Physical and Thermal Processing of Food, Packing of Fruits and Vegetables,Cryogenic Processing of Foods, Health Foods, Functional Foods, Cereal Processing, Grain Processing, Dairy Products, Solar-Thermal Applications in Foods, Processing of Horticultural and Plantation Crops.	
		Agricultural Biotechnology: Microbial and Enzyme Technology; Plant Tissue Culture, Algal Biotechnology,Biotechnology of Medicinal and Aromatic Plants.	
		Agronomy: Climate Change Impact Assessment on Crop Yields, Organic Farming, Tea Cultivation and Processing.	
		Soil Science: Water and Nutrient Management, Soil Physics.	
		Aquacultural Engineering: Waste Utilization and Agro Environmental Technology, Aerators, Cage Aquaculture,Fish Processing Technology, Biofloc Technology.	
KHAP01	Architecture and Food Engineering	Universal Design, Building Automation and Management Systems, Building Materials and Composites, Urban design,City Planning, Computer Applications in Architecture and Planning, Disaster Responsive design and planning, GreenArchitecture, Energy Efficient and Cost-effective Building Technology, GIS and Remote Sensing, Heritage studiesand Conservation, Housing and Community Planning, Infrastructure Planning and Systems Management, MetropolitanPlanning, Recreation and Tourism Planning, Regional Planning, Spatio-environmental Planning and Design,Transportation Planning and Traffic Engineering, Urban Development Management, UrbanOpen Space, WaterSensitive Planning.	
KHBT01	Biotechnology	Bioinformatics, Tissue Engineering, Bioreactor /bioprocess development,Enzyme Technology, Plant biotechnology Down stream processing,Genetics, Environmental biotechnology, Cell/molecular biology,Biochemistry, r-DNA Technology, Structural Biology.	***Minimum Qualification*** Minimum 60% of marks (or equivalent Grade point average) is required in case

		of M.Sc./M.Tech degree.
KHET01	Center for Educational Technology	AI and Cognitive Science in Education and Assessment, Instructional Pedagogy Design, Learning Science andEducational Psychology, E-learning, Speech Technology, Language processing for e-learning.
KHCH01	ChemicalEngineering	Transport Operations, Membranes and other Separation Processes, Reaction Engineering, Particulate Technology, Process Dynamics & Control, Fuel and Mineral Processing, Petroleum Refining & Petrochemicals, Industrial PollutionControl, Modeling & Simulation of Chemical Processes, Green Process Technology, Micro-Scale Heat Exchange &other processes, Advanced Materials Engineering using Plasma, Polymer Engineering etc.
KHCY01	Chemistry	DNA Interacting Molecules, Enzyme Inhibitors, Bio-mimetic, Bio-Inorganic Chemistry, Protein Chemistry, SyntheticOrganic Chemistry, Surface Chemistry & Catalysis, Nano Crystalline Semi –conducting Magnetic MetalChalcogenides and Magnetic Ferrites, Biologically Active Compounds: Stereo selective Synthesis, Isolation andCharacterization of Bioactive Materials, Macromolecules, Colloids and Drug Delivery, Environmental Chemistry,Energy from Non-conventional Sources, Aromaticity in Metal Clusters, Nanoparticle Catalysis, Nano Technology,Solid State Chemistry, Supra- molecular Chemistry, Transition Metal Chemistry, Self-assembly and Metallahelicatesin Coordination Chemistry, Organometallic Chemistry, Homogeneous Polymer Anchored Catalysis, Photochemistry& Photophysics in Organized Assemblies, Carbohydrates and Nucleosides Biological Dual Perspectives, EnantiomericSeparation Using Capillary Electrophoresis, Density Functional Theory: Quantum Chaos, Chemical ReactionDynamics in Liquids and Biological Systems, Computer Simulations of Complex Systems with Applications inBiology and MaterialsScience,Electrocatalysis,Electrochemical Biosensors,Chemical Reactivity,Quantumtoxicology.
KHCE01	Civil Engineering	Structural Engineering, Hydraulic and Water Resources Engineering, Geotechnical Engineering, Transportation Engineering, Environmental Engineering and Management.
KHCS01	Computer Science Engineering	Artificial Intelligence, Speech and Lanuage Processing, Software Reliability, Data-base systems, VLSI System Design, Embedded Systems, Fault Tolerant Computing, Distributed Systems, Computer Networks, Image Processing and Computer Vision, Computational Geometry, Theoretical Computer Science, Bioinformatics, AssistiveTechnology, Formal Verification, Cryptography and Network Security.
KHCR01	Cryogenic Engineering	Production, Storage and Utilization of Industrial Gases, Air Separation, Mass Transfer and Separation Processes, Natural Gas Processing and Liquefaction. Hydrogen Energy, Low Temperature Adsorption of Gases, Gas Hydrates, Computer Aided Design of Cryogenic Process Plants, Closed Cycle Cryocoolers, Low Temperature Heat Exchangers, Expansion Machines, Heat Transfer, Cryogenic Rocket Propulsion, Magnetic Refrigeration Materials, Spintronics, Superconducting Magnets and Applications, Thermo Physical Properties of Nanoscale Materials, Magnetic Sensors, Vacuum Technology and Process Applications. Helium Liquefaction and Refrigeration, Oxygen Safety, Superconducting Magnetic Energy Storage, Cryogenic / Superconducting / Vaccum aspects for nuclear fusion and Power Applications.
KHEE01	Electrical Engineering	**Machine Drives and Power Electronics:** Control of drives, Switched mode and resonant modepower supplies, Power Converters, Medium voltage converter topology and drives, Digital control of SMPS, EnergyEfficient drives, Electro-magneticLevitation, Variable Speed Constant Frequency Generation Systems, AutomatedElectrical Vehicles, Non-linear Phenomena in Power Electronics, Bifurcation and Chaos in Hybrid Dynamical Systems. **Control System Engineering:** System identification and modeling, Fault detection, diagnosis and control,Learning control, Nonlinear control, Robust control, Intelligent control, System Theory, Large-scale systems, Reducedorder modeling, Fuzzy control, Periodic controllers, Attitude and orbit control of launch vehicles and satellites,Embedded Systems Fractional-order systems and control, Control Allocation. **Power & Energy Systems:** Power Systems Analysis, Dynamics, Modeling and Control, Power SystemStability,Protection, Real-time Simulation, High Voltage Engineering, Photovoltaic, Wind Energy, Energy modeling andManagement, Insulation Engineering, Condition monitoring of power apparatus,Digital relaying, Power Quality,Electrical Power distribution systems, PowerSystem deregulation, FACTS design including devices, Distributed generation, Microgrid. **Instrumentation and Signal Processing:** Instrumentation and signal Processing: Sensor development MEMS and Mixed signal VLSI design and validation, Magnetic sensing, Medical instrumentation and imaging, Embeddedsystems,Signal/Image processing, Machine learning.
KHEC01	Electronics and Electrical Communication Engineering	Device modeling, Technology CAD, Silicon Heterostructures, Compound Semiconductor Electronics and OpticalDevices, MEMS and Nanotechnology, Mixed signal design, Low Voltage Low Power Circuit Design, Low Power RFIC Design, Design of VLSI based Signal Processing Chips, SOC based Embedded System /VLSI for BiomedicalInstrumentation, VLSI Testing, Fault Diagnosis, Design Automation of Analog VLSI Circuits, Circuits for High SpeedWired Link, On-chip Power management.Antennas, Planar and Waveguide Circuits, RFICs; RF MEMS; Metamaterials; RF- VLSI Interconnects; EMI, EMC,EMP, Radar Cross section, Microwave Imaging; Channel Modeling for Wireless Communication.Image and Video Coding, Computer Vision, Video Surveillance, Medical Image processing Multimedia, Database,Multimedia Network, Parallel and distributed Processing, Audio coding, Computer Architecture, Embedded Systems,Network-on-Chip. Computer Networks, Wireless Communications and Networking, Wireless Internet, Multiuser Receiver, MultibandOFDM, Channel Coding, Link Adaptation Techniques, MIMO Systems, Capacity Mobile Adhoc Networks, WirelessSensor Networks, Optical Communications and Networking, WDM Transmission, Fiber Nonlinearities, WavelengthRouted Networks, Passive Optical Networks, Optical Burst Switching, Cognitive Radio, 4G Cellular, Fiber Optics,Fiber Optic Sensors, Fiber Optic amplifiers and Lasers, Plasmonics, Photonic Crystal Fibers and Waveguides.Architectural Optimization, Adaptive Filters, Wavelets and Multirate-DSP,DSPApplication inWirelessCommunication, Biomedical Signature Analysis, Voice Signature Analysis, Detection and Estimation, Modeling ofSignals and Systems
KHGG01	Geology andGeophysics	Igneous and Metamorphic Petrology, Ore Petrology, Geochemistry and Mineralogy, Isotope Geology, PrecambrianGeology and Tectonics, Structural Geology, Microtectonics, Stratigraphy and Sedimentary Geology, Basin Analysis,Applied Micropaleontology, Paleoceanography and Paleoclimatology, Coastal and Quaternary Geology, MineralExploration and Resource Potential Mapping, Hydrogeology, Groundwater Contamination,

		Remote Sensing and GIS,Environmental Geochemistry of water, soil and air-their contamination by natural and anthropogenic factors, LandslideHazards, Gravity, Magnetic and Electrical Fields Electrical Fields (including modeling and numerical analysis),Seismic and Electromagnetic wave Propagation (including modeling and numerical analysis), Nuclear Geology andGeophysics, Geophysical Exploration of minerals, ground water and hydrocarbons, Airborne Electromagnetics &Exploration of Deep Seated Uranium Ores, Earthquake Hazard Assessment and Seismic Microzonation,Geotomography, Pattern Recognition in Geophysics, Strong Motion Seismometry, Computational Geophysics.	
KHGT01	G. S. Sanyal School of Telecomm-unication	Digital Communication, Mobile Communications, Information Theory and Capacity Analysis. Error Control Coding, Digital Signal Processing, Optical Communications, Tele Communication Networks, Multimedia Communications, Detection and Estimation Theory, RF and Digital Design for Telecommunication, Cognitive Radio.	
KHHS01	Humanities andSocial Sciences	English Language and literature, American Literature, Afro-American Literature, Comparative Literature, Post-colonial Literature, Indian Literature, Dalit Literature, Indian Aesthetics, Media Culture, Culture Studies, Communication Studies, Econometrics and Applied Economics, Financial Economics, Economic Planning andPolicies, Managerial Economics, Organizational and Development Economics, Agricultural Economics, ManpowerPlanning. Human Resource Development and Management, Organizational and Social Psychology, InterpersonalCommunications, Clinical Psychology and Neuropsychology.Philosophy of Mind, Logic, Applied Ethics.Rural and Urban Sociology, Sociology of Development and Sociology of Health.	
KHMS01	Materials Science	Polymer composites, Polymer Synthesis & Characterization,Semiconductor Materials Opto-electronic Materials, Wide BandGap Semiconductors, Synthesis and Processing of GlassandCeramics, Nano and magnetic materials.	***Minimum Qualification :*** B.Tech/B.E Degree in Chemical Engineering/Technology, Ceramic and glass Technology,Materials Technology, Plastic and/or Rubber Technology, Polymer Science and Technology With 60% marks minimum.M.Sc. in Physics, Solid State Physics, Chemistry, Material Science, Polymer Chemistry, ElectronicScience. With 60% marks minimum
KHMA01	Mathematics	Fluid Mechanics, Numerical Analysis, Statistics, Operation Research, Computer Science, Functional Analysis,Complex Analysis, Computational Fluid Dynamics, Algebra, Fuzzy Mathematics, Artificial Intelligence, Data BaseManagement Systems. Cryptography, Graph Theory, Applied linear algebra.	
KHME01	Mechanical Engineering	Fluid machanics.CFD, Hydrodynamic stability, Multiphase flow, Numerical heat transfer, Experimental heat transfer and fluid flow, Liquid fuel atomization, and Spray combustion, I.C Engines, Fluidised bed combustion, Refrigeration and air conditioning, Transcritical CO 2 and natural refrigerant based heat pumps, Thermal systems modeling and optimization, Solar energy, Optical diagnosticsof thermo-fluid systems, Thermal hydraulics of nuclear plants, Microfluidics and Micro- scale transport processes. Casting, Welding and Metal forming, Maching and grinding, Machine tools, Cutting tools and coating, Tool condition monitoring, Plasma-spray ceramic coating, Electrophysical machining process, Precision manufacturing and laser processing, Computer aided design and manufacturing, Computer Aided Process Planning, Rapid Prototyping, Intelligent Machines and Systems, Numerical Modeling of Manufacturing Process. Systems, Modeling and design using Bond Graphs, Modeling and control of Microsystems, MEMS, AutomotiveEngineering, Noise Vibration Control, Signal Processing in Mechanical Systems. Finite Element Method andBoundary Element Method, Computational solidmechanics, Non-linear Mechanics, Fracture mechanics, Compositematerials, Smart materials and Structures, Biomechanics,Industrial, bio- and nano-Tribology, Surface Engineering,Mechanical Systems Dynamics, Rotor Dynamics, Vehicle Dynamics ,Bifurcation and Chaos, Condition monitoringand Fault tolerant control, Mechanical handling systems and Industrial automation, Industrial fluid power and control.	
KHMT01	Metallurgical and Materials Engineering	Physical Metallurgy, Extractive Metallurgy and Mineral Processing, Steel Technology, Process Modeling, CorrosionScience and Technology, Mechanical Metallurgy, Structural Integrity, Casting and Solidification, Powder Metallurgy,Welding Metallurgy, Computational Material Science and Technology, Nanostructured Materials, Bulk MetallicGlasses, Biomaterials, Electronic and Magnetic Materials, Functionally graded Materials, Intermetallics, Composites.Tribology and Surface Engineering, Thin films and coatings.	
KHMT01	Mining Engineering	Experimental and computational geomechanics, Geostatistics, GIS and Remote Sensing: Subsurface and surfaceenvironment (heat, air, water and soil), waste (fly ash, mill testing) characterization and utilization. Occupational healthand safety, Mining systems and management, Material- Rock Interaction, Mineral Economics and Mining Finance,Environmental Impact Assessment and Management, Waste Remediation, Mining Machinery &Bulk materialHandling, clean coal technology; Coalbed methane and shale gas; Mineral processing. Explosive, Blasting and groundvibrations. **B.Tech/BE/**in Mining Engineering, Civil, Mechanical Engineering, Petroleum Engineering, Chemical Engineering,Mining Machinery and Mineral Processing, **M.Sc** in Physics, Applied Geology, Mathematics and Geo-Informatics, **M.Tech.**in Chemistry, Geo-Informatics and Geo-Physics.	
KHMN01	Ocean Engineering and Naval Architecture	Marine Hydrodynamics, Marine & Ocean Structures, Ocean Engineering Materials, Fluid – Structure Interaction,Marine Design, Marine Production and welding,Ocean Engineering, Coastal Engineering, Water Wave Mechanics,Physical and Dynamical Oceanography, Ocean Wave Modeling, CFD. Numerical Simulation and Analysis of OceanStructure.	
KHPH01	Physics	Astrophysics & Cosmology, Condensed Matter Physics, Ferroelectrics & Dielectrics, Fiber Optics, Magnetism,Multiferroics, Nanoscience & Nanotechnology, Nonlinear Optics, Nonlinear Instability, Nuclear Physics, QuantumMechanics & Field Theory, Radiation Measurements, Semiconductor Devices, Solid State Ionics, Thin Films,Renewable Energy Sources.	
KHRT01	Rubber Technology	Polymer blend& alloys, Composites, Polymer and Rubber Processing, ProductDevelopment, Polymerization, Development of Novel Polymers, Structure-Property Correlation, Waste Polymer Recycling, Thermoplastic Elastomer, Adhesion andSurface Treatment, Nanocomposites, Polymer Rheology, Smart Polymers.	

		RubberComposities and Compounding, Rubber Product Design & Development.	
KHRD01	Rural Development	Transfer of technology; Socio-economic aspects of Rural Development, Planning anddevelopment models, Crop, water and land use planning; Information Technology inRural Development, Tribal Development, Upgradation of technology.	
KHIM01	Industsrial and Systems Engineering	Operations Research, Operations Management, Logistics and Supply ChainManagement,HealthcareSystemsManagement,ProjectManagement,Manufacturing/Production Planning and Control, Performance/Productivity Analysis,Quality Design, Control and Improvement, New Product Development ,ProcessTransforma, Ions and Lean Six Sigma, Work Systems Design, Human ComputerInteraction(HCI), Ergonomics andHuman Factors Engineering, Safety Analytics,Operation Analytics, Quality Analytics, Industrial Analytics, Data Analytics and BigData, Decision Support System, E-Business, Management Information System,Software Project Management, Service Science, System Dynamics and Simulation,Systems Engineering.	***MinimumQualification:*** BTech degree in any branchof engineering and MTechinIndustrial/Production/Mechanical/ Manufacturing/Computer/ IT/ Reliability &Safety/ Other related fieldsor MBA with a minimum of60% marks or equivalent inall examinations from 10th standard onwards.
KHRE01	Reliability Engineering	System Reliability assessment, Reliability and design, Reliability simulation,MachineryFaultDiagnosis,Maintenance Engineering & Management, Risk and Safety Assessment, Software reliability.	
KHID01	Ranbir and Chitra Gupta School of Infrastructure Design and Management	Project Engineering and Management; Financing Infrastructure Projects; Quantitative Methods for Decision Making;Simulation Laboratory; Environmental Impact Assessment; Infrastructure Regulatory Issues; Virtual Reality Lab.;Transportation: Urban Transportation Systems Analysis, Evaluation and Planning; Airport Planning; Bridges andTunnels Engineering; Analysis and Design of Pavements, Traffic Engineering; Highway Construction Practice andPlanning; Sea and Inland Port Infrastructure; Water Supply Systems; Waste Water Management; Solid WasteManagement; Air Quality Management; Environment Sanitation; Hazardous Waste Management; Housing andCommunity Planning; Facility Programmeming & Specialized Building Design; Building Management Systems;Regional Infrastructure Development; Remote Sensing and GIS; Thermal, Hydel and Nuclear Power Generation;Power Infrastructure: Generation, Transmission and Distribution; Internal Combustion Engine; Power TransmissionSystems; Non-conventional Energy Systems; High Voltage and Insulation Engineering; Power Infrastructure:Economics, Management, and Environment; Power System Planning and Reliability; Air-conditioning andVentilation; Power Systems Transients and Protection.	
KHMG01	Vinod Gupta School of Management	Accounting, Finance, Business Economics, Strategy, Technology Management,Operationsmanagement, Organizational Behavior, Human Resource Management, Marketing, Business Communication. **Eligibility**: MBA with a Postgraduate Degree/ M.Tech/ A Post Graduate Degree.	
KHEN01	School of Energy Science & Engineering	**Fundamentals of Energy Sciences**: Thermodynamics, Thermochemical andElectrochemical Reactions, Transport phenomena including heat and mass transferand electrochemical phenomena, Solid-state phenomena including photo, thermal andelectrical aspects, Bio-processes, Nano-sciences, Deep ocean processes, Gas and FluidDynamics, Nuclear sciences. **Energy Resources and Recovery:** Traditional resources - Coal, Petroleum, NaturalGas; Others - Solar, Wind, Geothermal, Wave, Ocean-thermal, Biomass, Hydrogen,Gas from non-conventional sources - Gas Hydrates, Coal beds, Tar sands. **Energy Systems**:Energy Conversion Systems for Oil, Gas, Coal, Solar, Wind,Biomass, Nuclear, Hydrogen, Ocean Waves, Waste. Power generation, distribution,transmission, access; Transportation Power Systems - IC Engine, Advanced FuelTechnology based combustion ignition, Electric, and Hybrid Systems. Embeddedgeneration systems; Smart grids; Electrochemical systems; New age Fuel systems andprocess development; Hybrid andelectrical systems; Battery & super-capacitors;Energy systems for marine, space and difficult terrains. **Other Aspects of Energy Science & Engineering**: Energy Materials; Energy Storage& Transportation; Energy Efficient Devices & Systems; Energy Efficient Design ofequipment, buildings and appliances; Sustainable Energy; Conservation; Recyclingand Management: Environment and Climate Change; Computational Aspects; EnergyEconomics; Energy byproduct (particularly carbon) recycling, capture, sequestrationand storage; Rural and small scale energy research.	***Minimum Qualification:*** **(i)** M.Sc.- Chemistry/ Physics /Biotechnology **(ii)** M.Tech–Electrical Engineering/ Electronic Sciences/ Electrical Communication Engineering/ Mechanical Engineering/ Civil Engineering/ Chemical Engineering/Bio-technology
KHEV01	Centre forOceans, Rivers, Atmosphere and Land Sciences	The centre is involved in frontier research in oceanographic and atmospheric observational and modelling. In oceanography, the areas of present research activities include numerical modelling of Bay of Bengal and Indian Ocean, wave modelling and ocean circulation. In atmospheric research, the present focus is on the observations and modelingstudies of severe thunderstorms. Besides, the centre is also involved in mesoscale modelling of extreme weather eventsviz., tropical cyclone, heavy rainfall, and flash floods etc. The areas of specific interest in this direction are mesoscaledata assimilation and micro-physical processes. The centre is also involved in observational modeling studies of urbanboundary layer, regional climate modelling and impact assessment studies. Space based observations, retrievals;validation and assimilation of geophysical parameters of ocean, atmosphere and land are another area of research ofthe Centre. In view of India's active research in Antarctica, the Centre is also focusing on the remote sensing of sea-iceand southern ocean in relation to climate studies.	
KHAT01	Advanced Technology	Current areas of research focus in laboratories directly under ATDC include VLSI Design and CAD, MEMS and BIO-MEMS, Nano-electronics and material sciences, MBE and MoCVD Technology, Bio-energy, Embedded Controls and	

	Development Centre	Software, Plant Genetic Engineering, Communication Empowerment, High-speed and Heavy-Haul Technology for Railways, Reliability Analysis, Micro and nano-Fluidics, etc	
KHWR01	School of Water Resources	Integrated water resources planning and management; River basin planning and management (considering the aspects of flood, drought or contaminant); Water and Wastewatertreatment; Surfaceand groundwater quality control; Conjunctive use of surface water and groundwater; Urban, rural and industrial water supply and distribution systems; Remote sensing andGIS application in water resources; Modelling of fate and transport of contaminants; Water governance and policy issues; Environmental impact assessment; Surface water and groundwater interaction; Water resources system analysis; Irrigation and drainage system	***Minimum Qualification***: Specialization M.Tech/M.E. in Water Resources, Environmental, Irrigation & Drainage, Soil& Water Conservation, Chemical Engineering and Biotechnology.
KHMB01	School of Medical Science and Technology	Medical Imaging and Image Analysis; Rehabilitation Engineering; Biomedical Sensors nd nstrumentation; Healthcare Information anagement System; Preventiveand Promotive ealthcare System; Bio-markers and their application in Oncology;Tissue Engineering; Biomaterials; ano- echnology and MEMS in Medicine;Prosthesis; Orthosis and Implant Design; Reproductive Biology.	***Minimum qualification:*** Degree in any one of the areas **(a)** B.Tech. (Bachelor of Technology, M.Sc. (Master of Science), MBA (after BA/ B.Sc/ B.Com) MA (Master of Arts), B.Arch. (Bachelor of Architecture) B.Sc (Engg.), PG Diploma in Management of 2-year duration (after BA/ B.Sc/ B.Com), MBBS degree with compulsory one year internship completed **OR** A degree equivalent to any of the above. **(b)** M. Tech (Master of Technology), M. S., M. C. P. (Master of City planning) M. E., M. R. P. (Master of Regional Planning) M. Sc. (Engg.), M. Arch. (Master of Architecture) M. Phil., M.B.A. (after B. Tech./ M.Sc./ M.A./ M.Com.) 2 year M.B.M., 2 years of LLM programme after either at least 5 years of integrated LLBdegree after 10+2 examination **OR** 3 years LLB degreeafter 10+2+3 examination **OR** A degree equivalent toany of the above.

7. Indian Institute of Technology Kanpur, Kanpur 208 016 – KN

The basic qualification for admission to the Ph.Dprogramme is Master's degree in Engineering, Science, Humanities and Social Sciences respectively or allied area(s). However, the applicants with Bachelor's degree in Engineering may also be considered for admission based on their performance and attainments.

Code	Department	Fields of Specialization	Minimum Qualification
KNAE01	Aerospace Engineering	**Aerodynamics:** Experimental Aerodynamics, High Speed Jets, Acoustics, Unsteady Aerodynamics * Flapping Wing, Transition & Turbulence, Hypersonic Aerodynamics, Microfludics, FD/High performance Computing, Flow Control, Wind Energy & design, Fluid Structure Interactions. **Flight Mechanics and Control:** Design & Control, Missile Guidance &Control, light Testing, Instrumentation & Parameter Estimation, Unmanned & Autonomous Air Vehicle, Space Dynamics. **Propulsion**: Experimental & Computational Combustion,Emissions, Liquid Atomization, Turbomachinery, IntakeAerodynamics, Thrust Vectoring, Electric Propulsion.Fundamentalsof Combustion, Applied Compressible Flows, Aircraft propulsion. **Structures, Structural Dynamics & Aeroelasticity:** Material Characterization, Composite Materials and SmartStructures, Structural Dynamics and Stochastic Modeling,Aeroelasticity,Helicopter Theory (Dynamics &Aerodynamics), Structural Design & Optimization,Damage Modeling, Design and Dynamics of Autonomous Micro and Mini Air Vehicles, Wind Turbines.	Master's degree in: (1) Engineering (Aeronautical, Aerospace, Mechanical, Civil, Chemical, Naval Architecture Electronics). OR (2) Science with a minimum of 3 years of relevant R&D experience in Aerospace Engineering
KNCH01	Chemical Engineering	Transport phenomena, Chemical Reaction Engineering, Applied Kinetics and Catalysis, Thermodynamics, Membrane Separation Processes, Process Systems Development, Computer Aided Design, Optimization and Control, Petroleum Engineering, Polymer Science &Engineering, Environmental Pollution & Control, Adsorption, Safety and Reliability, Dynamics of Nonlinear Systems, Colloids and Interface Engineering, CFD, Rheology, Non-Newtonian Fluid Mechanics, Nanotechnology, Numerical Methods for Engineers, Mathematical Methods in Chemical Engineering, Modeling and Simulation in Chemical Engg., Bioinformatics, Modeling and Simulation of Separation Processes. Molecular Simulation, Granular Mechanics.	First class Master's degree in Chemical Engineering or equivalent
KNCY01	Chemistry	**Inorganic:** Bio-inorganic chemistry, Coordination polymers, Organometallic chemistry, Inorganic materials. **Organic:** Supramolecular chemistry, Bio-organic chemistry, Medicinal Chemistry, Organic photochemistry,OrganicsynthesisandReactionmechanisms ,Organometallic chemistry.	Highsecond-class Master's degree in Chemistry orPhysics; ***Note:*** *Candidates must* have *had Bachelor's degree with Chemistry and preferably Mathematics as one of the subjects.*

KNCS01	Computer Science & Engineering	**Algorithms:** Randomized, Graph Theoretic, Number Theoretic, Data Streaming algorithms, Algorithmic game theory. **Systems:** Computer Architecture, VLSI testing, Software Architecture, Internet Technologies, Distributed and Mobile Computing, Data bases, Programme Analysis, Compilers and optimization, Cyber Security, Cyber Physical Systems, Embedded Systems, Robotics,Database Technology. **Theory:**Complexity,InformationTheoreticComplexity,AlgebraicComputation,Computational arithmetic & Geometry, Quantum Computing, Computational Game Theory, Logic for CS, Cryptography. **ArtificialIntelligence:**MachineLearningandProbabilisticReasoning,NLP,Bioinformatics,Intelligent Tutoring, Game theory and Multi-agent Systems, Computer Vision, Graph database and data mining.	First class Master's degree in Engineering Must possesses Adequate Computer Science background. (Note: Outstanding candidates)
KNCE02	Civil Engineering (Code no of speiclization to be indicated in the data sheet)	Environmental Engineering	M.Tech./M.E. in Civil/ Environmental/ Chemical / Mechanical / Metallurgical Engg. Or related engineering branch. Candidates with M.Sc. degree must have mathematics as one of the subjects at the 10+2 level.
KNCE03		Geoinformatics	M.Tech. / M.E.d e g r e ein Civil / Mining / Electrical / Computer Science Engg. / Electronics Engineering. / Information Technology or M.Tech / MSc. Degree in Geography, Geology, Geophysics/Physics/Mathematics/ Environmental Sciences. Candidates with MSc. degree must have mathematics as one of the subject at the B. Sc. level.
KNCE04		Geotechnical Engineering	M Tech/ M.E degree in Civil Engineering
KNCE05		Hydraulics & Water Resources Engineering	M. Tech / M.E. degree in Civil / Aerospace/Agricultural Engieering
KNCE06		Structural Engineering	M.Tech / M.E. degree in Civil Engineering
KNCE07		Transportation Engineering	M.Tech / M.E degree in Civil Engineering
KNIM01	Industsrial and Management Engineering	Service Management, Management of Technology, Innovation and Entrrepreneurship, Marketing Management, Branding, Consumer Research, Manufacturing, Operations and Supply Chain QAuantitative Methods & Decision Making Organiztional Behaviour, Human Resource Management, Business Economics, Infrastructural and Public Systems, Corporate Governance, Finance Risk Management and Financial Markets and Models, Enterprise Information and Knowledge Systems, Leadership, Ethics, Strategic Management, Business Policy, Energy Economics, Policy and Regulation etc.Intellectual Property Management, Sustainability, Project Management, Business Process Management, E-Governance, Information Systems, Change Management, Business Analysis. Operations Research; Operations Management and Big- Data. Energy and Climate Modeling, Product Design and Development, Industrial Systems Engineering and Simulation	Master's degree in Civil Engineering
KNPH01	Physics	Atomic and Molecular Physics, Astrophysics , Biologicaland Statistical Physics, Biological and Statistical Physics,Biophotonics, Computational Physics, Condensed MatterPhysics, Cosmology, Dynamical Systems and Turbulence,Fiber optics, Ion Beams and Nuclear Physics Techniques,Laser Cooling and Trapping, Light-MatterInteraction,Nonlinear Optics, Particle Physics, Photonics of Micro andNano Structured Materials, Plasma PhysicsandLaserPlasma Interaction, QCD and Lattice Gauge Theories,Quantum Phase Transition, Quantum Field Theory, StringTheory and Quantum Gravity, AdS/CFT, Hydrodynamics,Quantum Optics, Quantum Computing and Information, Soft matter physics, Quantum materials.	First class Master's degree in Physics or first class Master'sdegree in a related subject or first class Bachelor's degree ina related branch of Engineering.
KNEE01	Electrical Engineeing (Codes mentioned against specializations)	Power Systems Engineering	Master's Degree in Electrical Electronics or Communication Engineering or equivalent
KNEE02		Signal Processing, Communicaion and Neworking	
KNEE03		Microelectronics and VLSI	
KNEE04		RF and Microwaves Engineering	
KNEE 05		Photonics	
KNEE06		Control & Automation	
KNHS01	Humanities and Social Sciences	**Economics:** Industrial Organization and Polcy, Environmental Economics, Environmental Impact Assessment, Development Economics & Policy, Microeconomics, Inter-Industry Economics, Project	55% marks in Master's degree in the respective area with consistenly good academic record.

		Evaluation / BCA, Regional Economcs, Macroeconomic Theory & Policy, Monetary Economics, Managerial Economics, Transport Economics, Law and Economics, Health Economics, Econometrics, Applied Econometrics, Game Theory, Political Economics, Mathematical Economics and Optimizational, International Economics, Agricultural Economics & Policy, Behavioral Economics, Financial Economics, International Finance & Commodity Derivatives & Risk Modelling. **English Literature:** American Literature, British Literature, Common wealth Liteature, Thnic Literatures, European Literature, Indian Writing in English, Literary Movements, Literary Theory, Teaching of Liteature. Post Colonial Studies, Indian Literature, Translation Studies, Literature and the Environment, Postthumanism, Gender Studies. **Linguistics:**Linguistic Theory, Cognitive Linguistics, Computational Linguistics, Communication studies, Sociolinguistics, AppliedLinguistics and English Language Teaching, First and Second Languageacquisition, Linguistic typology, Field Linguistics, Historical Linguistics. **English LanguageTeaching**:Teaching methodology,Curriculumdevelopment, Language testing. **Fine Arts:** Art Appreciation, Art Education, Art-History, Indian Art Painting, Film and Media Studies. **Philosophy:** Twentieth Century Philosophy, Logic, Philosophy ofScience Ethics, Philosophy of Language, Philosophy of Social Sciences,Indian Philosophy,Philosophyof Mind, PhilosophyofCognitiveSciences, Philosophical Aesthetics, Philosophy of Religion Ethics. **Psychology:**Social Cognition, Personality,Experimental SocialPsychology,OrganizationalBehavior,Human Cognitive Processes,ConsumerPsychology, Cross-cultural Psychology, Health Psychology andNeuropsychology, Cultural Issues in Psychology, Disaster Mental Health,Perception & action, embodied cognition, Psycholinguistics, Attention,Bilingualism & Executive Control, Lateralization of Cognitive Functions. **Sociology:** Sociology of Religion, Urban Sociology, Social Demography,Environmental Sociology,SociologyofDevelopment,Science,Technology and Society, Social Movements, Third SectorNon-Governmentand Voluntary developmentOrganization,Human Rights,Social Gerontology, Sociology of Educationand DisabilityStudies.Mobility Studies, Border Studies, New Media Studies.	
KNMA01	Mathematics / Statistics	Coding Theory, Differential and Integral Equations, Partial DifferentialEquations, Functional analysis, Harmonic Analysis, Fourier Analysis,Operator Theory, Numerical Analysis, Commutative Algebra, Differentialand Algebraic Topology, Differential Geometry, Algebraic Geometry,Combinatorics, Logic, Fluid Mechanics, Biomathematics, ParallelComputing, Mathematical Modeling, Order Statistics, NonlinearRegression, Time Series, Reliability Theory, Variational Analysis,Statistical InferenceStatistical Signal Processing~~Order Statistics~~Econometrics, **Stochastic Partial Differential Equations, NumberTheory, Arithmetic Geometry, Representation Theory, Rough SetTheory, Model Theory, Category Theory, Set Theory**	Minimum high second class Master Degree in Mathematics or Statistics with at least 55% marks or equivalent.
KNMS01	Materials Science (Interdisciplinary programme)	Chemical sensors Transport and reactions Microfluidics Micro/nanofabrication Semiconductor devices. Synthesis and Characterization of Nanomaterials, Layer-by-Layer Assembly, Bioimaging, Drug Delivery, Photoelectrochemical WaterSplitting, Growth Mechanism of Nanomaterials.Electrochemical, reaction and separation engineering.Materials for solar cell, fuel cell, lithium battery, water purification, high performance structural composites, and detection and destruction ofcancer cell.Microwave imaging, characterization and nondestructive testing. RF andMicrowave Sensors. Artificial Dielectrics and Metamaterials. Microwave material processing. Electromagnetic scattering: direct and inverse problems. Design of Microwave Filters using the inverse scattering procedure. Electromagnetic modeling of metal	M.E.,M.Tech.,M.Sc.(Engineering)Degree in Materials Scienceoranyequivalent branch ofengineering/technology;orB.E., B.Tech.,B.Sc.(Engineering) with a minimum of75%marks or Cumulative Point Index (CPI)of 7.5/10 in any relevant branch ofEngineering/technology,OrM.Sc.degree in an allied area with, Exceptional academic records.

		powder compacts specializedcompositesandmeta-materials. Interactionofelectromagnetic waves with biological tissues. Computational electromagnetics Organic Semiconductor and Energy Storage/ Conversion Materials.Materials for Flexible Electronics and sensors.Multiferroics and other novel oxides. Study of structural, magnetic andother properties for various application susing optical spectroscopy(Raman, IR, Photo luminescence) and other probes.	
KNNE01 KNME01	Nuclear Engineering & Technology Mechanical Engineering	Reactor Safety, NumericalMethods, RadiationMeasurementsandNuclear Instrumentation, Reactor Analysis and Design, Non InvasiveImaging, NDT, Computed Tomography. **Solid Mechanics:** Composite Materials, Fracture Mechanics, Multi-scale Simulation, Stress Waves, Non-Destructive Testing, Large Deformation, Elasto-Plastic Analysis, Impact-Contact Problems, Smart Structures-Materials and System, Micro electro- Mechanical Systems. Computer Aided Design, Kinematics and Dynamics of Machinery, Vibration, Friction and Wear, Lubrication, Rapid Prototyping, Rapid Tooling, Reverse Engineering, Compliant Mechanisms, Granular Media, Crystal Physics, Noise and Acoustics, Non-Linear dynamics and Control. **Fluid Mechanics:** Flow Control, Turbulence, Wake Dynamics, Experimental Techniques, Computational Fluid Dynamics, Computerized Tomography, Transport in Hierarchical Porous Media, Hydrodynamic Instability, Micro Fluidics, Wave Mechanics, Natural Flows, PIV/LDV/Optical Techniques for flow analyses. **Thermal Sciences:** Computational Heat Transfer, Heat Pipes and Thermosyphons, Drop-wise Condensation, Solar Desalination, Electronics Cooling, Gas Turbine Blade Cooling, Turbo Machinery, Emission from IC Engines, Biofuels, Hydrogen Technology, Flames, Spray Combustion, Portable Energy Storage, Energy, Storage Material, Micro Scale Heat Transfer, Natural Convection. **Manufacturing Sciences:** Additive manufacturing,Unconventional Machining, Design of Machine Tools, Computer Aided Manufacturing, Computer Integrated Manufacturing System, Casting and Solidification, Nanotechnology, Bio mems and materials, Computational Material Science, Conventional metal operations/machining like cutting and forming. **Robotics and Automation:** Manipulator Design, Kinematics and Dynamics, Motion and Path Planning, Collision Avoidance and Navigation, Sensor Based Intelligent Robotics, Industrial Robotics, Intelligent Control, System, Human Machine Interface, Flexible Manipulators, Compliant Mechanisms	First class Master's degree in any branch ofEngg.,preferablywithsomeknowledgeinNuclearEngineering orequivalent. First class or equivalent Master's Degreein Mechanical Engineering. **Note:** (i) In exceptional cases applicants with first class Master's degree in other branches of Engg. may also considered. (ii) Candidates with first class Degree in Production Engg. Are eligible for admission only to Manufacturing Science Stream.
KNMT01	Materials Science and Engineering	Heat and Mass Transfer in Metallurgical System, Process Design and Development in Extractive Metallurgy, Optimization, Electro-deposition,Physical Metallurgy, Alloy Development Thermodynamics and Kineticsof Phase Transformations, Heat Treatment, Solidification, MechanicalProcessing, Steel Making, Processing and Advanced Structural Steel,Processing-Structure-Property Relations, Nanostructural Materials,Microstructural Characterization and Stereology, Textures in materials,Environmental Degradation of Materials, Corrosion, Powder Metallurgy,Structural Ceramics and Composite, Tribology, Welding, MagneticMaterials, Electromagnetic Materials, Thin Film Technology, Opto-Electronic Materials and Devices, Ferroelectric Ceramics, ElectronicMaterials, Organic semiconductor, Display Materials and Technologies,Bio-materials. Multiferroic Materials & Thin films, Clean energy,Photovoltaic and energy materials & devices.	B.E./ B.Tech.degree and a M.E./M.Tech degree in Metallurgical orMaterialsEngineering,Materials Science, Ceramic Engineering, Nano-science, Nano-technology, Mechanical,Electronics.Minimum 60% marks or a CPI of 6.0/10in B.E./ B.Tech.&Minimum 70%marks or a CPI of 7.0/10 in M.E./M.Tech **OR** M.Sc. and M.E./ M.Tech. Degree inMetallurgical or Materials Engineering,Materials Science, Ceramic Engineering,Nano-science,Nano-technology,Mechanical, Electronics.Minimum 60% marks or a CPI of 6.0/10in B.Sc. and M. Sc.& Minimum 70%marks or a CPI of 7.0/10 in M.E./M.Tech.
KNLS01	Photonics Science & Engineering	Ultrafast spectroscopy, Bio-medical applications of lasers, Femto second Pulse Shaping, Femto second optical tweezers Nonlinear Spectroscopy, Coherent Control, Multi photon Imaging, Quantum Computing, Quantum Optics, Imaging in Complex Media & Biological Tissues, Interferometric Tomography, Laser & Rainbow Schliern, Imaging Growth of Protein Crystals, Quantum	Master's degree in any branch of Engg. or Master's degree in Science with some exposure to Optics or Photonics. Engineering degree holders with a Bachelor degree can also apply if they have the requisite CPI of 8.0 and have studied in a CFTI.

		Cryptography, Nonlinear Fibre-Optics, Optical Fiber Communication, Electro magnetics and RF, Opto-Electronics, Semiconductor Device & Lasers, Mill metric & Microwave Circuits, Nonlinear Optics, Photonic Band Gap Structures, Laser Ranging, Laserimaging and cross-section, Flash and scanning laser applications, Digital Holography, Particle Image Velocimetry, Laser Schlieren, Experimental Stress Analysis, Smart Materials, Development and analysis of reconstruction algorithms for nonlinear tomography, Shape-based tomography, Numerical solutions to partial differential equations in electromagnetic, Subsurface imaging, Quantitative Phase Imaging, Optical Metrology, Applied Signal Processing, Fringe Analysis, Biophotonics, Fiber and integrated optics , Infrared and terahertz frequency sensors, Long-period gratings, Fiber optic Bragg gratings, Plasmonics and Metamaterials Nanophotonic and plasmonic devices for application in optical communication and sensing.	
KNCY01	Chemistry	**Inorganic:** Bio-inorganic chemistry, Main group chemistry, lanthanide chemistry, Molecular spintronics, Metalla-supramolecular chemistry, Organometallic chemistry, Catalysis, Inorganic materials. **Organic:** Organic Synthesis, Enantioselective synthesis, Bio-organic chemistry, Chemical biology, Medicinal Chemistry, Organic photochemistry, Photocatalysis, Organic materials, Organometallic catalysis, Small molecule therapeutics, High-energy-density materials, Soft matter. **Physical:** Molecular Spectroscopy, Spectroscopy of nanoparticles and surfaces, Biological nanoparticles, Plasmonic photocatalysis, Quantum statistical mechanics, Chemistry at surfaces, Computational chemistry/materials, Molecular dynamics simulations, Bio-physical chemistry, Chemical kinetics, Magnetic resonance, Mass spectrometry, Physical photochemistry, Ultrafast spectroscopy, Functional materials.	High second-class Master's degree in Chemistry or Physics ***Note:*** *Candidates must have Bachelor's degree with Chemistry and preferably Mathematics as one of the subjects.*

8. Indian Institute of Technology Madras, Chennai 600 036 –MD

In all cases the eligibility requirement for consideration for admission to Ph.D is a First Class or Equivalent with a minimum of 60% marks or 6.5/10 CGPA for General and OBC candidates and minimum of 55% marks or CGPA of 6.0/10 for SC/ST candidates in the qualifying Masters degree in Engineering/Technology/Science as indicated under minimum qualifications in the table given below for different departments. Minimum marks or CGPA is to be based on all years/semesters of the qualifying examination put together.

Code	Department	Fields of Specialization	Minimum Qualification
MDAE01	Aerospace Engineering	Helicopter Aerodynamics, Geo-Physical Fluid Dynamics, Subsonic, Transonic, Supersonic, Hypersonic, Shock and Blast Wave Dynamics, Rarefied Gas flows, Boundary Layers and Stability of Flows, Turbulent Flows, Shock Tubes and Related Problems, Development of Algorithms and Code for Numerical Methods in Gas Dynamics and Computational Fluid Dynamics, Vortex Dynamics, Supersonic Mixing and Combustion, Optical Flow Diagnostics, Linear and Nonlinear Acoustics. Non-Linear Dynamics in Aerospace Applications, Computational Methods in Nonlinear Dynamics, Nonlinear Control Theory and Applications, Flight Simulations and Controller Development, Design Development of Autonomous Flying Vehicles. Finite Element Methods, Numerical Methods, Composite Structures, Fatigue and Fracture Mechanics, Contact Mechanics, Vibration and Impact Mechanics, Constitutive Modelling. Rocket Propulsion and Solid Propellant Combustion, Airbreathing Propulsion and Combustion, Cascade Flows, Multiphase Flow Simulation, Combustion Instability, Optical Flow/Combustion Diagnostics. (In all cases, there is a good mix of experimental, computational and theoretical work).	Master's degree or its equivalent in Aerospace/ Civil/ Applied Mechanics/ Mechanical/ Chemical or Master's degree in Mathematics/ Physics and aptitude for research. Science Post- graduates should have exceptional merit and research or industrial experience in the appropriate field. Candidates with Master's degree in other allied engineering specializations can also be considered provided they have either basic degree in Aerospace Engineering or at least five years experience in Aerospace industry/ Research Organisation.
MDAM02	Applied Mechanics	**Biomechanics,** Cardiovascular System studies, Image and Signal Processing, Speech Signal Processing, Biomedical Instrumentation, and Ultrasound and Laser instrumentation in Medicine, Rehabilitation Engineering, Evoked Response and Functional Electrical Stimulation, Physiological Modeling, Biomaterials, Biosensors, Medical Diagnostics,AI/ML and Biomedical Informatics Biomechanics, Cellular biomechanics, Neuromechanics,	Master's degree in Applied Mechanics / Civil / ECE / Mechanical/ Electrical/ Biomedical Engineering/ Computer Science/ Instrumentation/ Aerospace/Chemical/ Nanotechnology or Nano engineering/ Engineering Mechanics/Metallurgy and Materials science Engineering/ Production/ Nuclear Engineering and allied branches of Engineering.

		Neural control of movement, Neuro-rehabilitation, Perception and Virtual Reality. Computational Fluid Dynamics (CFD), Laser Diagnostics for fluids, Turbulent Convection, Bluff body and Industrial Aerodynamics, Cooling Technologies, Turbulence Modeling, Experimental Fluid Mechanics, Sprays and multiphase flows. Micro and Nanoscale Fluid Mechanics and Heat transfer, Rarefied gas Dynamics, Bio-Fluid Mechanics, Cardio-vascular and Pulmonary Fluid Mechanics, Nuclear Thermal Hydraulics, Fluid-Structure Interaction, Computational and Experimental studies in fatigue, fracture, smart materials, photoelasticity, plasticity, vibration of structures, linear and nonlinear dynamics, structural control, composites, constitutive modelling and stochastic mechanics, Impact Mechanics, Multiscale and multi-field modelling, Damage mechanics, Mechanics of soft matter	Master's degree in medicine in MD/MS, MDS **With an aptitude for research in the relevant areas mentioned.**
MDCH01	Chemical Engineering	Transport Phenomena, Reaction Engineering, Systems and Control, Environmental Engineering, Energy & Materials, Process Intensification, Molecular Simulations, Thermodynamics	Master's degree in Chemical Engineering
MDCY01	Chemistry	Theoretical and experimental homogeneous and heterogeneous catalysis, colloid and interfacial chemistry, analytical instrumentation, polymer chemistry and applications of chitin/nanochitin, polymer physics and polymer chemical synthesis, biopolymers, molecular biophysics and biophysical chemistry, molecular self assembly and photophysics, protein folding, chemical biology, single molecule spectroscopy, electrochemistry and battery research, chemistry of solar cells and supercapacitors, fluorescence and biomolecular spectroscopy, novel molecular probes for fluorescence, OLED, chemical reaction dynamics, laser spectroscopy and dynamics, atmospheric chemical processes, molecular and nanoscale materials with clean water applications, mass spectrometry and instrumentation, X-ray crystallography, ionic liquids and chemical thermodynamics of fluid equilibria, quantitative structure activity relationships and correlations. Nonequilibrium thermodynamics and statistical mechanics, classical and quantum optics.Theoretical and computa- tional chemistry, experimental and theoretical molecular spectroscopy; quantum chemistry, quantum and compu- tational scattering, polymer and stochastic chemical dynamics, biopolymer dynamics and computational materials science Natural product synthesis; atmospheric organic and green chemistry, heterocyclic chemistry, small molecule and C-H bond activation, carbohydrate chemistry, medicinal chemistry, drug design and pharmaceutical chemistry, organometallic chemistry with functionalization chiral and asymmetric synthesis, organic photochemistry and synthesis of polycyclic aromatic compounds, supramolecular chemistry and self assembly. Solid state chemistry and synthesis, structural and main group chemistry, metalloboranes and boron chemistry for catalysis, zeolites and metal organic frameworks for catalysis, organic single molecule and ion magnets, radical, diradical and radicaloid chemistry, porphyrins, metallo porphyrins and dendrimers, bioinorganic chemistry and inorganic spectroscopy, bioinorganic chemistry and inorganic spectroscopy.	Master's degree in Chemistry.
MDBT01	Biotechnology	**Research Areas** The department focuses on a wide array of research topics, reflecting the diversity of modern biotechnology. The ~~four~~ thrust areas of Research (M.S. and Ph. D.), are listed here: **Research in theBiochemistry and Molecular Biophysics Group**	Same as for our regular PhD programme

		• Protein Structure-Function Relationships; Structural Enzymology; Structural basis of Enzyme Properties; Protein Engineering; Structure and Mechanism of DNA Replication. • GPCR-mediated Signal Transduction; Biophysical Chemistry of Calcium-binding proteins • Biophysics; Green Chemistry; Structure-based Drug Design Phospholipid Scramblases; Membrane Biochemistry; Biochemical and Biophysical	
MDBT01	Biotechnology	• Protein Folding and Function; Protein-Protein-DNA Binding; Downhill Folding, Molten-Globules and Intrinsically Disordered Proteins; Thermodynamics, Dynamics and Kinetics; Liquid-Liquid Phase Separation; Engineering Protein Stability, Barriers and Rates; Statistical-Mechanical Models; Coarse-Grained and All-Atom Molecular Dynamics Simulations; Multi-Domain Proteins; Allostery; Epistasis; Macromolecular Crowding • Enzyme-mediated Biomass Conversion for Biofuel and Functional Oligosaccharides; Bioremediation; Carbohydrate Chemistry Targeted Drug Delivery: Development of Conjugation Strategies for Antibody-Drug and Polymer-Drug Conjugates; Development of New Biosimilar: Identification of Novel Clones for Biosimilars and Improvement of Therapeutic Index of Proteins by Lipidation and Glycosylation; Biophysical Chemistry of modified Nucleic acids. **Research in theBiological Science group** • Electrophysiology, Ion Channeland receptor biology, Calcium signaling • Molecular epigenetics, Infection Biology, Malaria • Quantitative genetics and systems biology of yeast, Specialized ribosomes in yeast, Gene-gene and gene-environment networks in yeast,. • Bio-ethanol production, functional oligosaccharides, Molecular bioremediation • Germline stem cells, Caenorhabditie elegans, Gene silencing • Vascular biology, Endothelial dysfunction, Atherosclerosis Pancreatic cancer evolution, Cellular plasticity, Metastasis, Chemoresistance, developing preclinical model of pancreatic cancer. • Cardiovascular biology, Metabolic syndrome, Neuromodulation, Transgenic mouse models. • Cardiovascular genetics, Biomarker discovery, Molecular basis of hypertension, type 2 diabetes, myocardial infarction, chronic kidney disease • Molecular mechanisms of pattern formation in the cellular slime mold Dictyostelium, Estimating the types and rates of classes of spontaneous mutations and manipulation of meiotic recombination rates in Arabidopsis • Molecular pathogenesis of HIV/AIDS, Cancer biology, Regulation of nucleo-cytoplasmic transport proteins • Neuronal communication, Neuropeptides in facilitating neuronal function, Neuronal degeneration, Vision restoration • Monoclonal and Polyclonal antibodies, Peptides targeting novel oncogenes, CRISPR/Cas9, Developing pre-clinical models	Same as for our regular Ph D programme

		of tumor progression • Tuberculosis, Microbiology, Immunology, Host-Pathogen interactions.	
		Research in the Biological Engineering group **Bioprocess engineering:** Development of biomanufacturing platforms for ● conversion of lignocellulosic biomass to value added products like ethanol, xylitol, arabitol, biopolymers and 3-hydrosypropionic acid ● metabolic engineering strategies to improve the yields of industrially important metabolites ● production of industrially important biocatalysts such as L-asparaginase, esterases, oxidoreductases and caffeine degrading enzymes ● production of biopharmaceuticals and bioactive compounds from plants ● alternative food products (synthetic meat) and marine based bioproducts ● understanding biological systems and its manipulation **Biomaterials engineering:** ● **Developing novel biomaterials for drug delivery and tissue regeneration** ● **Designing bioengineered microenvironments to study physiological and pathological niches** ● **Micro/Nanofabrication and 3D bioprinting technologies for the development of functional tissue scaffolds** ● **Engineering organoids and microfuidic tissue-on-a-chip platforms for disease modeling** ● **Extracellular matrix regulation to control cellular behaviour** **Biochemical and biophysical stimulation for cells and tissues Research in the Computational Biology group** ● Protein structure and function; Protein stability; Protein interactions; Binding affinity; Transcriptome analysis; Disease-causing mutations; Development of databases and tools ● Molecular dynamics simulations of proteins and nucleotides; QSAR; Structure-based drug design ● Computational neuroscience ● Systems biology; Metabolic engineering ● Molecular evolution; Comparative genomics; Structural bioinformatics ● Protein assembly and aggregation; Design of drug delivery mechanisms	Same as for our regular Ph D programme
MDCE01	Civil Engineering	Building Technology & Construction Management	Candidates satisfying any of the following norms: Master's degree in Civil, Ocean or Industrial Engg., Industrial Management MBA after obtaining a basic degree in Civil Engineering, or in Architecture, Master's degree in Housing, Town & Country planning after obtaining a basic degree in Civil Engg., or Architecture with first Class.
MDCE02		Environmental and Water Resources Engineering	M.Tech or M.S. or equivalent degree in Engineering Mechanics/ Aerospace Engineering/ Agricultural Engineering/ Civil Engineering/ Environmental Engineering or M. Tech or M.S. or equivalent degree in Chemical Engineering/ Biotechnology.
MDCE03		Geotechnical Engineering	Master's degree in Civil or Ocean Engineering or Engineering Mechanics, Mining Engineering. With two years experience.
MDCE04		Master's degree in Civil or Ocean Engineering or	Master's degree in Civil, Ocean, Aerospace,

		Engineering Mechanics, Mining Engineering. With two years experience.	Naval Architecture, Mechanical, Computer Science or in Engineering Mechanics with basic degree in Civil Engineering or Infrastructural Civil Engineering.
MDCE05		Transportation Engineering	Master's degree in Civil/ Architecture/ Town and Country Planning/ Regional Planning/ City Planning/ Urban Engineering or 2 years full time Postgraduate Diploma in Town and Country Planning with specialization in Traffic and Transportation Planning of the School of Planning and Architecture, New Delhi/ MBA after obtaining a basic degree in Civil Engineering.
MDCS01	Computer Science & Engineering	**Intelligent Systems and Human Computer Interaction:** Artificial Intelligence, Natural Language Processing, Machine Learning, Deep Learning, Reinforcement Learning, Big Data, Computational Brain Research, Computational Biology, Bioinformatics, Data Mining, Ontologies, Human Computer Interaction, Speech Technology, Visualization and Perception, Computer Vision. **Systems Engineering:** Compilers, Programming Languages, Software Verification, Computer Architecture, VLSI Design, High Performance Computing and Parallelization, Cyber-Physical Systems, Hardware and NetworkSecurity, Computer Networks, Distributed Systems, Cloud Computing, Blockchain Technology. **Theoretical Computer Science:** Design and Analysis of Algorithms, Graph Theory, Computational Complexity Theory, Cryptography and Information Security.	M.Tech/ M.E./ M.S. in Computer Science & Engineering or Information Technology.
MDEE01	Electrical Engineering	Communication theory and systems, Wireless Communications (5G and 6G); Internet of Things (IoT) and Cyber Physical Systems (CPS); Networks: Design, Optimization & Control; Speech & Image Processing; Statistical Signal Processing: Estimation, Detection & Learning; Information and Coding Theory	Modern communications, networking, signal processing, and machine learning. Basic graduate-level courses include probability foundations, communication networks, and digital signal processing among others. Several advanced electives are available in the areas of digital communication, information theory, coding theory, wireless communications, speech & image signal processing, stochastic modeling and machine learning. Comprehensive laboratory training covers advanced wireless communications. The students opting for this programme are expected to have good basic knowledge in the areas of digital communications, signal processing. The mathematical backgrounds needed are (i) signals and systems (LTI systems and basic transform theory) and (ii) basic probability &random-processes.
MDEE02		Power Systems, Power Electronics and moor drives, High voltage Engineering, Power quality, renewable energy and microgrid systems	M.E/MTech/MS in Electrical Engineering, Power systems, Power Electronics, Machines and Electronic Circuits, High voltage Engineering.
MDEE03		Nano Micro Electronics, MEMS, Organic Electronics, & VLSI Technology, Non-volatile memory, Phase change memory, Resistive random access memory, Neuromorphoic computing	https://www.ee.iitm.ac.in/2020/02/mtech-program-in-microelectronics-and-vlsi-design/
MDEE04		Electronic System Designand Instrumentation: Sensor systems, analog and digital systems, Biomedical instrumentation, IoT applications, Data analytics, Wearable sensors and systems, industrial instrumentation	MTech in Electrical and Electronics Engineering, Electronics and Communication Engineering, Sensor system, Robotics, Biomedical Instrumentation. (EEE, ECE, IN, C&I)
MDEE05		**Photonics** Optical communications (optical fibre and free space), optical signal processing, RF and microwave engineering (inverse problems in electromagnetics, breast cancer detection, antenna arrays, remote sensing), quantum technologies (devices, sensing, communications and computing), pulsed and CW fiber lasers, silicon photonics, diffractive and meta optics, complex light, optical sensors and imaging technique.	Generation, transmission, modulation, processing, switching, amplification, detection and sensing. Expertise in the area of Photonics in the EE department fall under the categories of 1. Devices and Components - Integrated optoelectronics, Fibre Bragg Gratings (FBGs), Plasmonics, Optical MEMS, All optical logic. 2. Subsystems - a combination of optoelectronic devices and mixed signal electronics for metrology and instrumentation. 3. Networks - Optical communication networks, both at a physical layer and the implementation of algorithms and protocols at the service layer, and advanced encryption schemes using quantum key distribution. The program is supported by faculty from Departmentsof Physics, AppliedMechanics,and Engineering Design.
MDEE06		Integrated Circuits and SystemsAnalog, mixed-signal, and RF IC design	MTech in Electronics & Communication Engineering, Electrical & Electronics

		● Analysis and simulation of noise in circuits ● VLSI DSP architectures, Reconfigurable computing ● Efficient circuit implementations for ML	Engineering, Instrumentation Engineering. (EEE, ECE & IN)
MDEE07		Control and Optimization	M. Tech in Electronics and Communication Engineering, Electrical, Control (EC, EE, IN)
MDER01	Engineering Design	**Automotive Engineering**: Vehicle Dynamics, Tyre Mechanics, Mathematical Modelling of Dynamic Systems, Control, Fault Diagnosis, Automotive Systems, Automotive Power Electronics and Drives,Intelligent Transportation Systems. **Biomedical Design**: Medical Imaging, Biomechanical Modeling, Soft Tissue Mechanics, Bio-fluid Mechanics, Prosthetic and Scaffold Design, Biomedical Devices and Control Microwave Applications, Tissue Ablation and Hyperthermia Physics, Radiometry, Ergonomics, Rehabilitation Engineering, Bio-MEMS/NEMS, Biomedical Micro/Nano devices. **Materials and Design:** Geometric and Solid Modeling, Computational Geometry, Shape Search, Shape Optimization, Machine / Deep Learning in geometry processing,Image Based Reconstruction, Solid Free Form Fabrication, Design Theory, Reliability, Fatigue and Fracture, Finite Element Analysis, Impact mechanics, Material Characterization, Design with Smart Materials, Sustainable Manufacturing, Additive manufacturing. **Robotics and Mechatronics**: Parallel Manipulators, Underwater Robots, Medical Robotics, Exoskeletons, Rehabilitation robotics, Path Planning, System Dynamics and Control, Opto-mechatronics, Sensing.	Master's degree in Aerospace, Automobile, Biomedical, Chemical Engineering, Civil, Computer Science, Electrical, Electronics, Engineering Physics, Instrumentation, Mechanical, Metallurgical, Material Science, Naval Architecture, Production / Manufacturing Engineering, or Master's degree in Design (Engineering) (M.Des.) or M.Tech.(Industrial Mathematics).
MDHS01	Humanities & Social Science	● **Economics:** Development Economics, Energy and Environmental Economics; Applied Econometrics; Industrial Economics; Microfinance; International Trade; Economics of Innovation and Technological Change; Health Care Economics and Public Policy; Financial Economics and Banking; Economics of Education/Labour Markets; Urban Water Management. ● **Education and Technology Studies:** Theories of Learning; Information and Communication Technologies (ICTs) in Higher Education; Engineering Education; Engineering Ethics; Assessment and Evaluation in Higher Education; Quality Assurance. ● **History:** Modern Indian History, History of Science, Technology and Medicine (since 1700s). ● **Linguistics:** Language in Education; Sociolinguistics; Applied Linguistics; syntax/Morphology; Linguistic Typology. ● **Literature and Media Studies:** American Literature; English Literature; Hindi Literature; Eco-criticism; (American/British); Disabilty Studies; Film and Media Studies; Popular Culture; Life writing. ● **Philosophy:** Phenomenology; Hermeneutics; Philosophies of Heidegger and Wittgenstein; Indian Philosophy; Philosophy of Mind; Consciousness; Analytical Philosophy; Philosophy of Language; Political Philosophy; Ethics; Professional Ethics; Engineering and Higher Education; Bioethics. ● **Politics & International Relations / Political Science:** International Relations Theory; International Political Economy; Taiwan Studies; Chinese Studies; Democracy Theory and Practice. **Sociology/ Anthropology:** Sociology of Religion; Islam; Sociology of Work and Gender; Anthropology of body; Anthropology of Technology; Gender Studies; Disability studies; Sociology of Science.	Master's degree in relevant discipline.
MDMS01	Management Studies	**Finance:** Corporate Finance: Financial Decision Making; Family Business Management; Financial Modelling & Forecasting; Banking and Risk Management. Financial Markets: Capital Market; Bond Market; Commodity Market; Derivative Market; Market Microstructure. Venture Capital and Private Equity; Small and Medium Enterprises; Real Options; Developmental Finance; Development Studies; Infrastructure Finance; Public Sector Finance; Behavioural Finance. **Marketing:** Salesperson Performance; Branding in emerging economies; Corporate identity; B2B Marketing; Customer	Master's Degree in Mathematics/ Statistics/ or M.Tech (Industrial Mathematics & Scientific Computing).

		Relationships and Communities; Marketing Measures; Entrepreneurial Marketing; Food Marketing. Big Data-Driven Consumer Analytics Social Media Marketing Marketing Engineering and Analytics, Gamification in marketing; Human engagement with AI powered devices; Consumer behaviour online & offline - Perception, Motivation, Intention, etc. Consumption communities; Luxury and Environmentally Responsible Consumption; Developing Psychometric measures/scales. **Information Systems:** Preference Elicitation; Electronic Negotiation Tactics; Electronic Shopping Agents; Analytics in Cloud Computing; Smart Phones and Healthcare Web Personalization; Information Privacy; IT Usage; Adoption; Business Value; IT Services; Cloud and Emerging Business Models; eGovernment Systems; Social Network Mining; Recommender Systems; Mobile App Analytics; Econometric Modeling. **HR and OB:** Organizational Behaviour; Positive Organizational Behaviour; Leadership and Organization Development (L&OD); Cognition; Spontaneous Mental States and Goal Directed Behaviour Across Contexts; Behaviourism - Combining Elements of Philosophy, Methodology, and Psychological Theory; Employee Voice and Silence; Workforce Diversity and Inclusion; Judgement and Decision making; Human Comfort Studies; Social Neuroscience; Human Resource Management; Training & Development; HR Audit; Workplace Teams; Work-Life Balance; Family-Friendly HR Policies and Practices; Employee Wellbeing; Women in Management and Entrepreneurship; Employer Branding; Corporate Sustainability and CSR; Technology and Human Interface; Knowledge Sharing / Hiding Behavior; Workplace Emotions; Ancient Indian Wisdom in Management; Creativity & Innovation; Cross-Cultural Research; Integral Education; Teaching-Learning Practices. **Operations:** Supply Chain and Logistics; Green Concerns; Healthcare and Food Sectors; Game Theoretic Models; Pricing and Revenue Management; Scheduling in Manufacturing and Service Operations; Integrated Production; Logistics and Inventory Optimization in Supply Chain Management; Behavioral Decision Theory. **Integrative Management:** Strategy and Policy Studies; Technology Management; Business Model Innovation; Entrepreneurship	
MDMM01	Metallurgical and Materials Engineering	Metal casting, Metal forming, Metal joining, Materials Technology, Physical and Structural Metallurgy, Mechanical Metallurgy, Chemical Metallurgy, Thermodynamics of Metallurgical Systems, Powder Metallurgy, Ceramics and Composites, Corrosion, Surface Engineering, Biomaterials, Simulation and Modeling of Materials Processing, Nanostructured Materials, Magnetic Materials, Amorphous Alloys, Nonequilibrium Processing, Hydrogen Storage Materials, Smart Materials, Fuel Cells, Metallic Foams, Chemical Sensors, Carbon Nanotubes, Special Steels, Superalloys, Intermetallics, Materials for Optoelectronic Applications, Shape Memory Alloys, Fatigue and Fracture Mechanics, High Temperature Behaviour of Materials and Creep.	Master's degree in appropriate branch of Engineering/ Technology. Engineering graduates (B.Tech/BE or equivalent) and Science postgraduates (M.Sc. or equivalent) to be considered should have exceptional merit and research or industrial experience in the appropriate field.
MDME01	Mechanical Engineering	**1) Design Engineering**: Machine Elements ~ design development, analysis and performance improvements, New materials and design, composites, nano composites, bio materials, porous materials, radiation damage, surface engineering, design process, contact mechanics, tribology, tyre mechanics, biomechanics, fatigue and failure analysis, computational and experimental fracture mechanics, fatigue crack closure – environment interaction studies, alternate small specimen test methods, small crack propagation under biaxial multiaxial loading, multi crack interaction studies, fatigue damage in composites, failure mechanics of biomaterials. Non linear finite element analysis, Vibration, finite element including coupled problems, Non destructive evaluation, structural health monitoring, Materials Characterization, Measurements of Material Properties and Behavior, machinery signal processing, Condition monitoring of structures machines, machinery diagnosis, and combustion flame noise,	Master's degree in Mechanical Engineering, Aerospace Engineering, Automobile Engineering, Automotive Engine Tech., Biomedical Engineering, Chemical Engineering, Computer Science, Electrical Engineering, Electronics, Energy Engineering, Industrial Engineering, Instrumentation, Maintenance Management, Metallurgical Engineering, Production/ Manufacturing Engineering, Agricultural Engineering and in related areas depending on the research topics.

		Acoustics and Noise Control, Prosthetics and human body movement, Design optimization, constitutive modeling, MEMS, Rotor Dynamics.	
MDOE01	Ocean Engineering	**Ocean engineering :** Wave-structure interaction, Soil-structure interaction, Hydrodynamics of fixed, floating and compliant offshore structures, Port and harbor structures, Coastal structures, coastal processes and shore protection, Subsea pipelines, risers and cables, Remote sensing and ocean optics, Ocean renewable energy - wind, wave, current and OTEC, Offshore structural engineering,- Ocean and underwater acoustics, and Ocean environment. **Marine vehicles** : Motion and stabilization, Maneuvering and controllability, Resistance, powering and propulsion systems - Design and surface development, Shipbuilding materials, structure and vibrations, under water vehicles, hydrodynamics and control, under water acoustics – under water towed systems and marine CFD.	Master's degree with good academic record and exceptional merit in Aerospace Engineering, Civil Engineering, Marine Engineering, Mechanical Engineering, Marine Structures, Naval Architecture, Ocean Engineering Or any other appropriate engineering discipline Or M.Sc. in Physics, Mathematics, Statistics or Oceanography.
MDOE02		**Petroleum engineering:** Reservoir engineering; Reservoir Simulation; Analysis of seismic data and interpretation, Artificial lift methods, Drilling engineering and drilling fluids, Enhanced oil recovery, Flow assurance technologies, Formation evaluation from well logging methods, Gas hydrate studies, Hazards identification and risk management, Petroleum geology and geophysical studies, Flow through shale gas reservoirs, CBM reservoirs, fractured carbonate reservoirs and CO_2 sequestration.	Master's degree with good academic record and exceptional merit in Chemical Engineering, Civil Engineering, Marine Engineering, Mechanical Engineering, Marine Structures, Naval Architecture, Ocean Engineering, Petroleum Engineering Or any other appropriate engineering discipline OR M.Sc. in Physics, Mathematics, Statistics, Oceanography, Geology and Geophysics.
MDPH01	Physics	Applied Optics, Quantum Optics, Photonics and nonlinear optics, Atomic and Molecular Physics, Complex fluids, Soft Condensed Matter and Biological Physics, Low temperature physics and superconductivity, Magnetism and Magnetic materials, Semiconductor Physics, Photovoltaics, Dielectric materials & Microwave Physics, Spintronix Multifunctional materials. Thin film phenomena, Metal-oxide Thin films, Nanostructured thin film and heterostructures, Low Dimensional Materials, Carbon Nanotubes and Graphene, Hydrogen Storage Materials, Statistical Physics and Quantum Field Theory, String theory, electronic structure and Computational Material Science, Nonlinear Dynamics and Complex systems, Quantum Chaos, Quantum information and computation,, Experimental High Energy Physics, Gravity and Cosmology. Nuclear many-body theory, condensed matter theory.	M.Sc/ M.Sc (Tech) in Physics, Applied Physics, Materials Science/ M.Tech (Solid State Technology) / M.Tech. (Materials Science) M.Tech (Functional Materials and Nano Technology)or equivalent.
MDMA01	Mathematics	Detailed information about the specialization of each faculty member is available in the Department web site.Mat.iitm.ac.in **Algebra:** Commutative Algebra, algebraic combinatorics, Geometry and Topology of Toric Varieties, group Theory, , Fuzzy Algebra, Linear Algebra, Algebraic Geometry, Applications of Algebra **Analysis:** Functional Analysis, Numerical Analysis,Complex Analysis, Functional Spaces, pecial Functions, Operator Equations, Inverse and III-osed Problems, Harmonic Analysis, Wavelets, Mathematical Programmeming, Game Theory, Conformal eometry, Fixed Point Theory and Applications, Fuzzy Set heory and Analysis, Functional Equations, Summability heory, SpectralApproximation,Non-smooth Analysis, Optimization Theory, Sampling Theory, Approximation Theory, Control Theory,- **Applied Mathematics: Numerical PDE,** Convective Heat and Mass Transfer, Computational Fluid Dynamics, Ship Hydrodynamics, Mathematical Problems related Naval Architecture and Ocean Engineering, Mathematical Modeling, Non - linear Differential Equations. Fluid Mechanics, Bio-Fluid Mechanics, Integral and Differential Equations, Water Waves. **Applied Probability and Stochastic Process:** Applied Probability and Stochastic Processes, Operations Research, Stochastic Models, Mathematical Ecology. **Theoretical Computer Science andDiscrete Mathematics:** Theoretical Computer Science, Graph Theory, Combinatorics, DNA Computing, Theory of Codes, Combinatorial Optimization, Discrete Mathematics,Formal Language, Automata Theory, Modular Computing, Approximation Algorithms.	Master's Degree in Mathematics/ Statistics/ Physics/ Computer Science or M.Tech (Industrial Mathematics & Scientific Computing).

9. Indian Institute of Technology Roorkee, Roorkee 247 667 – RR

Minimum Educational Qualification:

(a) Masters degree or equivalent in respective discipline with a minimum Cumulative Grade Point Average (CGPA) of **6.00** on a 10 point scale or equivalent as determined by the Institute wherever letter grades are awarded; or 60% marks in aggregate (of all the years/semesters) where

marks are awarded, for the GENERAL (UR) / GEN-EWS/ OBC category.

(b) The admission eligibility requirements may be relaxed to 5.5 on a 10 point scale or equivalent, or to 55% marks to the SC/ST/PD candidates with Master's degree.

(c) Candidate supported by a sponsoring organization, the applicant having THREE years' experience at the time of submission of application for Ph.D. programme. This category refers to persons who are released from governmental or educational institutions on study leave for a period of not less than three years for pursuing Ph.D. programme.

(d) Candidate should submit sponsorship certificate and copy of appointment letter with a proof of regular / permanent teacher.

Code	Department	Fields of Specialization	Minimum Qualification
RRAR01	Architecture and Planning	Architecture, Urban and rural planning, Built Environment including urban design and landscape design, Building science and architecture, Energy and architecture planning, Architectural Climatology, Ecology in relation to architecture and planning, Art in relation to architecture	(i) Bachelor's Degree in Architecture or Planning followed by Master's Degree in any specialization. (ii) Bachelor's Degree in Civil Engineering followed by Master's Degree in any specialization of Planning.
RRBS01	Biosciences & Bioengineering	Structural and computational Biology, Cell and Molecular Biology, Biological Engineering	(i) Structural and computational Biology: • Master's degree in any disciplines of Science. • Four year Bachelor's (In any related areas of biological sciences. (Biology, Biotechnology, Bioscience or related areas with biology as a subject) / MBBS. • Bachelor's / Master's Degree in engineering, Pharmacy and related disciplines. (ii) Cell and Molecular Biology: • Master's Degree/ Four year Bachelor's (In any related areas of biological sciences (Biology, Biotechnology, Bioscience or related areas with biology as a subject)/ MBBS. • Bachelor's / Master's Degree in engineering. • MD/ MS in Ayurveda, M.Pharma, M.V. Sc. (iii) Biological Engineering: • B.Tech. (4 years after XII)/ M.Tech. with the condition that applicant.should have Mathematics at 12th level.
RRCH01	Chemical Engineering	**Transport Processes:** Transport phenomena, Fluid dynamics, Fluidization Engg., Packed beds, Slurry transport, Boiling and condensation, Mixing phenomena, Gas-liquid-solid mass transfer. Adsorption, Catalysis and Reaction Engg., Process Intensification, Membrane separation process, Flow of emulsions, Heat integrated Distillation. **Computer Aided Process Plant Design:** Modeling and simulation of Chemical processes. Analysis and optimization of chemical process systems, Heat exchanger networks. Distillation columns. Catalytic reactors and Monolithic converters, Design of chemical equipment, Applied numerical methods, Dynamics and control of chemical processes and equipment, PC-based instrumentation and control, Process Integration, CFD. **Industrial Pollution Abatement:** Environment pollution control strategies, Modeling and simulation of pollution control systems. Modeling of dispersion of air and water pollutants. Treatment methodologies for air pollution and wastewater systems, Hazardous waste management. Risk analysis & hazard management. **Energy Engineering:** Design of energy efficient equipment and Energy conservation in chemical process industries, Bioenergy and Biomass energy systems. **Biochemical Engineering and Down Stream Processing:** Biochemical Engg., Design, Simulation and control of bioreactors, Biogasification. Bioseparation.	(i) B.Tech. / M.Tech. or equivalent degree in Chemical Engineering (ii) B.Tech. / M.Tech. or equivalent degree in any branch of Engineering / Chemical Technology and interdisciplinary areas. (iii) M.Sc./ MS in disciplines consistent with the research areas of the department.

RRCY01	Chemistry	**Analytical; Inorganic; Organic; Physical:** Asymmetric synthesis; Bioanalytical chemistry; Bioinorganic chemistry; Biophysical chemistry; Chemical biology; Chemical kinetics; Coordination chemistry; Development of low cost carbon alternatives for waste water management; Electroanalytical chemistry; Electrochemical sensors and chemical sensors; Electrochemistry; Electronic structure calculations and molecular dynamics simulations; Enantiomeric resolution of pharmaceutically important compounds; Enantioselective catalysis; Environmental chemistry; Epoxidation of olefinic compounds; Evolution and origin of life; Extraction chromatography; Extraction, separation and recovery of metal ions; Heterogeneous catalysis; Inorganic biochemistry; Kinetics and nanomaterials; Liquid chromatography; Macrocycles; Main group chemistry; Metal speciation in environment; Metal-based drugs; Materials modification; Nanomaterials for biomedical and environmental applications; Neutron activation analysis; Organic electrochemistry; Organic materials for OLED and photovoltaic applications; Organic reaction mechanism; Organic synthesis of biological interest molecules and new methodology in organic synthesis; Organometallics (Ru, Si and Sn); Photochemistry; Protein sequencing; Size and shape effects of nanomaterials on their physico-chemical properties; Supramolecular chemistry; Synthesis of heterocyclic compounds; Synthetic polymers/membranes/membrane electrodes; Syntheses of porphyrinoids for material applications; Solid state and materials chemistry; Statistical mechanics of polymers; Rational drug design; Multi component synthesis; Microwave assisted organic synthesis; Theoretical chemistry.	M.Sc. or equivalent degree in Chemistry / Physics / Applied Chemistry / Industrial Chemistry / Pharmaceutical Chemistry / Biochemistry or B.Tech in Polymer Technology / Chemical Science and Technology.
RRCE01	Civil Engineering	**Environment Engineering -** Environmental Pollution, Optimization of distribution network, water and wastewater quality assessment and treatment alternatives, Industrial wastewater treatment, air pollution modeling, abatement and control device, EIA & control water quality modeling, interdisciplinary problems.	(i) Bachelor's degree in Civil Engineering. (ii) Bachelor's degree in Civil Engineering and Master's degree in research areas relevant to the different groups of the Department (Environmental, Geomatics, Geotechnical, Hydraulics, Structural and Transportation). (iii) Bachelor's degree in any branch of engineering with Master's degree in relevant research areas of the above groups of Civil Engineering, having mathematics at the Bachelor's level. (iv) Bachelor's / Master's degree in any branch of engineering but having 8 years of work experience in the research areas relevant to the above groups of the department. (v) For Geomatics Engineering group, MCA (with mathematics as one of the subjects in Bachelor's level) shall also be eligible for applying.
RRCE02		**Geotechnical Engineering –** Behavior of shallow and deep foundations under static and dynamic loading, Problems of rock mechanics and Underground Space Technology, Static and Dynamic Soil Structure Interaction, Expansive soil, Reinforced earth, Ground Improvement Engineering.	
RRCE03		**Hydraulics Engineering -** Sediment transport & Alluvial stream dynamics. Open channel flows, Wind tunnel studies on Turbulence, Boundary layer and Drag, Ground water hydrology, Ground water flow and transport modeling, Water resources, Surface hydrology, Computational Hydraulics, Irrigation Engineering, Environmental Hydraulics.	
RRCE04		**Geomatics Engineering** - Surveying: Plane, Geodetic and GPS, Photogrammetry-close range, analytical and digital, Geodesy-Geometrical, Physical, Mathematical and Satellite, Remote Sensing-Optical and microwave, Hyperspectral, SAR interferometry, Digital image processing, AI soft computing Fuzzy theory, GIS, Web GIS Applications.	
RRCE05		**Structural Engineering -** Performance Based Design of Concrete/Metal Structures, Risk and Reliability Analysis, Nonlinear Computational Mechanics, Nano-mechanics, Soft Computing and Structural Optimization, Strength and Deformation Characteristics of Reinforced Concrete/Masonry/Structural Steel, High Rise Building Systems, Behavior of Bridge Systems, Laminated Composites and Sandwiched Structures, Thin Walled Structures, Smart Structures, Steel Concrete Composites, Concrete Mechanics, Concrete Durability, Special Concretes, Sustainable Concrete, Recycled aggregate concrete Damage Assessment and Structural Health Monitoring, Retrofit and Rehabilitation of Structures, Structures Subject to Extreme Loads (Wind, Earthquake, Impact, Blast and Fire)	
RRCE06		**Transportation Engineering** - Highway material characterization for pavements, Reinforced flexible pavements, modified binders, composite pavements, pavement management systems, low cost pavements, mixed traffic flow modeling and simulation, highway capacity, Environmental impact assessment, mass transportation systems analysis, Rural Urban and Regional Transport Planning, Road Traffic Safety, Intelligent Transport System, GIS applications.	
RRDE01	Design	Product design, Visual design, Sustainable design, Innovation and Entrepreneurship, Design Thinking, Intellectual property development and its management	(i) M.Des / M.Tech / M.Arch OR (ii) Bachelor's degree in Design followed by Master's Degree in any specialization. OR (iii) MIM / Master's in Management / MBA or equivalent OR (iv) Master's degree in Science / Bachelor Degree in Engineering / Technology / Architecture may be considered for research areas consistent with the academic background and special interests.

RRES01	Earth Sciences	**Geology:** Engineering Geology; Environmental Geology; Geochemistry and Petrology; Geotechnical Investigation; Ore Geology; Petroleum Geology; Remote Sensing and GIS; Sedimentology; Stratigraphy and Paleontology; Structural Geology; Waste Disposal. **Geophysics:** Engineering Geophysics; Exploration Geophysics; Geodynamics; Seismology; Solid Earth Geophysics; Mathematical modeling and Inversion; Geoelectromagnetism.	M.Sc / M.Sc.Tech / M.Tech. / MS degree in Geology / Geophysics / Applied Geology / Applied Geophysics / Geological Technology / Geophysical Technology / Geosciences / Applied Geosciences / Petroleum Geology / Petroleum Geophysics / Earth Sciences.
RREQ01	Earthquake Engineering	**Structural Dynamics:** Dynamic analysis and design of structures like buildings, dams, bridges and nuclear power plants, Finite & element methods, Static and dynamic nonlinear analysis, Constitutive modeling, Computer aided analysis, Soil-Structure and fluid- structure interaction, Seismic base isolation, Seismic risk analysis, Random vibration theory and probabilistic design methods, Shake table and pseudo dynamic testing of structure and structural components, System identification, Structural response control / Performance Based Design, Seismic Vulnerability and Risk analysis. **Soil Dynamics:** Analytical and experimental studies on dynamic soil properties, Seismic analysis and design of foundations, Wave propagation and ground response analysis, Liquefaction studies using laboratory and field tests, numerical modeling. Nonlinear constitutive models of soils, Finite element dynamic analysis of embankment dams, Dynamic soil-structure interaction analysis, Pile and well foundations for dynamic loads, Machine foundations, Model studies using geotechnical centrifuge for static and dynamic loads, Dynamic earth pressure and retaining walls, Soil improvement techniques, Reinforced earth and geotextiles for seismic loads, Field exploration using SPT, Wave propagation, Block vibration, Cross bore hole and SASW tests. **Engineering Seismology and Seismotectonics:** Microearthquake investigations, Estimation of earthquake source parameters, Seismotectonic modeling, Attenuation characteristics, Strong motion seismology, Broadband seismology, Finite-difference method and study of local site effects, Numerical and empirical ground motion prediction, Estimation of response spectra and design spectra, Probabilistic and deterministic seismic hazard assessment, Vulnerability and Risk Assessment, Seismic microzonation, Remote sensing/GIS/SAR based studies, Pattern Recognition, Earthquake Early Warning Systems.	(i) B.Tech. / M.Tech. or equivalent degree in Civil Engineering/ Earthquake Engineering. (ii) M.Sc. / M.Tech. in Geophysics/ Physics / Mathematics / Geology for research areas in Engineering Seismology and Seismotectonics.
RREE01	Electrical Engineering	Power electronics, Electrical drives and their control, Electrical machines analysis and computer-aided design, Power Quality, Embedded Systems, Condition Monitoring of Rotating Electrical Machines, Power Systems Stability, State Estimation, Security, Reliability, Optimization, Expert Systems, Application of neural networks and Artificial Intelligence Techniques, Distribution System Automation, Relaying, Distribution system reforms and bench marking HV engineering, Automatic Generation Control, Restructured Power Systems, Measurement techniques, Smart and intelligent transducer, process instrumentation & control, Power system instrumentation, Applications of digital signal processing, AI & ANN Techniques in Instrumentation, Biomedical Instrumentation, Analysis and modeling of bioelectrical signals and systems, Medical Signals & Image Processing, Operations research, Reliability engg., Optimal scheduling, System modeling, Simulation and analysis, Model reduction techniques, Micro processor and microcomputer based systems for measurement, Monitoring, operation and control, Robotics, Control and optimization.	(i) B.Tech. / M.Tech. or equivalent degree in Electrical Engineering.. (ii) B.Tech. / M.Tech. or equivalent degree in a branch of Engineering consistent with the research areas as mentioned by the Department from time to time. (iii) M.Sc. in a discipline consistent with the research areas as mentioned by the Department from time to time.
RREC01	Electronics and Communication Engineering	Communication Systems	(i) ME. / M.Tech. in Microelectronics / VLSI / Microwaves / Communication Systems / Control Systems / Instrumentation / Circuits & Systems or equivalent (ii) B.E. / B.Tech. in Electronics & Communication / Electrical Engg. Or equivalent. (iii) M.Sc. in Physics / Instrumentation / Electronics. (iv) B.Tech + M.Tech in Computer Science.
RREC02		RF & Microwave Engineering	
RREC03		Microelectronics and VLSI	

RRCS01	Computer Science and Engineering	Computer Science and Engineering	(i) M.E. / M.Tech. in Information Technology/ Computer Science & Engg. / Software Engg. or equivalent. (ii) M.Tech. / ME in Electrical Engineering/ Electronics and Communications Engineering or equivalent. (iii) B.E. / B.Tech. in Computer Sc. & Engg. / Information Technology or equivalent.
RRDM01	Centre of Excellence in Disaster Mitigation & Management	• Natural/Manmade Hazards and Impact Assessment • Hazard Monitoring, Prediction & Microzonation • Data Processing Techniques & Models	M.Tech. (Civil, Mechanical & Industrial, Chemical, Computer Science), M.Arch. & M.Planning or equivalent. OR M.Tech. in Geological Technology, Geophysical Technology, Biotechnology or equivalent. OR M.B.A. or M.C.A. in Computer Science or M.Sc. in Physics, Geophysics, Geology, Mathematics, Environmental Sciences (with Maths in B.Sc.), M.Tech. Bio-technology or equivalent.
RRHS01	Humanities and Social Sciences	English, Economics, Psychology and Sociology	(i) M.A. or equivalent degree. (ii) Master's degree in Science/Graduate Degree in Engineering / Technology with 60% marks (or equivalent grade) may be considered for research areas consistent with the academic background and special interests.
RRHY01	Hydrology	Analysis of hydrological extremes, Stochastic hydrology, Reservoir operation, System analysis of water resources, Conjunctive use, Hydraulic and hydrologic routing, Hydrogeology Contaminant transport through open channels and porous media, Surface and ground water pollution assessment, Water quality modeling Remediation of aquatic systems, Water and Wastewater Treatment.	(i) Master's degree in Civil Engg. / Water Resources Development / Hydrology. (ii) Master's degree in Agricultural Engg. / Environmental Engg. / Instrumentation / water use management (iii) M.Sc. / M.Tech. in Geology / Geophysics / Soil Science / Forestry or natural Resources/ Chemistry / Meteorology / Atmospheric Physics / Mathematics / Nuclear Physics & Environmental Sciences (iv) M.Sc. Hydrology with Mathematics at Bachelor's level
RRHR01	Hydro and Renewable Energy	Small Hydro Energy and other Renewable Energy Development.	(i) B.Tech. / M.Tech. or equivalent in Civil / Electrical / Mechanical / Industrial / Chemical / Electronics / Computer / Agricultural / Environmental / Biotechnology/ Instrumentation Engineering or Equivalent and related disciplines. (ii) M.Sc. in disciplines consistent with research areas of the department.
RRHR02		Environmental management of Rivers and Lakes	
RRIC01	Institute Instrumentation Centre	Centre houses modern facilities for advanced materials processing and characterization. The facilities include well-established Nanoscience Lab., which consists of state of the art nanomaterials synthesis facilities (Physical vapour deposition (PVD) Technique for Nano-materials synthesis.).	M.Sc. / M.Tech. in Physics, Applied Physics, Material Science, Chemistry, Electronics & Nanotechnology.
RRMG01	Management Studies	International Marketing, Service Marketing, Marketing Management, Strategic Management, Health Care Management, Managing Non Profit Organizations, Supply Chain Management, Human Resources Management, Organizational Behavior, Knowledge Management, Financial Accounting and Management, Quality Management, Fuzzy Mathematics, Nonlinear Dynamics and Chaos, Mathematics Finance, Statistical Field Theory, Quantum Information Theory and Quantum Computing, Optimization, General Management including Indian Philosophy Vedic Values, Rural Management & Marketing, Education Business Management, Management Teaching Management, Family Owned Businesses, Bottom of the Pyramid Markets & Business Opportunity Development.	(i) B.E. / B.Tech. or equivalent, M.E. / M.Tech. or equivalent qualifications. (ii) M.Sc. / M.A. / M.Com. (iii) Master's in Management/M.B.A. or equivalent.
RRMA01	Mathematics	Elasticity and Vibration, Fracture Mechanics, Fluid Mechanics, Computational Fluid Dynamics, Bio-Mathematics, Numerical Analysis, Operations Research, reliability Theory, Control Computer Applications, Image Processing, Computer Graphics, Summability Theory, Approximation Theory, Statistics, Computerized Tomography, Abstract Algebra, Applied Algebra, Cryptography, Complex Analysis, Mathematical Modeling, Robotics & Control, Symbolic	(i) M.A. / M.Sc. / M.Tech. / Int. M.Sc. (5 years) in Mathematics / Applied Mathematics / Industrial Mathematics / Statistics / Operations Research / Applied Operations Research / Mathematics and Computing or equivalent. (ii) M. Stat. / M. Math.

		Computation, Theory of Differential Equations, Special Functions.	(iii) B.Tech. in Maths and Computing / B.S. Maths (4 years) from IITs / IISc.
RRME01	Mechanical and Industrial Engineering	**Machine Design Engineering: Machine Design:** Computational Mechanics, Computer Aided Design, Experimental Stress Analysis, Fracture Mechanics, Noise Control and Vibrations, Robotics and Control, Solid Mechanics, Tribology, Rotor Bearing Dynamics, Vehicle Dynamics. Machine Diagnostics, Machine Dynamics, Instrumentation & Control, Machanics of Composites, Bio-Mechanics, MEMS/NEMS, Composite and Smart Structures.	(i) B.Tech. / M.Tech. degree or equivalent degree in Mechanical / Industrial / Production Engg. (ii) B.Tech. / M.Tech. degree in Aerospace / Chemical / Civil / Electrical / Metallurgical Engg. may be considered for research areas consistent with the academic background and special interests.
RRME02		**Production and Industrial Engineering Systems:** Computer Aided Process Planning, Computer Aided Manufacturing, Manufacturing Systems, Metal Casting, Machine Tools and Metal Cutting, Product Design & Development, Unconventional Machining Processes, Advanced Manufacturing, Supply Chain Management, Quality and Reliability Engineering, Processing of Composites, Surface Engineering, ARC Stability Analysis, Design of Weld Joints, Welding Metallurgy, Fracture Mechanics of Weld Joints, Weld Surfacing, Thermal Spraying.	
RRME03		**Thermal Engineering**: Experimental Fluid Mechanics, Micro & Nano Fluidics, Bio Fluidics, Fuel Cell, Combustion and IC Engines, Computational Fluid Dynamics, Energy Systems, Heat Transfer, Thermal Contact Couductance, Refrigeration and Air-Conditioning, Solar Energy, Turbo-Machines, Design of Thermal System, Two-Phase Flow and Heat Transfer Fire Dynamics Erosion Wear.	
RRMT01	Metallurgical and Materials Engineering	Development of Ferrous and Non ferrous Materials, Solidification and P/M Processing of Materials, Mechanical Processing of Materials, Direct reduction process, Aqueous and hot Corrosion, Nano materials and Composites. Tribology of materials, Advanced Welding Technologies and joining of dissimilar materials, Adhesive joining, Fatigue and fracture of materials, Electro Ceramics and Structural Ceramics, Energy Storage Materials, Surface modification and Coatings, Structure property correlation, Polymer technologies etc.	Candidates with Bachelors or Master's Degree (B.E. / B.Tech. / M.E. / M.Tech. / equivalent) in Metallurgical Engineering, Metallurgical and Materials Engineering, Materials Science and Engineering, Ceramis Engineering, Polymer Engineering.
RRMF01	Mehta Family School for Data Science and Artificial Intelligence	Machine Learning and Deep Learning, Data Mining and Big Data, Analytics, Text, Image and Video Analytics, Natural Language, Processing, Soft Computing, Application of Mathematical Methods, Application of Statistical Methods, Decision Support Systems, Robotics, IoT and Sensors, Any other research areas relevant to AI and DS	(i) M.Tech. / M.E. or equivalent OR (ii) Bachelor's Degree in Science / Mathematics / Statistics / Operations Research / Actuarial Science followed by Master's Degree in any specialization. OR (iii) MIM / Masters in Management / M.B.A. / M.Arch. or equivalent with Mathematics / Statistics at graduation level.
RRNT01	Centre of Nanotechnology	Synthesis of Nanowires/Nanocolloids/Quantum Dots, Nanocomposites & their coatings, Nanobiotechnology, Nanosurface Engineering, Modelling & Simulation, Thin Films & Nanostructures, Photochemistry & Photophysics of Nanomaterials	(i) B.E. / B.Tech. or M.E. / M.Tech. in Nanotechnology / Metallurgy / Chemical / Polymer / Mechanical / Biotechnology / Engineering Physics / Engineering Chemistry / Electronics / Electrical/ Computer Science and Engineering / Civil / Energy / Environmental / Agriculture or equivalent. (ii) M.Sc. / Int. M.Sc. / M.S. in Science / Engineering, B. Pharm / M. Pharm. (iii) MBBS/MD/BDS/MDS or equivalent.
RRPH01	Physics	Atmospheric Physics, Atomic and Molecular, Physics, Fibre Optics and Photonics, Laser Physics, Condensed Matter Physics, Nuclear Physics, Thin Film Devices ,High Energy and Particle Physics.	(i) M.Sc. in Physics / Applied Physics or equivalent. (ii) M.Sc. in Chemistry / Mathematics / Biophysics / Geophysics / Computer Science / Electronics or equivalent, provided Physics was a subject at B.Sc. level. (iii) B.Tech. in Electrical / Electronics / Chemical / Metallurgical / Nanotechnology / Engineering Physics or equivalent. (iv) M.Tech. (Solid State Electronics Material), M.Tech. (Photonics), M.Tech. (Nanotechnology), M.Tech (Applied Optics), M.Tech. (Optoelectronics and Optical Communication) or equivalent. (v) Integrated M.Sc. in Photonics or equivalent.

RRPP01	Paper Technology (Saharanpur Campus)	Pulp Processing, Non-wood fiber pulping, Secondary fiber pulping, Recycling, Paper Making, Paper Properties, Printing, Energy Management, Chemical Recovery, Environmental Science & Engineering, Industrial Chemistry, Pollution free bleaching, Modelling of Process Systems, Wood Chemistry, Electronics, Instrumentation and communication, Biotechnology, Nanotechnology	(i) M.Sc. /M.S. (Science/Engineering). (ii) BE / B.Tech / B.Pharm / M.E. / M.Tech. / M.Pharm. in any branch of engineering or equivalent.
RRPP02	Polymer and Process Engineering (Saharanpur Campus)	Polymer Engineering, Biopolymers, Nanopolymer, Functional Polymers, processing Engineering, Tissue Engineering, Financial Management, Modelling & Simulation Performance Coatings, Process Optimization organic Metallic and Hybrid Polymer.	(i) B.E./M.E./B.Tech/B.Pharm./M.Tech./M.Pharm. in Polymer Science and Engineering / Technology; Chemical Engineering / Technology; Oil / Petroleum / Paint / Ceramics / Leather / Paper/ Packaging Technology; Material Science / Engineering / Technology; Plastics / Rubber / Jute / Textile / Membrane / Engineering / Technology; Mechanical Engineering; Electronics / Instrumentation; Environmental Engineering; Biotechnology; Pharmaceutical Science / Engineering; Biomedical Engineering / Technology; Nanobiotechnology; Nanotechnology (ii) M.Sc. in Chemistry; Polymer / Applied / Industrial Chemistry; Materials Science.
RRPP03	Applied Science and Engineering (Saharanpur Campus)	Degradation of materials, Microbial Corrosion, Coating, Nanomaterials, Nanoscience, Energy Storage devices, Li-battery, Super Capacitor and Fuel Cell, Fuel Cells, Theoretical Physics, Superconductivity, Nanomagnets, Materials Chemistry, Applied Mathematics, Industrial Mathematics, Optimization, Cloud Computing, English, Humanities.	(i) M.Sc. / M.S. / M.A. (Science / Engineering / Humanities. (ii) B.E. / B.Tech./ M.E./ M.Tech. in any branch of engineering or equivalent.
RRTS01	Centre for Transportation Systems (CTRANS)	Urban Transportation Policy and Research, Environmental Analysis of Transportation Systems, GPS and GIS Applications in Transportation Systems, Optimization of Public Transport Operations, Economic Appraisal of Transport Systems, Multiplier Effect, Project Management, and Inter modal Transportation	M.Tech. / M.Arch. / M.Planning / M.Des. / MBA or equivalent degree in Civil Engg. / Mechanical Engg / Industrial Engg. / Production Engg. / Computer Science &Engg. / Chemical Engg. / Infrastructure Systems/ Biotechnology / Architecture / Planning / Urban Engg. / Business Administration /Automobile Engg. / Mechatronics Engg.
RRWR01	Water Resources Development & Management	Water Resources Planning, Design, Development and Management (Hydropower, Water Supply, Flood, Control, Irrigation), Surface and Ground Water Hydrology, Environmental Impact Assessment, Water Quality Modeling, Hydraulic and Hydrologic Design Modeling, River Engineering, System Analysis, Interbasin Transfer, Basin Planning and Development, Irrigation Water Management, Agricultural Crop Planning, Natural Resources Management using Remote Sensing and GIS.	(i) B.E. / B. Tech. / M.E. / M.Tech. in Civil, Environment/Electrical, Mechanical /Agricultural / Computer Engineering or equivalent degree. (ii) M.Sc. Degree in Agricultural / Computer Science / Environmental / Natural / Environmental Planning or equivalent consistent with research areas of the Department along with Mathematics at bachelor's level

10. Indian Institute of Technology, Banaras Hindu University, Varanasi 221 005 – VN

Minimum eligibility for Ph.D. Programme in Met. Engineering. Is Master's degree in Metallurgical or an equivalent branch of Engineering with 55% marks (or equivalent grade point average) or in Chemistry, or Physics with 60% marks for Ph.D. in Mining Engineering with 55% marks (or equivalent grade point average) or M.Sc. in Geology with 60% marks.

a) Ph.D. in Engineering

Applicants with master's degree in engineering in the discipline concerned or in an allied discipline/area must have a minimum of 60% marks or 6.0 CPI (on a 10.0 point scale) at the master's degree level.

b) Ph.D. in Pharmacy

Applicants with master's degree in Pharmacy in the discipline concerned or in an allied discipline/area must have a minimum of 60% marks or 6.0 CPI (on a 10.0 point scale) at the master's degree level.

c) Ph.D in Interdisciplinary Programmes

i)Ph.D. in Systems Engineering Applicants with a bachelor's and master's degree in any branch of Engineering must have a minimum of 60% marks or 6.0 CPI (on a 10.0 point scale) at the master's degree level.

ii) Ph.D. in Industrial Management.

Applicants with bachelor's degree in any branch of engineering and master's degree in any branch of engineering/ management must have a minimum of 60% or 6.0 CPI (on a 10.0 point scale) at the master's degree level.

iii) Ph.D. in Bio-chemical Engineering/Bio-medical Engineering/Materials Science and Technology

Applicants with master's degree in the discipline concerned or in an allied discipline must have a minimum of 60% or 6.0 CPI (on a 10.0 point scale) at the master's degree level.

Code	Department	Fields of Specialization	Minimum Qualification
VNMT01	Metallurgical Engineering	Microstructural,StructuralandChemicalCharacterization,DeformationandFracture,PhaseStability,Phase Transformations,Rapid Solidification ProcessingIncludingMetallicGlasses, Ultra-Fine Grained and Nano structuredMaterial,MetallurgicalThermodynamicsandKineti	MasterDegreeinMetallurgicalEngineering/MaterialsEngineering/MaterialsScienceandMetallurgy. Bachelor's / Master's degree in Mechanical /Chemical

		cs,CorrosionandEnvironmentalStability,MetalCastingTechnology,Tribology andSurfaceEngineering,Non-FerrousExtractiveMetallurgy,FerrousExtractiveMetallurgy,ProcessSimulationStudies,AgglomerationofOreFines, Metallurgical and E-WasteUtilization,DesignandDevelopmentofAdvancedSteels, Alloy Technology,MetalsandMaterialsProcessing,Advanced StructuralandFunctionalMaterials. Composite materials.	/ProductionEngg./ManufacturingEngg./Mineral Engg./Ceramic Engg.Master's degree inMaterials Science/ Engg./TechnologyMaster's degree in Physical Sciences (Solid StatePhysics)/Chemical Sciences (Inorganic/ PhysicalChemistry/IndustrialChemistry)/ BiologicalSciences/Geology with Mathematics as a subjectat Bachelor's level..
VNM101	Mining Engineering	Rock Mechanics Ground Control, Mine Environment, Mine Planning & Design, Mining Machinery, Numerical Modeling of Mining Structures.	Master Degree inMiningEngineering.
VNCH01	Chemical Engineering	Energy, Environment, TransferProcesses.	MasterDegreeinChemicalEngineering,Chemistry,Bio Chemistry,EnvironmentalSciences,BioTechnology AndIndustrial Chemistry.
VNCE01	Civil Engineering	StructuraEngineering, EnvironmentalEngineering, GeotechnicalEngineering, Hydraulics&WaterResourceEngineering, TransportationEngineering, Geoinformatics Engineering, Engineering Geology.	Master Degree in Civil Engineering, AppliedMechanics, ChemicalEngineeringandTechnology, Environmental Engg., AerospaceEngineering, EarthquakeEngineering, NavalArchitecture,MechanicalEngineering,ComputerScienceandEngineering Or M.Sc. in EnvironmentalScience,GeophysicsandGeology,Geoinformatics,Geomatics, RemoteSensingand GIS.
VNEE01	Electrical Engineering	Electrical Machines and Drives, Power Systems, Control Systems and Power Electronics	Master Degree in Electrical Engineering
VNEE02		Systems Engineering (Inter disciplinary).	MasterDegreeinElectrical/ Electronics / Computer Engineering
VNME01	Mechanical Engineering	Machine Design, Thermal & Fluids, Production Engineering	MasterDegreein Mechanical Engineering
VNME02		Industrial Management	Master Degree in any branch of Engineering
VNEC01	Electronics Engineering	Microwave Engineering, Digital Techniques & Instrumentation, Microelectronics & Communication Systems Engineering	Master Degree in Electronics or Electrical Engineering
VNCS01	Computer Science Engineering	ArtificialIntelligence,Machine/DeepLearning,Computer Vision, Data Science, Image, Video andText Analysis, Computer Networks, Wireless SensorNetworks,PrivacyandSecurity,SoftwareEngineering, High-Performance Computing, DataMining, Social Network Analysis, InformationRetrieval	Master Degree in Computer Science and Engineering. Allied Disciplines: Master Degree in Electrical Engineering, Electronics Engineering, Computer Science related fields, Mathematics and Computing.
VNMA01	Mathematical Sciences	Bio-mechanics, Digital Image Processing, Elasticity, Fluid Dynamics, Free boundary problems, Functional Analysis, Fuzzy Mathematics, Mathematical Modelling, Operations, Research Pseudo differential operators, Theory of Rings and Modules, Wavelets and distributions.	Master Degree in Mathematics
VNBM01	Biomedical Engineering	Artifcial Intelligence, Bio Instrumentation, Biomaterials, Biomedical Signal and Image Processing, Biomechanics, Composities, Mathematical Modelling of Biological Systems, Neuro Physiology, Stress and Patho-Physiology, Tissue Engineering and Biomicrofludics, Molecular Biology and Nanotechnology.	Master Degree in Bio Engineering/Electrical Engineering / Electronics Engineering / Instrumentation Engineering / Mechanical Engineering / Computer Engineering / MaterialScience and Technology / Chemical Engineering/Biotechnology or M.Sc. In Physics / Chemistry / Polymer
VNBC01	Biomedical Engineering	To be annouced at the time of interview	Master Degree in Bio chemistry / Bio-technology / Biochemical Engineering / Pharmacy / Microbiology / Environmental Science or in Chemistry with specialization in Biochemistry or Physical Chemistry.
VNMS01	Material Science & Technology	Material Science & Technology related current areas	Master's Degree in Chemical Science, Materials Sciences, Ceramic / Chemical Engineering / Electrical/ Civil/ Electrical / Civil/ Electronics/ Polymer / Plastic Technology / Materials Technology/ Nanotechnology / Metallurgical Engineering/ Dentistry/ Othropedics / ENT/ Rasshastsra
VNPH01	Physics	Solar Physics, Space &Planetary Physics, Astrophysics, Condensed Matter Physics (Theory &Experiment), Biophysics, Fiber optics, Photonics,RemoteSensing, Materials Science,Quantum information, Renewable Energy.	M.Sc./M.Tech. in Applied Physics, Engineering Physics,Bio-Physics,ElectronicsEngg.,MaterialsScience,CeramicEngg.,Metallurgical Engg., Electrical Engg.,Bio-Informatics,GeomaticsandGeoinformatics,ComputerScience,ComputerEngg.,MechanicalEngg.,Mathematics, Chemistry,Remote

			Sensing, Astrophysics, Space Physics, Applied Optics, Atmospheric Physics, Fibre Optics & Photonics.
VNVY01	Chemistry	Synthetic Chemistry, Environmental Chemistry, Surface Chemistry, Computational Chemistry.	M.Sc/M.Tech.in Chemistry/ Industrial Chemistry/ Applied Chemistry/ Biochemistry/Biotechnology/ Medicinal Chemistry/MaterialsScience & Technology/Environmental Scienceand Nano Technology with chemistry as asubject at Bachelor Level.
VNCM01	Ceramic Engineering	Bio-Ceramics, Ceramic/Metal/Polymermatrixcomposites, ElectroCeramics, GlassandGlassCeramics,Refractories, AdvancedCeramics,NanoTechnology, Cement & Concrete Technology, Energy	Bachelors / Master's degree in any branch of Engineering Master's degree in Chemistry / Applied Chemistry / Physics / Applied Physics/ Geology or Geophysics (with Mathematics as a subject at Bachelor's Degree level). Master's degree in Modern Medicine/Indian Medicine (for the areas related to Bioceramics) B. Tech/ M Tech in Ceramic Engineering with some background of Ceramics.

11.Alagappa Chettiar Government College of Engineering and Technology Karaikudi, Tamilnadu - 630 003 – AC

Code	Department	Fields of Specialization	Minimum Qualification
ACCE01	Civil Engineering	Structural Engineering, Transportation Engineering,Environmental Engineering, Biological Treatment of waste water, Air Poluttion monitoring and control Physical-Chemical Treatment of waste water	M Tech / ME in Civil Engineering
ACEE01	Electrical and Electronics Engineering	Power Electronics & Drives, Power Systems, Renewable Energy, Fractional Order Systems, Communication, Image Processing, Computer Networks, Optimization Techniques.	M.E/ M Tech in Electrical & Electronics Engineering, Electronics & Instrumentation
ACEE02		Optical Communication, Non linear optics, Visible light communication.	M Tech/ME in Electronics &Communication Engineering.
MCEE02	Mechanical Engineering	Material Science, Composites, Robotics, Advanced Machining, CAD, Surface Engineering, Machining Optimization, Solar Power Engineering Green Engineering, Corrosoion Engineering, Laser-welding	M. Tech in Mechanical / Automobile / Industrial & Production Engineeing.

12. Government College of Engineering, Amravati (Maharashtra) - 444 604 – AM

Code	Department	Fields of Specialization	Minimum Qualification
AMEE01	Electrical Engineering	Power System Operation and Control, Power System Protectionand Stability, Deregulation, Electrical Network, CongestionManagement, FACTs and Power re-routing, Application ofOptimization and AI Techniques to Power System,PowerElectronics, Distributed Generation.	M.E./M.Tech or equivalent degreein relevant branch **And** As per the affiliating University norms.i.eSantGadgeBabaAmravati University.
AMME01	Mechanical Engineering	Thermal Engineering, Production Engineering.	M.E./ M.Tech or equivalent degreein relevant branch **And**Aspertheaffiliating Universitynorms.i.eSantGadgeBabaAmravati University.
AMCE01	Civil Engineering	**Geotechnical Engineering:** Foundations, Earth and Earth Retaining Structures, Ground Improvement Techniques,GeoenvironmentEngineering,EarthquakeGeotechnical Engineering.	M.E./ M.Tech. or equivalent degreein relevant branch **And**Aspertheaffiliating Universitynormsi.eSantGadgeBabaAmravati University.
		Water resources and Environment Engineering: Open ChannelFlows, UrbanWaterDistributionSystems, Environmental Hydraulics, Water Quality Modeling, Hydraulics, Water Quality Modeling, and Hydraulic Structures.	
		Structure Engineering: Structure Mechanics, FEM Techniques,RC and Prestressed concrete, Masonry Structures, StructureDynamics, Non-Linear and Stochastic Dynamical Systems,Earthquake Engineering, Structural safety, Fracture Mechanics ofConcrete, Materials in Civil Engineering, Structural HealthMonitoring.	

13. Anna University, Chennai 600025- AU

A minimum of 55% of marks/CGPA of 5.5 on a 10 point scale in Master's degree in Engineering/Technology. In case of SC/ST candidates, 50% marks or CGPA of 5.0 on a 10 point scale in the respective Master's degree. Candidates will be selected based on written test.

Code	Department	Fields of Specialization
Alagappa College of Technology Campus (A. C. Tech. Campus), Anna University, Guindy, Chennai- 25		
AUCH01	Chemical Engineering	Petroleum Refining and Petrochemicals, Ceramic Technology, Chemical Engineering, Polymer Science and Engineering.
AULT01	Leather Technology	Leather technology, Footwear Science & Engineering.
AUTX01	Textile Technology	Textile Technology, Apparel Technology.
AUBT01	Bio-Technology	Biotechnology, Computational Biology, NanoScience and Technology, Food Technology, Bio-Pharmaceutical Technology.
College of Engineering, Guindy, Chennai- 25		
AUCE01	Civil Engineering	Environmental Engineering, Structural Engineering, Hydrology and Water Resources Engineering, Construction Engineering and Management, Irrigation Water Management, Urban Engineering, Remote Sensing, Soil Mechanics and Foundation Engineering, Integrated Water Resources Management, Transportation Engineering, Environmental Management, Environmental Science, Remote Sensing and Geomatics.
AUEE01	Electrical Engineering	Power Systems Engineering, Control and Instrumentation, Power Electronics and Drives, High Voltage Engineering, Electronics Engineering, Instrumentation Engineering, Power Engineering and Management, Embedded System Technologies.
AUIC01	Information & Communication Engineering	Optical Communication, Medical Electronics, Applied Electronics, Communication Systems, Laser and Electro Optical Engineering, Computer Science & Engineering, Software Engineering, Bio Medical Engineering,SystemEngineeringandOperationResearch,ComputerScience Engineering(Specialization in Big Data and Analytics), Multimedia Technology, Information Technology, Master of Computer Application.
AUME01	Mechanical Engineering	Internal Combustion Engineering, Refrigeration and Air-conditioning, Energy Engineering, Engineering Design, CAD/CAM, Product Design and Development, Mechatronics, Automobile Engineering, CAD, Solar Energy, Manufacturing Systems Management, Printing and Packing Technology, Computer Integrated Manufacturing, Industrial Engineering, Quality Engineering and Management.
School of Architecture and Planning, Guindy, Chennai - 25		
AUAR01	Architecture and Planning	Architecture, Digital, Landscape, Plan.

Code	Department	Fields of Specialization
Madras Institute of Technology Campus, Chennai - 44		
AUAE01	Aerospace Engineering	Aircraft Structures, Aerodynamics, Propulsion.
AUAU01	Automobile Engineering	Alternate fuels, IC combustion, Simulation of Engine, Vehicle Dynamics, Automotive Chassis.
AUEC01	Electronics Engineering	Networking, Communication, VLSI, Embedded, Electronics, Avionics, Signal and Image Processing.
AUIN01	Instrumentation Engineering	Process Modeling and Control, Fault diagnosis, VLSI, Biomedical Instrumentation, Transducers and Measurement.
AUPT01	Production Technology	Manufacturing Processes, Metrology, Mechatronics, Metallurgy Manufacturing Management, Robotics, Automation, Production.

14. Basaveshwar Engineering College, Bagalkot 587 103 – BA

Code	Department	Fields of Specialization	Minimum Qualification
BACE01	Civil Engineering	StructuralEngineering,GeotechnicalEngineering,Environmental Engineering, Hydraulics and Water ResourcesEngineering	M.E./ M.Tech. in Civil Engineering.
BAME01	Mechanical Engineering	Material Science & Metallurgy, Deign and Dynamics, ThermalEngineering & Tribology.	M.Tech in Mechanical/ Automobile/ Industrial & Production Engineering.
BAEE01	Electrical Engineering	Power Systems, Renewable Energy Systems, Smart Grid/Micro Grids,Energy Conservation, Energy Audit, DemandSide Management, Power Electronics & Drives, SignalProcessing.	M.E/M.Tech in Electrical & Electronics Engg.Electronics &CommunicationEngineering Electronics and Instru-mentation.
BAEC01	Electronics & Communication Engineering	Speech Processing, MEMS,Computer Communication & Networking, VLSI and Signal Processing.	M.E./ M.Tech inE&E/ E&C/Telecommunications/ Instrumentation& Technology.
BACS01	Computer Science & Engineering	Image Processing, Wireless Networks Pattern recognition.	M.Tech/ M.E CSE, CN, CE, & ECE.

15. Indian Institute of Engineering Science and Technology, Shibpur- (*Formerly Bengal Engineering and Science University, Shibpur*) - BE

Code	Department	Fields of Specialization	Minimum Qualification
BECE01	Civil Engineering	Structural Engineering & Concrete Technology, EarthquakeEngineering, Applied Mechanics,Geotechnical Engineering Water resource Engineering, Environment	Post Graduate Degree in the relevantfield in Engineering or equivalent.

		Engineering,Highway and Traffic Engineering etc.	
BEEE01	Electrical Engineering	"Power and Energy Systems","ControlSystems and Instrumentation", "Power Electronics, Machines and Drives"	Post Graduate Degree in the relevantfield in Engineering or equivalent.
BEME01	Mechanical Engineering	ThermalEngineering, MachineDesign, Manufacturing Science.	Post Graduate Degree in the relevantfield in Engineering or equivalent.
BEMI01	Mining Engineering	GSI/GPS/Remote Sensing, Occupational Health & Safety, Coalbed methane & Carbon sequestration, MineEnvironment,Mineral Dressing.	Post Graduate Degree in the relevantfield in Engineering or equivalent.
BEAE01	Aerospace Engineering &Applied Mechanics	Bio-Mechanics, Soil Structure, Robotics, Fluid Mechanics/Hydraulics, Computational Mechanic, Earthquake Engineering,Structural Dynamics, Aero Dynamics , Aero-structure.	Post Graduate Degree in the relevantfield in Engineering or equivalent.
BEIT01	Information Technology	Systems Architecture Design and Test, Cellular Automata Theory and Applications, Signal Processing, Digital Geometry,MobileCommunication,SensorNetworks, Cyber Security,Machine Learning in Cognitive Radio Networks	Post Graduate Degree in the relevantfield in Engineering or equivalent.
BEMT01	Metallurgy and Materials Engineering	Nano Materials, High Strength Steel, Phase Transformation,Joining of Materials, Neural Network, Tribology, AdditiveManufacturing, High Entropy alloys, Non-ferrous technology,Microstructure modelling	Post Graduate Degree in the relevantfield in Engineering or equivalent.

16. **BMS College of Engineering, Bangaluru 560 019 – BS**

Code	Department	Fields of Specialization	Minimum Qualification
BSCE01	Civil Engineering	Structural masonry, New generation concrete, Alternativebuilding materials and technology, Remote sensing and GIS,Water resource management, Pavement material and evaluation,Environmental Engineering, Fracture behavior of concrete, Soilstabilization, Ground improvement techniques	M. Tech.
BSEE01	Electrical Engineering	Power Electronics and Drives, Power Electronics & RenewableEnergy, Solar-Photovoltaic systems, Solar-Wind HybridSystems Power systems engineering, Power distribution, HVDCtransmission systems, Material research on semiconductordevices and photovoltaic cells, H.V Engineering & InsulationDiagnostics., Smart Sensors & Nanotechnology, Power qualityImprovement.	M. Tech.
BSME01	Mechanical Engineering	Structural dynamics, Tribology, Solid mechanics, Compositematerials,Structural health monitoring, Smart materials and structures,Optimization, Powder Metallurgy, Contact Mechanics, FrettingMechanics, Fatigue of Materials & FEM, Conventional /Unconventional Machining, Advanced Materials Heat Transfer, Heat Pipes, Fluid Mechanics, Maintenance Engineering, Robotics, Materials and Mathematical Modelling. Vibrationstability, Rotor dynamics, Squeeze film and flexible shaftdamping,Thermoacoustic refrigeration, Journal bearing,Vibrationtest facility,Hightemperatureofpinon disc,	M. Tech.
BSIE01	Industrial Engineering & Management	ERP and Ergonomics, Quality and reliability, Maintenanceengineering, Production process, Facility planning, ERP andErgonomics, Quality and reliability, Maintenance engineeringProductionprocess,Facilityplanning,ThermoacousticRefrigeration System, Supply Chain Management, MultipleCriteria Decision Making Process.	M. Tech.
BSEC01	Electronic & Communication Engineering	Nonlinear control strategies, Embedded system Design, signalprocessing, Power electronics, Image Processing, and patternclassification. Low power electronics, Wireless Communication, Wireless Sensor Networks, Synthesis and characterization of semiconductor alloys for various applications, Automotive Electronics. Avionics,Satellite Communication, SoftwareDefined Radios andNetworks, Optical Communication andNetworks,NetworkPlanningand Optimization,EmbeddedSystems and Design, VLSI Verification & Testing, NanoElectronics, MEMS, IoT, SoC, Network Security &Cryptography, Low Power VLSI Design, synthesis andOptimization of Digital Circuits, Device Modeling andProcessing Technology, Mixed-Signal Circuit Design, RFDesign, Microwave Systems, Hardware-Software Codesign,System Verilog and Verification.	M. Tech.

17. College of Technology & Engineering, Maharana Pratap University of Agriculture and Technology, Udaipur - 313 001, Rajasthan – CA

Code	Department	Fields of Specialization	Minimum Qualification
CAEE01	Electrical Engineering	Efficient power converters & drivesDeregulation ofPower system **& reliability ofPower equipments** Solar & Wind Power converters	M.E./M.Tech. (Electrical Engg).
CAFM01	Farm Machinery &Power Engineering	Farm Machinery & PowerErgonomicsTillage & Traction	M.E./M.Tech. (Ag. Engg.) in PFE
CAPF01	Processing & Food Engineering	Drying & Dehydration of Horticultural ProduceValue addition of Agricultural ProduceSpice Processing	M.E./M.Tech. (Ag. Engg.) in PFE
CASW01	Soil & Water Engineering	Soil Water Engineering & Watershed Management Irrigation Water Management Command Area Studies	M.E./M.Tech. (Ag. Engg.) in SWC / iWM; ME / M Tech. in water Resource Engg. / Irrigation Engg. Note. At least one degree i.e B Tech./ B.E or M Tech./ ME, must be in Ag. Engg. Discipline.
CARE01	Renewable Engergy Enigneering	Solar Energy Bio-Energy Solid Waste Management	ME / M Tech. (Ag. Engg.) in Renewable Engergy.

18. Coimbatore Institute of Technology, Coimbatore 641 014 – CC (Addendum)

Code	Department	Fields of Specialization	Minimum Qualification
CCCE01	Civil Engineering	Structural Engineering, Geotechnical Engineering, WaterResources Engineering, Environmental Engineering, RemoteSensing & GIS, Construction Management.	M.E./M.Tech. degree in relevantfields of Engineering
CCME01	Mechanical Engineering	Welding Technology, Advanced ManufacturingTechnology,Heat Power Engineering, Nano materials, Energy Engineering,Computational Fluid Dynamics.	
CCEE01	Electrical & Electronics Engineering	Power Systems, Power Electronics & Drives, Control Systems,Embedded Systems, Analog and Digital Electronics.	
CCCH01	Chemical Engineering	Chemical Engineering, Process Control, Nano Technology,Membrane Technology, Environmental Engineering, BioTechnology.	

19. National Institute of Technology Calicut, Calicut 673 601 – CL

M.Tech Degree in Engineering/Technology in the appropriate branch of study with first class or minimum 60% marks (CGPA 6.5/10) in aggregate of all semesters [For SC/ST candidates, the minimum mark is 55% (CGPA 6.0/10)].
Candidates shall be required to have passed the four-year regular full time B.E/B.Tech. Degree in an appropriate branch with minimum 60% marks (CGPA 6.5/10) in aggregate in the qualifying examination. [For SC/ST candidates 55% marks (CGPA 6.0/10)].
Candidates under lateral entry should have passed the three year diploma in engineering with minimum 60% marks [For SC/ST candidates 55% marks (CGPA 6.0/10)].

Code	Department	Fields of Specialization	Minimum Qualification
CLCE01	Civil Engineering	StructuralEngineering	Structural Engineering
		OffshoreStructures	Offshore Structures/ Structural Engineering/ Ocean Engineering/ CoastalEngineering
		Traffic & TransportationPlanning	TransportationEngineering/ Highway Engineering/ Traffic& TransportationPlanning/Urban Engineering
		GeotechnicalEngineering	GeotechnicalEngineering/ Environmental Geotechnology
		WaterResourcesEngineering	WaterResources Engineering/ Hydraulic Engineering/ Hydraulics and Water Resources Engineering/ Irrigation Engineering/ Coastal Engineering/ Environmental Geotechnology/ Environmental Engineering / Remote Sensing and GIS/ Geoinformatics
		EnvironmentalEngineering	EnvironmentalEngineering/ Environmental Geotechnology
		BuildingTechnology and Construction Management.	Building(Construction) Technology/ConstructionManagement/Structural Engineering/ Architecture
		Town Planning	Town PlanningUrbanDesign/Architecture
CLEE01	Electrical Engineering	InstrumentationandControlSystems.	Electrical Engineering/ Power Systems/ Energy Systems/ Energetic/ Industrial Power/ Industrial Power & Automation/ Power Electronics/ Power Electronics& Drives/ Control Systems/ Instrumentation and Control Systems/ Instrumentation Engineering/ Applied Electronics and Instrumentation/ Biomedical Engineering/ Computer Controlled Industrial Power/ Avionics
		Power and Energy Systems.	
		Power Electronics &Machines.	
		Industrial Power & Automation	
		BiomedicalInstrumentationandSignal Processing.	
		High Voltage Engineering.	

			Engineering/ Guidance and Navigation Control/ High Voltage Engineering/ Control and Automation.
CLEC01	Electronics and Communication Engineering	Electronics Design and Technology(Embedded System Design, EMI/ EMC, Control System Design, Biomedical System Design, System Design for Signal Processing and Communication)	Post Graduate Degree in relevant streams of Electrical & Electronics Engineering/ ElectronicsEngineering/ Electronics & Communication Engineering/ Computer Science Engineering
		Microelectronics and VLSI Design(Power Management in IC Design, Analog & Mixed-signal IC design, Semiconductor Device modeling, Micro fabrication Technology, Micro/Nano Electro Mechanical System MEMS/NEMS, VLSI architectures for Signal Processing and Communication)	
		Telecommunication (Wireless Communications and Networks, OFDM/MIMO and Massive MIMO, 5G Wireless Communications, Cryptography and Secure Communication,RF/Microwave)	
		Signal Processing (Speech/Audio/Image/Video Processing, Signal Theory, Compressed Sensing/Sparse Signal Processing, Multi-rate Signal Processing and Filter banks, Biomedical Signal Processing, Machine Learning, VLSI architectures for Signal Processing)	
		Industrial Engineering and Management. (Ergonomics and Product Design, Supply Chain Management, Marketing Management, Human Resource Management, Data Science Applications in Operations Management**)**	Post Graduate Degree in Mechanical Engineering in the relevant fields of specialization**.**
		MachineDesign. (Computational Mechanics, Robotics, Tribology, Machine Dynamics and Vibrations, Nano- and Micro-mechanics, Product Design)	
		Materials and Manufacturing. (Macro and Micro Machining, Modern Machining, Metrology, CAD/CAM, Composite Materials, Ferrous and Non-Ferrous Metallurgy, Materials for Electronics Application, Additive Manufacturing/3D printing, Digital Manufacturing and Design, Automation of Manufacturing Functions)	
		Thermal and Energy Engineering. (Renewal Energy Technologies, Energy Conservation, Fuel Cells and Hydrogen Technology, Computational Fluid Dynamics, Heat Pipes, Cryogenics, Jets and Flow Acoustics, Combustion and Fire Safety, Fluid-Structure Interactions, Multi-phase Flows, High Performance Computing, Lattice Boltzmann Modeling, High Speed Flows, Turbo-machinery, Internal Combustion Engines, Convection and Radiation Heat Transfer)	

20. College of Engineering, Pune 411 005 – CP*

Code	Department	Fields of Specialization	Minimum Qualification
CPCE01	Civil Engineering	Construction Management, Geotechnical Engineering, SoilLiquefaction, Pavement Engineering, Ground Improvement,Laboratory and Field, Practices in Foundation Engineering, Soil,Structure Interaction; Structural Engineering, Water ResourcesEngineering, Town and Country Planning, Transportation Engineering.	Master's degree in Civil ConstructionManagement, Geotechnical Engineering, Structural Engineering,Water Resources Engineering, Townand Country Planning.
CPME01	MechanicalEngineering	Thermal Sciences, Heat Transfer, Fluid Mechanics, IC Engines,Solar Energy, Automobile Technology, Refrigeration, airconditioning, energy management.Vibration and Acoustics,Tribology, Industrial Engineering, Micro Manufacturing,Vibrations & acoustics, Stress Analysis/ Fracture mechanics	Master degree inMechanical/Automobile/ Industrial/ ProductionEngineering & allied specializations.
CPPE01	Production Engineering	Non-Traditional Machining, Machining, Machine Tools andMetal Cutting, Micro Machining, Casting, Welding and FormingProcesses, Tool Design, Rapid Prototyping and Tooling,Modeling and Simulation of Manufacturing Processes,Manufacturing Automation and Control, Ergonomics, IntelligentManufacturing, Cellular Manufacturing,additive manufacturing,Dimensional Tolerance Technology, CAD/CAM, Finite ElementAnalysis, Features Based	MasterdegreeinProduction/Mechanical/ Auto mobile/ IndustrialEngineeringandalliedspecializations.

		Modeling, Computer Aided ProcessPlanning, Intelligent Product Design and Manufacturing CIMS,Product Lifecycle Management, Quality Engineering, Planning,Scheduling, Queuing, ManagementofOperations,AdvancedManufacturing, Materials Processing and Heat Treatment, MetalForming, Structural Ceramics Composite Materials, Metal MatrixComposites, Tribology of Advanced materials, SurfaceEngineering, Magnetic Materials, Electromagnetic Materials andProcessing, Ferroelectric Ceramics, Electronics Materials,System Reliability Assessment, Maintenance Management,Machine Diagnostic and Condition Monitoring, Reliability andDesign, Reliability Simulation, Machinery Fault Diagnosis,Terotechnology, Maintenance Engineering & Management, Riskand Safety Assessment, Software Reliability, Enterprise ResourcePlanning (ERP).	
CPEE01	Electrical Engineering	• Electrical Machines:- Permanent Magnet Machines, Linear Machines and Special Purpose Machines. • Power Electronics:- Topologies, Applications to Drives and Power System (FACTS/HVDC), Power Quality and Super Capacitors, renewable interconnection, Electric vehicles. • Control System:- Sliding Mode Control, Robust Control and Modeling of Large System. • Power System - Computation, Economics, Numerical Protection, WAMs, PMUS Technology, SMART Grid, Micro-Grid and Translents Demand side management, distribution.	Master's degree in Electrical Engineering
CPEC01	Electronic & Telecommunication Engineering	Image Processing and Pattern Recognition, Machine VisionSystems, Next Generation Networks, VLSI Architecture,Development for Signal Processing and CommunicationApplications, Information Security, Using Water Marking,Image Analysis for Medical/Document/ Agro Based Products/Microstructure/ Metallographic/ Satellite Images, Speech andAudio Processing, Synthesis and Coding.	Master'sdegreeinElectronics/Electronics&TelecommunicationEngineering.
CPCS01	Computer Engineering	Computer Networks, Information Security, Formal Methods andVerification, Bioinformatics, MachineLearning, DistributedComputing, Biometric Watermarking, Parallel Computing, DataMining,CloudComputing,ITenabledBusinessTransformations and Software Engineering.	Master'sdegree in Computer Engineering/ Information Technology/ Computer Science &Engineering/ any other Specializationof Computer Science & Engineeringor Information Technology.
CPIN01	Instrumentation and Control	Process Control, Biomedical Instrumentation, Control System Power Converters, Agricultural Instrumentation, Sensors/Transducers, Clinical Diagnosis/ Predictions.	Master's degree in Instrumentation/ Electrical/ Biomedical/Electronics/Computer/ Chemical Engg.
CPMT01	Metallurgy & Materials Science	Physical Metallurgy, Process Metallurgy, Casting, Welding,Metal Working, Corrosion and Surface Modification, HeatTreatment, Cryogenic Treatment, Power Metallurgy, Ceramics,Polymers, Composite Materials; MMC, Nano Composites,Polymer Based Composites, Iron and Steel Making. LaserMaterialsProcessing, LaserAssisted 3DPrinting, joining, deformation and machining' in the Metallurgy part.	Master's degree in Metallurgy, Materials Science, Mechanical Production Engineering.

*The College of Engineering Pune is affiliated to Pune University. As per the university rules, the candidate seeking admission to Ph.D course has to qualify in the entrance examination of Paper-1 and Paper-II of the University of Pune and then he/she will be eligible for selection through interview for Ph.D admission. However the candidate is exempted from qualifying entrance examination in Paper-I and Paper-II of Pune University if the candidate fulfills the following eligibility criteria as applicable. **(a)**Candidates having a GATE score **(b)**Candidates who are having minimum five years of approved teaching experience of an affiliated university.

21. College of Engineering Trivandrum, Engineering College P.O., Thiruvananthapuram 695 016 – CT

Code	Department	Fields of Specialization	Minimum Qualification
CTCE01	Civil Engineering	Geotechnical Engineering, Geo Environmental Engineering, Geosynthetics, Soil structure interaction, Soil dynamics and Ground Improvement. Structural Engineering, Composites,Steel Concrete Composites, Special Concrete, EngineeredCementacious Concrete,	M.Tech./ M.E. degree in relevant fieldof Engineering with a minimum CGPAof 6.5 for general candidates and 5.5for SC/ST. The institute is affiliated toDr APJ Abdul Kalam TechnologicalUniversity. Visit the university's

		Functionally Graded Materials, Seismic Studies and Metal structures, Hydraulics Engineering,Coastal Zone Management, Flood Management and WaterManagement, Climate and Flow, Modelling, ExperimentalHydraulics and Harbour Engineering, TransportationEngineering, Urban Transportation Planning, Traffic andPavement Engineering, Sustainable Transportation Environmental Engineering, Waste Management, LandfillLiners, Air and Water Quality, Environmental Microbiology,Environmental Biotechnology and EnvironmentalBiochemistry.	website (www.ktu.edu.in) for detailed information on qualification criteria.
CTME01	Mechanical Engineering	Fluid Mechanics, Microfluidics, Heat Transfer, Micro & nanoscale heat transfer, Multiphase flows, Thermodynamicsand Combustion, Computational Fluid Dynamics, SupersonicFlows, Thermal Engineering, Refrigeration and Air conditioning, Cryogenic engineering, Cryogenic heat transferand compact heat exchangers, Energy Management, AlternateEnergy Sources and Fuels, Machine Dynamics, ConditionMonitoring, Vibration, Fluid Structure Interaction, Smart/Intelligent Structures, Vibration, Fracture Mechanics,Machine Design, Tribology, Wear and Lubrication, FEM,System Modeling and Simulation, Molecular Dynamics,System Dynamics, Optimization Techniques, OperationsManagement, Supply Chain Management, Financial.	
CTEE01	Electrical Engineering	Power Systems, Electrical Machines, Control Systems, Guidance & Navigational Control, Power Electronics & Drives.E-mobility, Robotics & Automation, Smart Grid, Micro-grid,Renewable Energy Systems.	
CTEC01	Electronics & Communication Engineering	Radio Frequency Engineering, Signal Processing, Image Processing, Computer Vision, Optical Communication, Computer Communication, Wireless Communication, Sensornetworks, VLSI Circuits, Embedded Systems, MEMS,Instrumentation Engineering, Motor Drives, PatternRecognition, Machine learning, Deep Learning, IoT, NetworkSecurity.	

22. Delhi Technological University, Delhi – DD

Code	Department	Fields of Specialization	Minimum Qualification
DDCE01	Civil Engineering	Structural Engineering, Concrete Technology, CementitiousMaterials, Prestressed Concrete, Tall Structures and Rehabilitationof Structures, Geotechnical Engineering, Rock Mechanics, SoilMechanics, Geo Environment Engineering, Water ResourcesEngineering, Hyper Spectral, Microwave and LIDAR Remote Sensing, Pavement Engineering.	Masterdegreeinengineering/Technology/ Sciences in respectivediscipline or equivalent with minimum 60% marks in aggregate(of all the years/Semesters) orequivalent cumulative Grade pointAverage (CGPA) as determined bythe Delhi Technological University and at least 60% marks in aggregate(of all the years/Semester) orEquivalentCGPA atBachelor's degree level shall be eligible toapply for admission to a Ph.D.programmeoftheUniversityprovided he should not haveattainedanageof 50 yrs. Therelaxation in age limit may be doneby Academic Council on case to case basis. In exceptional casesapplicant with Bachelors degree inEngineering & Technology havingminimum 75% marks in aggregate(of all semesters) or EquivalentCGPA and having proven researchcapability may also be considered eligible.
DDME01	Mechanical Engineering	TurboMachinery,FluidMechanics,CFD,PowerPlantEngineering, I.C. Engines, Industrial Engineering & Supply ChainMgmt,SolarEnergy, BioFuels,PowerPlant,Robotics,CAD/ANN, GA & Welding Production Engineering, MachineDesign, System Dynamics, Structural Vibration, Modeling &Simulation, Turbo Machine Refrigeration and Airconditioning, Computational Fluid Dynamics, Production Engineering, SolarEnergy, CAM/Automation, Industrial Engineering & Refrigeration, Advanced Manufacturing Process, Human FactorEngineering, Automobile Engineering, Machine Design,	Masterdegreeinengineering/Technology/Sciences in respectivediscipline or equivalent with aminimum 60% marks in aggregate(of all the years/Semesters) orequivalent cumulative Grade pointAverage (CGPA) as determined bythe Delhi Technological Universityand at least 60% marks in aggregate(ofalltheyears/Semester)orequivalentCGPA atBachelor'sdegree level shall be eligible toapply for admission to a Ph.D.programmeoftheUniversityprovided he should not haveattainedanageof 50yrs.Therelaxation in age limit may be doneby

		Industrial Management Quality Engineering.	Academic Council on case tocasebasis.Inexceptional casesapplicant with Bachelors degree inEngineering & Technology havingminimum 75% marks in aggregate(of all semesters) or EquivalentCGPA and having proven researchcapability may also be consideredeligible.
DDEE01	Electrical Engineering	Power system Optimization, AI Techniques, Modeling & Analysisof Electrical Machines, Power Electronics & Drives Intelligentcontrol of non linear systems, FACTS, SSR, voltage stability,power Quality Improvement, Grid Integration, Micro Grid, smartGrid, BPL Analog Signal processing (Linear & Non Linear),Powersystem & control, system Engineering, Power systemAnalysis, Intelligent control Power electronics, renewable energy,HVDC, Power Quality, power system restructuring, AI inElectricity market forecasting, Wind Energy forecastingEmbedded System, Information security, design of power supply,Electric traction systems, Analog Signal Processing EnergyConversion and microgrid.	MasterdegreeinEngineering/Technology/ Sciences in respectivediscipline or equivalent with aminimum 60% marks in aggregate(of all the years/Semesters) orequivalent cumulative Grade pointAverage (CGPA) as determined bythe Delhi Technological Universityand at least 60% marks in aggregate(of all the years/Semester) orEquivalentCGPA atBachelor'sdegree level shall be eligible toapply foradmissiontoa Ph.D. programme of the University provided he should not haveattained an age of 50 yrs. Therelaxation in age limit may be doneby Academic Council on case to case basis. In exceptional casesapplicant with Bachelors degree inEngineering & Technology havingminimum 75% marks in aggregate (of all semesters) or EquivalentCGPA and having proven researchcapability may also be consideredeligible.
DDPS01	Polyment Science & Chemical Technology	Chemistry including synthetic organic chemistry, Bio inorganicchemistry, Bio organic chemistry, cheminformatics; MedicinalChemistry; including gene delivery applications, Bio Materials,Drug Deliverysystems; PolymerScienceincludingfiberTechnology,ConductingPolymers/composites/hydrogels:ChemicalEngineeringincludingReactionengineering,MulitphaseReactorsystemsanddesign,Pollutionabatementtechnologyandgene;Advancematerialsdevelopment,Separation Processes, Transport Phenomena, Pharmaceuticals Sciences, Food Science.	MasterdegreeinEngineering/Technology/ Sciences in respectivediscipline orequivalentwith aminimum 60% marks in aggregate(ofalltheyears/Semesters)orequivalentcumulative Grade pointAverage (CGPA) as determined bythe Delhi Technological University and at least 60% marks in aggregate(ofalltheyears/Semester)orEquivalentCGPAatBachelor'sdegree level shall be eligible toapply for admission to a Ph.D.programmeoftheUniversityprovided he should not haveattained an age of 50 yrs. Therelaxation in age limit may be done by Academic Council on case to case basis. In exceptional casesapplicant with Bachelors degree in Engineering & Technology havingminimum 75% marks in aggregate (of all semesters) or EquivalentCGPA and having proven researchcapability may also be consideredeligible.

23. Deenbandhu Chhotu Ram University of Science & Technlogy, Haryana-131039 –DM

Code	Department	Fields of Specialization	Minimum Qualification
DMXX01	DM	DM	As per Institute norms
DMXX02	DM	DM	
DMXX03	DM	DM	

24. Bannari Amman Institute of Technology, Erode, Tamil Nadu 638 401 - ER

Code	Department	Fields of Specialization	Minimum Qualification
ERBT01	Bio-Technology	Life Sciences:-Molecular Biology and Genetic Engineering, Plant Biotechnology, Animal Biotechnology, Molecular Diagnostics, Herbal Medicine, Pharmacology, Bio fertilizers, Microbial Fuel Cell, Pharmaceutical Microbiology. Technology and Engineering:- Biopharmaceutical Technology, Pharmaceutical Biotechnology, Bioprocess Engineering, Microbial Biotechnology, Tissue Engineering, Regenerative Medicine, Biomaterials, Chemical Reactor Design, Environmental Biotechnology, Nanobiotechnology.	As per the affiliating University norms. • M.Sc./ M.Phil/ M.E./ M.Tech. or equivalentDegree in Biotechnology or Environmental engineering or Biomedical Engineering or MPharm or allied disciplines in the relevant branch of Engineering and Technology. • A minimum of 55% of marks/CGPA of 5.5on a 10 point scale in Master's degree in Engineering/Technology. In case of SC/ST candidates, 50% marks or CGPA of 5.0 on a 10

			point scale in the respective Master'sdegree.
ERCS01	Computer Science & Engineering	**Intelligent Systems :-** Artificial Intelligence, Pattern Recognition, MachineLearning, Computer Algorithms & OptimizationTechniques, Soft Computing, Data Mining &Information Retrieval, Big Data Analysis, Bioinformatics, Social Network Analysis, CognitiveSystems, Deep Learning, Image Processing, ComputerVision and Graphics **Computer Systems and Software:-** Computer Communication, Wireless Sensor Networks, Internet ofThings, Mobile Computing, AdHoc Networks, Human-Computer Interactions, Cyber Physical Systems,Embedded System, Computer Security, Cloud and Distributed Computing.	As per the affiliating University norms.☐ M.E./M.Tech. or equivalent Degree inComputer Science and Engineering orElectrical Communication Engineering orElectrical Engineering or InformationTechnology or Information Sciences or allied disciplines in the relevant branch ofEngineering and Technology • A minimum of 55% of marks/CGPA of 5.5 on a 10 point scale in Master's degree In Engineering/Technology. In case of SC/ST candidates, 50% marks or CGPA of 5.0 on a 10 point scale in the respective Master's degree.
EREC01	Electronics & Communication Engineering	**Electronics System Design:-** VLSI system Design, Embedded System Design,Medical Electronics, Robotics, Device modelling,Semiconductor Memories, Nano Electronics, DisplayDevices. **Communication Systems:-** Wireless Communication Systems, CommunicationSignal Processing, Wireless Networks, Smart AntennaDesign, RF System Design, Computer Communication, Wireless Sensor Networks, Internet of Things, Mobile Computing, AdHoc Networks, Human-Machine Interactions. **Intelligent Systems :-** Artificial Intelligence, Pattern Recognition, MachineLearning, Computer Algorithms & OptimizationTechniques, Soft Computing, Software Defined Radio,Cognitive Radio, Deep Learning, Image Processing,	As per the affiliating University norms.☐ M.E./M.Tech. or equivalent Degree inElectronics and Communication Engineering, Computer Science and Engineering or Electrical and ElectronicsEngineering or Electrical Engineering orInformation Technology or Information Sciences or allied disciplines in therelevant branch of Engineering and Technology • A minimum of 55% of marks/CGPA of 5.5 on a 10 point scale in Master's degree in Engineering/Technology. In case of SC/ST candidates, 50% marks or CGPA of 5.0 on a 10 point scale in the respective Master's

25. Govt. College of Engineering, Aurangabad 431 005 – GA

Code	Department	Fields of Specialization	Minimum Qualification
GACE01	Civil Engineering	Water Resources Engineering, Environmental Engineering,Transportation Engineering, Structural Engineering, EarthquakeEngineering, Advanced Concrete Technology and StructuralAnalysis, Fracture Mechanics, FEA of structures, FerrocementStructures, Concrete Technology Design of RCC/ Steel Structures,GIS and Remote sensing applications in Water ResourceEngineering, Climate change studies	As per the norms of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Maharashtra). ***1.www.bamu.ac.in*** ***.http://bamua.digitaluniversity.ac***
GAEE01	Electrical Engineering	Application of Power Electronics, Electrical Drive, Reneable Energy Systems, Special Machines, Electrical Power System	
GAEC01	Electronics & Telecommunication	Signal and Image Processing, Communication Engineering Pattern Recognition, ANN	As per the norms of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Maharashtra)

26. G.B. Pant Institute of Engineering and Technology, Pauri-Garhwal, Uttarakhand-246194-GB

Code	Department	Fields of Specialization	Minimum Qualification
GBEE01	Electrical Engineering	Power Electronics, Electrical Drives, Power Quality, RenewableEnergy Systems, Electric Vehicles, Signal & Image Processing,Biomedical Signal & Image Processing, Machine Learning, AI inHealthcare, Machine Modelling, Power System, Control andInstrumentation.	The applicant must have passed B.Tech/BE(ElectricalEngineeringorElectrical&Electronics Engineering or allieddisciplines)withfirst Division
GBCE01	Civil Engineering	Geotechnical Engineering, Soil Dynamics, Laterally Loaded Pilenear Sloping Ground, Climate Change, Soil-Structure Interaction,Seismic Analysis of Earth Retaining Structures, Flood Modeling,Disaster Management, Environmental Engineering, WaterQuality Modelling (Surface and Subsurface), Air and WaterPollution Control, Solid Waste Management, Structural HealthMonitoring, Rock Mechanics, Underground Excavation, GroundImprovement of Cohesionless Soils: Application of ConfinedFootings, Ground Improvement of Cohesive Soils: Applicationsof Stone Columns, Geomechanics of Municipal Solid Disposal.	M.Tech/M.E in Civil Engineering/Earthquake Engineering or asimilar Discipline with first Division.

GBCS01	Computer Science and Engineering	Image Processing, Signal Processing, Software Engineering,BiomedicalImage &SignalProcessing,Soft Computing,Artificial Intelligence & Machine Learning (AI & ML), CyberSecurity, Internet of Things (IOT), Remote Sensing	M.Tech/M.E in ComputerScience and Engineering or InformationTechnology or Similar disciplines with first class degree or equivalent
GBME01	Mechanical Engineering	Production & Manufacturing, Industrial, Design, Thermal,Fluids, Renewable Energy, Materials, Composites, Metallurgy	The applicant must have passed First Class B.Tech/BE (MechanicalEngineering, Production Engineering, Manufacturing Engineering or Industrial Engineering) with First class M.Tech/ME (Production, Industrial, Manufacturing, Thermal & Fluids, Design, CAD/CAM, Automation,Materials, Metallurgy)

27. Govt. College of Engineering, Salem – 636 011 – GC

Code	Department	Fields of Specialization	Minimum Qualification
GCCE01	Civil Engineering	Structural Engineering Environmental Engineering	M.E./M.Tech.FirstClass orM.S.(by research) in the relevantbranch of Engineering.
GCME01	Mechanical Engineering	Mobile Robotics, Nano Coating/Nano Fluids, Composite MaterialCharacterization, Alternate Refrigerants, Engine Research withBiofuels, Micro Machining, Design/Thermal Engineering.	ME/M.Tech. First Class or M.S.(byresearch) in the relevant branch of Engineering.
GCEE01	Electrical Engineering	Electrical and Electronics Engineering including power systemsEngineering, High Voltage Engineering, Power Electronics andDrives, Embedded control Systems, Control and Instrumentation,Embedded System Technologies.	ME/M.Tech. First Class or M.S.(byresearch) in the relevant branch of Engineering

28. Govt. Engineering College, Thrissur 680 009– GK

Code	Department	Fields of Specialization	Minimum Qualification
GKCE01	Civil Engineering	EnvironmentalEngineering, StructuralEngineering, Building Technology, Transportation Engineering.	Masters in Technology/Engineering Degree in the relevant field.
GKME01	Mechanical Engineering	Fracture Mechanics, Structural Mechanics, ComputationalMechanics, Finite Element Analysis, Stress Analysis,Manufacturing Technology, Computational Fluid, Dynamics, I CEngines, Energy-Exergy analysis, solar energy, Fuel Cells,Tribology, thermal enhancement of electronics, optimization ofthermal systems, inverse methods, high speed compressibleinternal flows, high speed aerodynamics, shock waves atmicroscale, industrial management, operation management, leanmanufacturing,sustainable development, robotics &automation, Industrial safety engineering,hazard assessment and analysis, compositecasting, traditional machining andnontraditional machining of difficult tomachine materials, composite and shapememory alloys, fabrication of composites3D surface metrology, CMM, Lasermetrology , fluid power systems	

Code	Department	Fields of Specialization	Minimum Qualification
GKEE01	Electrical Engineering	Power Electronics & Drives, Power Quality, Power Systems, Energy Management, Control systems, High Voltage, Image Processing in Biomedical Applications/Control Systems, Soft Computing & Applications.	Masters in Technology/Engineering Degree in the relevant field.

29. Guru Nanak Dev Engineering College, Ludhiana – 141 006 - GN

Code	Department	Fields of Specialization	Minimum Qualification
GNCE01	CivilEngineering	1. Structure Engineering 2. Geo-Technical Engineering 3. Transportation Engineering 4. Computer Aided Design. 5. Environmental Science & Engg. 6. Water Resources Engineering	
GNME01	Mechanical Engineering	1. Thermal Engineering 2. Industrial Engineering 3. Manufacturing/Production Engineering.	
GNEE01	Electrical Engineering	1. Restructuring of Power System 2. Reliability and Maintenance Engineering 3. Renewable energy and smart grids 4. Power quality	

30. Shri G.S. Institute of Technology & Science, Indore - 452 003 – GS

Code	Department	Fields of Specialization	Minimum Qualification
GSCE01	Civil Engineering	Structural Engineering, Transportation Engineering, Environmental Engineering, Water Resource Engineering, Geotechnical Engineering, Remote Sensing.	M.E./ M.Tech degree in relevant disciplinewith minimum 55% marks or equivalentCGPA.
GSEE01	Electrical Engineering	Power Electronics, Electrical Drives, High Voltage Engineering, Power Systems, Energy Conservation, Control Systems, Industrial Electronics.	
GSEC01	Electronics & Communication Engineering	Wireless Communication, RF and Microwave, Digital Signal Processing, Microelectronics Design, Cryptograyphy.	
GSCS01	Computer Science & Engineering	-	
GSME01	Mechanical Engineering	Thermal Engineering, Design Engineering, Fluid Engineering, Conventional and Unconventional Energy, Tribology & Maintenance Engineering.	M.E./ M.Tech degree in relevant disciplinewith minimum 55% marks or equivalentCGPA.
GSIP01	Industrial & Production Engineering	Production/Operations Management, Supply Chain Management, Quality Management, Advanced Manufacturing Technology	

31. Giani Zail Singh Campus College of Engineering & Technology, Bathinda (Punjab) - 151 001 – GZ

Code	Department	Fields of Specialization	Minimum Qualification
GZME01	Mechanical Engineering	Investment Casting welding, Rapid Prototyping FDM, Additive Manufacturing, CNC Machining, Supply Chain Design and Optimization,Heat Transferand Fluid Flow,Optimization techniques, Advanced machining processes	M.Tech./M.E.inMechanicalEngineering/ProductionEngineering/Industrial Engineering/ProductionandIndustrial Engineering.
GZEC01	Electronics & Communication Engineering	Real-timeFault-tolerant Computing,Energy-efficient Multiprocessor Scheduling, Wireless sensor networks, Communication System, Antennas, Image Processing, Softcomputing, Nanomaterials applications in electronics and RadarWave absorption	M.Tech/M.E.Electronics/Electronics&CommunicationEngineering
GZCE01	Civil Engineering	Transportation Engineering, Environmental & Structural Engineering.	M.Tech./M.E.StructuralEngineering, Transportation Engg.,EnvironmentalEngineeringor inrelevant discipline
GZTX01	Textile Engineering	Textile Technology, Technical Textile,Clothing Comfort	M.Tech./M.E.intherelevantdiscipline.
GZCS01	Computer Science & Engineering	Natural language processing, Digital image processing, Networks,Software Engineering, Software System,Computer network,Mobile Adhoc Networks, ANT Colony, Optimization routing,Integrated and differentiated services Congestion.	M.Tech./M.E.intherelevantdiscipline.
GZEE01	Electrical Engineering	Control System, Measurement and Instrumentation, PowerSystem, Renewable energy systems, Hybrid power system	M.Tech./M.E.intherelevantdiscipline.

32. Harcourt Butler Technological Institute, Kanpur (Uttar Pradesh) - 208 002 – HK

Code	Department	Fields of Specialization	Minimum Qualification
HKCE01	Civil Engineering	StructuralEngineering,WaterResourcesEngineering,EnvironmentalEngineering, Transportation Engineering.	Master's degree in Civil Engineering with First division or equivalent.
HKME01	Mechanical Engineering	ThermalEngineering,Manufacturing Technology, Design Engineering.	Master's degree in Mechanical Engineering with First division or equivalent.
HKEC01	Electronics Engineering	Optical Network, Optical Communication	M.Tech.Electronics Engineering with First division or equivalent.
		Digital Signal Processing, Digital Signal Processors, Computer Arithmetic, VLSI Design	M.Tech. Electronics Engineering/ Electronics & Communication/ Electronics & Instrumentation/ Electrical& Electronics with First Division orequivalent.
		Wireless Communication	M.Tech. Electronics Engineering/ Electronic & Communication/ Electronics

			&Instrumentation/electrical & Electronics with First division orequivalent.
	Chemical Engineering	Catalysis & Kinetics	M.Tech. Chemical Engineering with First Division or equivalent.
		Emulsion Polymerization	
		Petroleum	
		Environmental Engineering	

33. Indira Gandhi Institute of Technology, Sarang, (Odisha) - 759 146 - IO

Code	Department	Fields of Specialization	Minimum Qualification
IOCE01	Civil Engineering	Structural Engineering, Geotechnical Engineering, Transportation Engineering.	First Division or 60% marks in B. Tech in Civil Engineering & M. Tech. in relevant field.
IOME01	Mechanical Engineering	Machine Design, Production Engineering, Thermal Engineering.	First Division or 60% marks in B. Tech in Mechanical Engg. & M.Tech. in relevant field.
IOEE01	Electrical Engineering	M/c Drives & Power Electronics, Power Systems Engineering, Signal & Image Processing.	First Division or 60% marks in B. Tech in Electrical Engg OR in Electrical & Electronics Engineering (EEE) & M. Tech. in relevant field.

34. Indian Institute of Technology, Indore, Madhya Pradesh 453 552- IR

Code	Department	Fields of Specialization	Minimum Qualification
IRCS01	Computer Science and Engineering	Computer Science and Engineering	Computer Science and Engineering
IREE01	Electrical Engineering	Electrical Engineering	Electrical Engineering
IRME01	Mechanical Engineering	Mechanical Engineering	Mechanical Engineering
IRCE01	Civil Engineering	Civil Engineering	Civil Engineering
IRBB01	Bio-Sciences and Bio-Medical Engineering	Bio-Sciences and Bio-Medical Engineering	Bio-Sciences and Bio-Medical Engineering
IRMM01	Metallurgy Engineering and Materials Science	Metallurgy Engineering and Materials Science	Metallurgy Engineering and Materials Science

35. Indian Institute of Technology (Indian School of Mines), Dhanbad 826 004 – IS

The eligibility for Ph.D Programmes is 1st class or equivalent in post-graduate degree.

Code	Department	Fields of Specialization	Minimum Qualification
ISMI01	MiningEngineering	Coal Mining, Metalliferrous Mining, Mine Planning & Design, Mine Systems Engineering, Rock Mechanics, Rock Excavation Engineering, Mine Environment, Open Cast Mining, Mine Surveying, Mine and Mineral Economics, Mine Management, SurfaceEnvironment, Marine Mining, Mine Safety Engineering.	Master's Degree in Mining Engineering.
ISME01	Mechanical Engineering	Mechanical Engineering.	M.E./ M.Tech degree with specialization in Mechanical/Production/Manufacturing/Industrial Production/CAD-CAM/Machine Design/Mechatronics/ Thermal/ Heat Power/ Energy/ PowerPlant/ Automobile/ Maintenance Engineering &Tribology **with** B.E./ B.Tech or equivalent degree inMechanical/ Production/ Manufacturing/ Aerospace/Energy Engineering.
ISCE01	Civil Engineering	Civil Engineering.	M.Tech/ M.E. in Civil Engineering **with**B.Tech/B.E. in Civil Engineering/ Env. Engineering having specialization in their M.Tech/ M.E. as Structural/Geotechnical/ Water Resources/Environmental/Transportation Engineering/ Remote Sensing &GIS/ Env. Science & Engineering.
ISEE01	Electrical Engineering	Electrical Engineering.	M.Tech or equivalent in Electrical Engineering/Control System Engineering/ Power SystemEngineering/ElectricalMachines/PowerElectronics and Drives/ High Voltage Engineering/Instrumentation Engineering/ Power Apparatus&Devices / Electronics **with** B.Tech or

			equivalent inElectrical/ Electrical & Electronics Engineering.
ISEC01	Electronics & Communication Engineering	Electronics & Communication Engineering	M.Tech/ M.E./ MS in Electronics/ Electronics & Communication/Electronics & Tele-communication/Electronics&Instrumentation/Instrumentation/Electronics & Electrical Engineering or related field**with** B.Tech/ B.E. or equivalent degree in Electronics/Electronics & Communication/ Electronics &Telcommunication/Electronics&Instrumentation/Instrumentation/Electronics&ElectricalEngineering.
ISCS01	Computer Science & Engineering	Computer Science & Engineering.	M.Tech or equivalent in Computer Science & Engineering/InformationTechnology/ComputerApplication/SoftwareEngineering/ElectronicsEngineering/Electronics and CommunicationEngineering/ Electrical Engineering **with** B.Tech. orequivalent in Computer Science & Engineering/ InformationTechnology/Electronics Engineering/Electronics and Communication Engineering/Electrical Engineering.

36. Dr. B. R. Ambedkar National Institute of Technology, Jalandhar, Punjab 144 011- JL

Code	Department	Fields of Specialization	Minimum Qualification
JLCH01	Chemical Engineering	Chemical Engineering	Master's Degree in Engineering/ Technology in the relevant area of research along with Bachelor's Degree In appropriate branch of Engineering/Technology with a first class or minimum 60% marks (or GPA of 6.5 on 10 point scale) in the qualifying examination.
JLCS01	Computing Science & Engineering	Computing Science & Engineering	
JLME01	Mechanical Engineering	Mechanical Engineering	
JLEC01	Electronics & Communication Engineering	Electronics & Communication Engineering	

37. Jamia Millia Islamia University, New Delhi -110 025 – JM

Code	Department	Fields of Specialization	Minimum Qualification
JMEE01	Electrical Engineering	▪ Power Systems, ▪ Machines, Drives and Power Electronics, ▪ Control and Instrumentation, ▪ Electronics Communication and Computer Technology. ▪ Bio-medical Sciences ▪ Bio-medical Engineering ▪ Dental Studies	Minimum 55% in M. Tech. in allied specialization of Electrical Engineering after B. Tech./ B.E. **or** Minimum 55% in M. Tech. in allied specialization of Electrical Engineering after M. Sc.

38. Jadavpur University, Kolkata 700 032 – JU

Eligibility for candidates of SC/ST/PD to Ph.D degree programme (Engineering. /Tech./Arch./Pharm.) of Jadavpur University is at least "Pass Class" marks in Master's Degree in Engineering./Tech./Pharm./Arch. or equivalent.

Code	Department	Fields of Specialization	Minimum Qualification
JUEE01	Electrical Engineering	**ControlSystems:**Controlandguidance,Knowledge-basesystems,ArtificialIntelligence,SoftwareEngineering,StochasticProcesses,DistributedComputerControl Theory,MotionControlandPowerConditioning.	Master's degree in Electrical Engineering.
JUEE02		**ElectricalMachines:**SystemOptimization,Optimal DesignofElectricalMachines,SynchronousMachinesStability, ElectricalDrives,Wind Energy.	
JUEE03		**ElectricalMeasurements:**DigitalandMicroprocessor-basedInstrumentation,BiomedicalInstrumentation,DigitalSignalProcessing,ProcessInstrumentation,FiberOptic Instrumentation.	
JUEE04		**HighVoltageEngineering:**HighVoltageLaboratoryTechniques ,FieldAnalysisandComputation,Discharge Phenomenain Gas,LiquidandSolid and SolidMedia, DielectricEngineering,Surge Analysis.	
JUEE05		**PowerSystems:**Computer-AidedPowerSystemAnalysisMicroprocessorApplications,PowerElectronics,PowerSystems Protection,PowerSystem Control.	
JUEC01	Electronics & Telecommunication	**CommunicationEngineering:**DigitalCommunication,DataCompression,ImageProcessing, Fiber Optic Communication,	Master's degree in Electrical Engineering&TelecommunicationEngineering

	Engineering	Analogand Digital Mixed Signal Circuits and Systems.	
JUEC02		**ComputerEngineering:** ProgrammeSemantics,Compiler,OperatingSystem,Computer Architecture,ArtificialIntelligence,PatternRecognition, Neural Networks.	
JUEC03		**Control Engineering:** Digital Control, Robotics,Adaptive and Optimal Control, Fuzzy Control.	
JUEC04		**ElectronicDevices:**PhotovoltaicEnergyConversion,PowerSemiconductorDevices,SemiconductorDeviceModeling,ElectricalConductionand Related Phenomena inSemiconductorsandSuperconductors,MicroelectronicsTechnology,Nano CrystallineMaterials and Devices, EDA, Sensors, MENS,VLSI Circuit Designand Implementation.	
JUME01	Mechanical Engineering	AppliedMechanics.	Master's degree In Mechanical Engineering with atleast 60% marks (and also in the preceding degree)
JUME02		HeatPower Engineering.	
JUME03		FluidandHydraulic Engineering(incl.WaterResources).	
JUME04		ProductionEngineering.	
JUME05		MachineDesign(includingBioengineering).	
JUPE01	Production Engineering	**Production Technology:**Machinetools and Metalcutting, Non-traditionmachining, Advanced material machining, CAD/CAM,Robotics, Tribology, Computer integrated manufacturing, Flexible automation, Precision engineering, Micro machining, Ergonomics, Designing forproduction, Manufacturing systems simulation.	Master's degree in Production / Industrial/ Mechanical/ Manufacturing Engineering.
JUPE02		Production Management: Operations Mangement, Quantative Management,Terotechnology, Reliability, Behavioural science, Enterprise resource planning (ERP), Supply chain management (SCM) Quality Engineering, Waste Management	Master's degree in any branch of Engineering / Technology

39. Kamla Nehru Institute of Technology, Sultanpur (Uttar Pradesh) - 228 118 - KS

Candidate should have M Tech Degree in the appropriate branch of study (as given in the last column) with first class or minimum 60% marks (CGPA 6.5/10). For SC/ST/PD candidates 50% minimum marks or CGPA of 5.5/10.

Code	Department	Fields of Specialization	Minimum Qualification
KSEE01	Electrical Engineering	Power Systems, Power Electronics and Drives,Control Systems, Distributed Generations, PowerQuality, AI applications in Power Systems andControl Systems, Transmission System andFACTS.	M.Tech. degree in Electrical Engineering (Power Systems/ Power Electronics/ Electric Drives/Control and Instrumentation).

40. Indian Institute of Technology, Mandi, Himachal Pradesh 175 005- MA

Code	Department	Fields of Specialization	Minimum Qualification
MABS01	School of Basic Science	Basic Science.	Master's degree in Sciences with a good academic record/Master'degree in Engineering/Technology with a good academic record/ B. Tech degree of IIT with a minimum of CGPA of 8.0 on a 10.0 point scale or with a valid GATE Score or B. Tech / B.E degree of any recognized University in India with a minimum CGPA of 8.0 on a 10.0 point scale or equivalent with valid GATE score.
MACS01	School of Computing & Electrical Engineering	Computing & Electrical Engineering.	(a) Candidates witha Master's degreeinEngineering/Technologywithagood academic record or aMaster'sdegree by Research inEngineering/ Technology disciplines, with agoodacademicrecord. **or** **(b)** Candidates with Master's degree in Scienceswith a good academic record and of exceptionalmerit are eligible for the relevant EngineeringdisciplineandwithavalidGATE scoreorUGC/CSIRNET/ NBHM or equivalent qualification in therelevantareatenablefortheyearofregistration. In the case of candidates with morethan5yearsofrelevantexperienceaftertheMaster's degree, the requirement of a test scoremaybewaivedbytheSelectionCommittee. **or** **(c)** Candidates who have qualified for the awardof Bachelor'sdegreeinEngineering/Technologywith exceptionally good academic record in aneligible discipline will be considered for directadmission to Ph.D. Programme as a regular fulltime scholarsubjecttothefollowingconditions: (i) B.TechdegreefromoneoftheIITs,withaminimum CGPA of 8.0 on a 10.0 pointscale. (ii)Bachelor's degree In Engineering/ Technology from any other University, should be among the top 5% or 20 rank holders, declared by the University and having a valid GATE score. (iii) Bachelor's degree holder in Engineering/ Technology, serving for two years or more in a reputed R & D organization and having a proven research record.
MASE01	School of Engineering	Engineering	

41. M. S. Ramaiah Institute of Technology, Bengaluru, Karnataka 560 054 – MB

Code	Department	Fields of Specialization	Minimum Qualification
MBCE01	Civil Engineering	**General Civil Engineering:** • Application of Bio mimicry in civil Engineering, • Environmentally responsible infrastructure development, • Sustainable/ green building technologies, materials and climate specific building design. Embodied Energy & Life Cycle Assessment. **Geotechnical Engineering:**	M.E./M.Tech in Transportation Engineering/ Highway Engineering/Structural/Concrete Technology/ Construction Management/ Geo-technical Engineering/ Water Resources/ Environmental Engineering/Remote sensing & GIS/ Public Health Engineering or equivalent Degree.

		• Earthquake Geotechnical Engineering • Geo environmental Engineering, Geosynthetics • Experimental Mechanics. **Water Resources Engineering:** • Open Channel Flows and Pipe networks • Surface and Ground Water Hydrology • Reservoir planning and regulation, Hydrologic simulation applications • Urban hydrology & drainage systems • Utilization of Remote sensing & GIS techniques **Environmental Engineering** • Solid waste treatment, recycling and management • Environmental Impact Assessment • Air pollution monitoring, modeling and control • Waste Water treatment and recycling. **Structural Engineering:** • Structural Mechanics and Finite Element Analysis • RC and Pre-stressed Concrete, Masonry Structures • Structural Safety and Structural Health Monitoring • Retrofitting of RC Structures and Artificial Intelligence & Machine Learning Techniques. **Transportation Engineering**: • Modeling and Optimization of Transportation Systems • Travel Behavior, Public Transport and Non-Motorized • Transport Planning and Management, Accident and Black Spot Studies • Highway Engineering.	
MBME01	Mechanical Engineering	**Manufacturing Engineering:** • Metal Matrix composites, Natural Fibre composites, Polymer composites • Tool Design, Rapid Prototyping and Tooling, Modeling and Simulation, CAD/CAM, CNC • Product Design and Manufacturing, Lifecycle Management, Inventory and Supply Chains Management, Management of Operations, Maintenance Management. **Thermal and Fluid Engineering:** • Convective and Radiative Heat Transfer • Design of Thermal Equipment and Systems, Numerical Techniques • Modeling and Analysis, combustion and Flames, Fuel injection, Petrol and Diesel Engines, CFD. **Design Engineering:** • Stress Analysis, Fatigue and Fracture, Fracture Mechanics • FEM, Tribology Design of Elements and Systems • Optimization, CAD • Vibrations • Smart Materials and Structures, NDT.	M.E./ M.Tech Degree in Mechanical Engineering/ Production Engineering/ Industrial Engineering/ Metallurgical Engineering/ Automobile Engineering/ Applied Mechanics Engineering/ Engineering Materials Technology.
MBEE01	Electrical & Electronics Engineering	**Power Systems** HVDC Transmission Systems • Distributed Generation • Smart Grid • Artificial Intelligence Applications to Power Systems **Power Electronics & Drives** • Power Quality • Switched Mode Power Supplies • Power Electronics for Renewable Energy • Induction Motor Drive System **High Voltage Engineering** • Insulation Engineering • Condition Monitoring and Diagnostics for HV Power Apparatus • EHV Power Transmission • Lightning Protection Computational Electromagnetics	M.E./ M.Tech in Power Systems/ Power Electronics/ Power & Energy Systems/ Electrical Energy Systems/ Electrical Machines/ Computer Applications in Industrial Drives/ Control Systems/ Control and Instrumentation/ VILSI &Embedded Systems/ or equivalent degree.

		• Composites for High Voltage applications **Robotics & Automation** • Sensing • Controls • Signal/ Image Processing • Machine Learning • Medical Robotics **Micro & Nano Systems** • Bio Electronics • MEMS	

42. Madhav Institute of Technology & Science, Gwalior – 474 005 – MG

Code	Department	Fields of Specialization	Minimum Qualification
MGCE01	Civil Engineering	Water Resources Engineering; Construction Technology & Management; Structural Engineering; Environmental Hydraulics.	M.E./M.Tech. or Equivalent degree in Civil Engineering with at least 60% marks or equivalent grade (55% marks or equivalent grade for SC/ST candidates).
MGEE01	Electrical Engineering	Power systems; Biomedical Signal Processing; Medical Image Processing: Application of AI & Soft Computing Techniques for Electrical Engineering; Condition Based monitoring of Electrical Machines, Control Engg., Renewable Energy; Nature inspired optimization, Economic Load Dispatch, Optimal Power Flow, ReactivePower Dispatch, Distributed Generation FACTS Controllers.	M.E./M.Tech in Electrical Engineering, Electronics &Instrumentation, Electronics Engg, Electrical & Electronics and Biomedical Engg. with at least 60% marks or equivalent grade (55% marks or equivalent grade for SC/ST candidates)
MGCS01	Computer Science & Engineering	Data Mining & Warehousing; Image Processing & Retrieval Techniques; Networking	M.E./M.Tech in Computer Science & Engineering or Information Technology or any other Specialization of Computer Science & Engineering and Information Technology with at least 60% marks or equivalent grade (55% marks or equivalent grade for SC/ST candidates)
MGME01	Mechanica lEngineering	Vibration & Noise Control; Design Engineering; Maintenance Engineering Tribology; Condition Monitoring; Industrial Engineering; Supply Chain Management; Operation Management, Production Engineering; Material Handling; Non-Conventional Energy System; Solar Energy, Heat Transfer; PV Technology; Green House Technologies; Thermal Engineering, FEA, Fracture Mechanics, Composite Material, FGM, Thermal and fire Protection, Hybrid Materials, Multi criteria optimization, Surface Engineering.	M.E./M.Tech. in the relevant discipline with at least 60% marks or equivalent grade (55% marks or equivalent grade for SC/ST candidates).
MGAR01	Architecture	Environmental Planning; Urban Design; Urban Planning; Urban Development, Energy Systems; Construction Management/ Project, Architecture, Interior Environment, Landscape Architecture and Conservation Energy & Sustainability, Facility Management.	M.Arch., M. Planning, M.E. or M.Tech. (Civil), with B.Arch/ Planning (Master in any Architecture, with at least 60% marks or equivalent grade (55% marks or equivalent grade for SC/ST candidates).

43. Malaviya National Institute of Technology, Jaipur - 302 017 - MJ

The minimum eligibility criteria for admission to Ph.D. is that at PG level the candidate should have secured a minimum CGPA of 6.5 on the 10 point scale (60% marks, only where CGPA is not awarded) with a relaxation for SC/ST implying minimum of 6.0 on the 10 point scale (55% marks, only where CGPA is not awarded) in qualifying degree.

Code	Department	Fields of Specialization	Minimum Qualification
MJCE01	Civil Engineering	All specialization relevant to Civil Engineering field.	M.E./ M.Tech. degree in relevant engineering discipline.
MJCH01	Chemical Engineering	Environmental Engg., Advanced Process Control, Colloid And Interface Science, Advanced Separation Processes, Wastewater Treatment, Heat Transfer, Polymer, Modelling And Simulation, Chemical Reaction Engineering, Oil/ Fat Processing, Bioprocess Engineering, Membrane Separation, Biofuels, Novel Separation Techniques, Industrial Pollution Abatement, Biotechnology, Fluid Particle Mechanics, Adsorption, Thermodynamics, Colloid And Interface Science, Composite Materials, Soft Matter, Thin films, Finite Element Method, Artificial Intelligence And Applications To Intelligent Control, Optimizations & Systems Applications, Solid Waste Management, Petroleum Refinery Engineering, Transport Phenomena, Computational method for linear/non-linear problems, Polymer Process	B.Tech./ M.Tech. or equivalent degree in Chemical Engineering, B.Tech./ M.Tech. or equivalent degree in any branch of Engineering/Chemical Technology and interdisciplinary areas.
MJCE01	Electrical	Modeling, Piping Engineering, Numerical Modelling,	M.E./ M.Tech. degree in relevant engineering

	Engineering	Computational Fluid Dynamics (CFD),Process Intensification, Advanced Oxidation Technique, Cavitation, Sonochemistry. Power Electronics and Drives, Application of power electronic converters for Wind and PV system, Design and applications of switched mode power supplies, Energy management scheme for hybrid autonomous microgrid, Power quality improvement in power converters, Voltage stability, FACTS devices, and power system operation and control, AI Applications To Power System, Electricity Markets, Power Systems Restructuring, Smart Grid , Power System Planning, Risk Management in Power System, Renewable Energy, Computational Intelligence in Power System, Demand response, Distribution system assets optimization, Integration of Microgrids and distributed generations, Optimal PMUs placement, Real-time optimal operation of distribution networks, Control of Discrete-time systems, Design of Observers for linear systems, Issues relating Deregulated & Restructured Power Systems, Real Time Visualization of Power Systems using WAMS, Application of AI techniques for Power System Operation and Control, Distributed Generation Placement and Integration Issues. Machine Learning, Robotics, Data Analytics.	discipline.
MJME01	Mechanical Engineering	Industrial Engineering, Design Engineering, Production Engineering and Thermal Engineering	The applicant must have Master's degree in any Discipline of Mechanical Engineering (Industrial Engg., Design Engg., Production Engg. and Thermal Engg.) with CGPA not below 6.5 on a ten point scaleor 60% marks (Where CGPA is not awarded).
MJMT01	Metallurgical & Materials Engineering	Metallurgical & Materials Engineering.	B.E./ B.Tech degree in Metallurgical/ Materials/ Mechanical/ Chemical/ Ceramic Engineering/ Nanotechnology (Engineering materials) with M.E./ M.Tech degree in Metallurgical/ Materials / Ceramic Engineering / Nanotechnology (Engineering materials). Nanotechnology (Engg. Materials) students should have Physics, Chemistry, and Mathematics at 12th and B.Sc. level.
MJEC01	Electronic & Communication Engineering	Communications, VLSI, MEMS, Embedded System, Microwave Engineering, Optical Communication System.	B.Tech. and M.Tech. Electrical/ Electronics/ Computer/ Communication / Telecommunication / Instrumentation/ Control/ Microelectronics or equivalent discipline consistent with research areas of department.
MJCS01	Computer Engineering	Language and Compilers, computer Architecture, Deep Learning, Embedded System, Computer Communication, Real Time Systems, Parallel and Distributed Processing, Software Engineering, Software Testing, Intelligent Systems, Security and Forensics, Big Data, Cloud Computing, IoT (Internet of Things), Ad hoc Networks, Video Processing, Video Surveillance, Underwater Image and Video Processing, Image Processing, Biometrics, Machine Vision, Computing, NOC, Wireless Networks, Database, Natural Language Processing, Information Retrieval, Data Mining, Information Security, Multicore Architecture, Malware Analysis, Embedded Systems and latest thrust areas in computer and communication.	
MJEN01	Centre for Energy and Environment Engineering	Water / Waste water / industsrial waste water treatment, energy efficiency in building solar PV, solar thermal, wind energy, bioenergy, smart grid, environmental impact assessment, energy management, smart city planning, smart buildings, energy storage, energy policy.	B.E./ B.Tech./ B.Arch. and M.E./ M.Tech./ M.Arch./ M.Plan. in relevant disciplines.
MJMS01	Management Studies	Corporate Finance, Behavioral Finance, Technology Adoption, Behavior in Digital Environments, Sustainable Consumption.	The applicant must have the MBA with preferable Engineering background/ M.Tech./ M.Plan. with CGPA not below 6.5 on a ten point scale or 60% marks (where CGPA is not awarded).
MJAR01	Architecture and Planning	All specialization relevant to Architecture and Planning.	1. Masters degree or equivalent in Architecture/Planning/other relevant discipline. 2. B.Arch./B.Plan.
MJDM01	National Centre for Disaster Mitigation and Management	Earthquake Engineering and/ or Structural Engineering.	UG degree in Civil Engineering. PG degree Specialization in Earthquake Engineering and/or Structural Engineering.

44. Madan Mohan Malaviya University of Technology Gorakhpur - 273 010 (Uttar Pradesh) MM

The minimum requirement is 60% or equivalent CPI (for SC/ST 55% or equivalent CPI) at qualifying degree.

Code	Department	Fields of Specialization
MMCE01	Civil Engineering	**Geotechnical and Geo-Environmental Engineering** Ground Characterization. Ground Improvement. Solid Waste Management. Innovative Foundations. Physical Modeling. **Hydraulics and Water Resources Engineering** Fluvial Hydraulics. Local Scour. Scour and Scour Counter Measures. Hydraulics Structures. River Training & Protection Works. **Environmental Engineering** Air Pollution. Noise Pollution. Effluent Treatment Process and Modeling. Water Characterization Water and Waste water treatment. Environmental impact Assessment and Management. **Remote Sensing and Engineering Survey** GIS and Its Application. GPS and Its Application. Remote Sensing/Geospatial Engg. **Structures** Concrete Structures. Steel Structures. **Transportation Engineering** Highway Engg. Airport Engineering.
MMEE01	Electrical Engineering	Bio-instrumentation/Bio-Medical Signal Processing, Power Electronics, Electrical Machines and Drives, Power System Analysis, Restructuring and FACTS Devices, Advance Control, Process Control and Instrumentation.
MMME01	Mechanical Engineering	**Production & Industrial Engineering** Metal Cutting, Advanced Manufacturing Technology, CAD/CAM.CIM, Automation, Robotics, Quality Management, Inventory Management, Supply Chain Management Operations Research, Modeling and Simulation, System Dynamics, Material Science. **Design Engineering** Design Engineering: Stress-strain Analysis, Mathematical Modeling, CAD, and Optimization. Mechanical Vibration.
MMEC01	Electronics & Communication Engineering	**Communication and Signal Processing** Wireless Communication. Data Communication. Microwave Engg. Optical Communication. Signal Processing & Coding Theory. **Integrated Electronics & Circuits** VLSI Design. Analog & Digital Circuits Design. Microelectronics. Device Modeling. **Electronic System and Instrumentation** Embedded System Design. Electronic Instrumentation. Microprocessor based Applications. Artificial Neural Network and Fuzzy logic.

45. Motilal Nehru National Institute of Technology, Allahabad 211 004 – MN

The minimum requirement is 60% or equivalent CPI (for SC/ST 55% or equivalent CPI) at qualifing degree

Code	Department	Fields of Specialization	Minimum Qualification
MNAM01	Applied Mechanics	Solid Mechanics, Computational Mechanics, Composite and Smart Structures, Stability and Dynamics of Structures, Advanced Materials, Stealth Materials, Materials Science and Engineering, Fatigue and Fracture, Mechanical Behaviour of Materials, Vehicle Crashworthiness, Low Energy Impact, Ballistic Impact and Blast Loading, Robotics and Mechanisms, Fluid Mechanics and Machines, Multiphase Flow, Computational Fluid Dynamics, Biomechanics, MEMS, Sound and Acoustics, etc. Solid Mechanics, Computational Mechanics, Composite and mart Structures, Stability and Dynamics of Structures, Advanced Materials, Stealth Materials, Materials Science and Engineering, Fatigue and Fracture, Mechanical Behaviour of Materials, Vehicle	M.Tech or Equivalent degree Mechanical Engineering, Civil Engineering, Metallurgical Engineering, Production Engineering, Ceramics, Materials Engineering, Textile Engineering, Ocean Engineering, Naval Architecture, Marine Structure, Materials Science, Applied Mechanics, Fluid Engineering, Aeronautical Engineering, Chemical Engineering, Marine Engineering, Biomedical Engineering, M.Sc of equivalent degree in Physics/ Mathematics with 60% marks (55% or Equivalent for SC/ST candidates).

		Crashworthiness, Low Energy Impact, Ballistic Impact and Blast Loading, Robotics and Mechanisms, Fluid Mechanics and Machines, Multiphase Flow, Computational Fluid Dynamics, Biomechanics, MEMS, Sound and Acoustics, etc.	
MNBT01	Biotechnology	Molecular Biology, Microbiology, Environmental Biotechnology, Agricultural Biotechnology, Immunology and Bioprocess development.	M.Tech (biotechnology), Bioinformatics and BiochemicalEngineering, or M.Sc. in Biotechnology or M.Sc. in Applied Biological Science Such as Microbiology, Biochemistry, Genetics, Molecular Biology, Pharmacy and Biophysics.
MNCE01	Civil Engineering	Structural Engineering, Geotechnical Engineering, Environmental Engineering, Transportation Engineering, GIS, Environmental Geotechnical, Remote Sensing, Water Resource Engineering, Construction Management.	M.Tech or Equivalent degree in Aeronautical Engineering, Architectural Engineering, Civil Chemical Engineering, M.Sc. Environmental Science or Equivalent. With 60% marks (55% or Equivalent for SC/ST candidates).
MNCS01	Computer Science & Engineering	Data Base, Software Engineering, Mobile Computing, ParallelComputing, Computer Architecture, Computer Algorithmic, Data Mining, Knowledge Based System, Real Time System, Distributed Computing.	M.Tech or Equivalent degree in Computer Science & Engineering, Software Engineering, Information Technology, Electrical Engineering, Electronics Engineering and Communication Engineering. With 60% marks (55% or Equivalent for SC/ST candidates).
MNEE01	Electrical Engineering	Control Systems and Mathematical Modeling, Nonlinear Systems, Model Reduction, Fuzzy Logic, Neural Networks, Al in Power Systems, Wireless Sensor Networks, Transmission Systems & FACTs, Power Electronics, Distribution Systems and Custom Power Devise, Distributed Generation &Control, Power Quality Modem, Electric Drives, Instrumentation Systems, Bio-medical Instrumentation, Virtual Instrumentation, Power Systems Protection.	M.Tech or Equivalent degree in Electrical Engineering, Electronics and Communication Engineering and Electronics Electrical Engineering, Electronics Engineering and Communication Engineering. With 60% arks (55% or Equivalent for SC/ST candidates).

Code	Department	Fields of Specialization	Minimum Qualification
MNME01	Mechanical Engineering	Thermal Sciences (Heat Transfer, Energy Conversion, Refrigeration and Air- conditioning), Turbo machines, CAD/ CAM/FMS, Fatigue and Fracture Mechanics, Unconventional Manufacturing Processes, Metal Cutting. Metal Forming, Noise and Vibrations, Industrial Engineering Rapid Prototyping and Reverse Engineering, Knowledge Management.	M.Tech or Equivalent degree in Mechanical, Aeronautical, Automobile, Chemical, Production, Metallurgical Engineering, Industrial Engineering. With 60% marks (55% or Equivalent for SC/ST candidates).
MNCH01	Chemical Engineering	Separation Process, Heat Transfer, Mass Transfer, Chemical Reaction Engineering, Modeling and Simulation, CFD, Energy Conversion.	M.Tech or Equivalent degree in Chemical Engineering, Petroleum Studies, Environment, Biotechnology. With 60% arks (55% or Equivalent for SC/ST candidates).
MNCY01	Chemistry	Organic – Metallic Material Chemistry, Polymer Chemistry, Environmental Chemistry, Nano Technology, Nano Chemistry, Bio-Inorganic, Photo-Chemistry, Drug Delivery, Co-ordination Chemistry.	M.Sc. in Chemistry/ Applied Chemistry With 60% marks (55% or Equivalent for SC/ST candidates) For interdisciplinary Field of Research Master degree in any Discipline of Science with 60% marks B.Tech 75% marks (70% or Equivalent for SC/STcandidates).
MNHS01	Humanities and Social Science	Commonwealth Literature, Psychology, Organizational Behavior, Social Psychology, Entrepreneurship, British /literature, American Literature, English Language Speaking and Human Recourses Management, Rural Economics, Allied Social Science, Accounting and Financial Management.	M.A in English or Psychology/ MBA/MSW With 60% aggregate marks or Equivalent CPI (55% or Equivalent for SC/ST Candidates).
MNPH01	Physics	Condensed Matter Physical/ Solid State Physics, Solid State Gas Sensors, Carrier Transport in Thin Films, Interface States Studies in Semiconductor Device, Characterization of Material, Nonlinear Dynamics, Spectroscopy of Nano-Materials and CNTs, Quantum Chemistry & Bio- Physics, Magnetic Material, Solar Photovoltaic's.	M.Sc. in Physics/ M.Tech in appropriate branch of Engineering or With 60% aggregate marks or Equivalent CPI (55% or Equivalent CPI for SC/ST Candidates).
MNMG01	School of Management Studies	Marketing, Human Resource, Finance, Systems Management, Strategic Management, Operations Management, Operations Management, International Business.	Master Degree in Management/ Technology/ Engineering/ Economics/ Commerce/ Science/ Computer Applications/ Social Science with minimum of 60% marks or equivalent (55% or Equivalent for SC/ST candidates) or Bachelor degree in Engineering with a minimum of 75% marks or equivalent CPI (70% or equivalent for SC/ST candidates).
MNGI01	GIS Cell		M.Tech or equivalent in GIS & Remote Sensing/ Civil Engineering/ Computer Science &

		Geoinformatics (Core and Application)	Engineering/ Information Technology/ Agricultural Engineering/ Mining Engineering or M.Sc. degree in GIS & Remote Sensing/ Applied Geology/ Geophysical/ Geography/ Environmental Science/ Computer Science or degree in aster of Computer Application. With 60% arks (55% or Equivalent for SC/ST candidates).

Where the eligibility qualification is Master's degree in Science or Commerce or Economics or English or any Subject of Humanities or Life Science or Management qualifying NET is must for getting Institute fellowship as per Letter ***F.No. 25-2/2010-TS.II, dated 30.09.2010*** and subsequent modification which may be issued by MHRD from time-to-time.

Important Note:

- Only deserving candidates with B.Tech/MCA or equivalent degree with 75% aggregate marks or equivalent (70% or equivalent for SC/ST candidates), may be considered for admission to Ph.D. programmes as mentioned above.
- Number of seats in each department will depend upon the availability of Supervisor in the department.
- Preference will be given to SC/ST candidates otherwise found eligible.

48. National Institute of Technology, Agartala (Tripura) – 799 046 - NA

Code	Department	Fields of Specialization	Minimum Qualification
NAME01	Mechanical Engineering	Thermal Science & Engineering Manufacturing Science & Engineering Machine Design Automotive Engineering.	Master's Degree in Engineering/ Technology or equivalent in an appropriate area with a minimum CGPA of 6.5 out of 10 or equivalent (60% of marks). Or Bachelor's degree in Engineering/ Technology with an excellent academic record and with CGPA of at least 9.0 out of 10 (85% of Marks). Candidates must have valid GATE score.
NAEC01	Electronic & Communication Engineering	VLSI Communication Engineering.	Master's Degree in Engineering/ Technology or equivalent in an appropriate area with a minimum CGPA of 6.5 out of 10 or equivalent (60% of marks). **Or** Bachelor's degree in Engineering/ Technology with an excellent academic record and with CGPA of at least 9.0 out of 10 (85% of Marks). Candidates must have valid GATE score.
NAEE01	Electrical Engineering	Power System Engineering Power Electronics & Drives Instrumentation Integrated Energy System Non Linear Optics.	Master's Degree in Engineering/ Technology or equivalent in an appropriate area with a minimum CGPA of 6.5 out of 10 or equivalent (60% of marks). **Or** Bachelor's degree in Engineering/ Technology with an excellent academic record and with CGPA of at least 9.0 out of 10 (85% of Marks). Candidates must have valid GATE score.
NAPE01	Production Engineering	Welding Foundry and Metal Casting, Application of Soft Computing Technique Metal Forming and Foundry Composite Material I C Engine Alternative Fuel Multi –criteria Decision Making Adv. Fluidics Case Based Reasoning	Master's Degree in Engineering/ Technology or equivalent in an appropriate area with a minimum CGPA of 6.5 out of 10 or equivalent (60% of marks). **Or** Bachelor's degree in Engineering/ Technology with an excellent academic record and with CGPA of at least 9.0 out of 10 (85% of Marks). Candidates must have valid GATE score.
NACE01	Civil Engineering	Structural Engineering Transportation Engineering Geotechnical Engineering Environmental Engineering Water Resource Engineering	Master's Degree in Engineering/ Technology or equivalent in an appropriate area with a minimum CGPA of 6.5 out of 10 or equivalent (60% of marks). **Or** Bachelor's degree in Engineering/ Technology with an excellent academic record and with CGPA of at least 9.0 out of 10 (85% of Marks). Candidates must have valid GATE score.

49. National Institute of Technical Teachers' Training & Research, Chandigarh-160019- NC

National Institute of Technical Teachers Training & Research (NITTTR), Chandigarh-160019 (i) Civil Engineering (ii) Computer Science and Engineering (iii) Electrical Engineering (iv) Electronics & Communication Engineering (v) Mechanical Engineering.

Code	Department	Fields of Specialization	Minimum Qualification
NCME01	Mechanical Engineering	3D/4D and 5D printing; Heat Transfer; Energy Conservation and Management; Bearing &Lubrication; Computer-Aided Design & Manufacturing; Industrial Engineering; Robotics Mechatronics and Manufacturing Technology; Operations Research; Production & Materials Management; Quality, Reliability and Maintenance; Productivity Management; Ergonomics; Total Quality Management; Business Process Reengineering; Enterprise Resource Planning.	Master's degree in relevant branch or a professional degree declared equivalent to the Master's degree by the corresponding statutory regulatory body, with at least 55% marks in aggregate or its equivalent grade 'B' in the UGC 7-point scale (or an equivalent grade in a point scale wherever grading system is followed) or an equivalent degree from a foreign educational Institution accredited by an Assessment and Accreditation Agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country for the purpose of assessing, accrediting or assuring quality and standards of educational institutions. A relaxation of 5% of marks, from 55% to 50%, or an equivalent relaxation of grade, may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/ Differently-Abled and other categories of candidates as per the decision of the Commission from time to time, or for those who had obtained their Master's degree prior to 19th September, 1991. The eligibility marks of55% (or an equivalent grade in a point scale wherever grading system is followed) and the relaxation of 5% to the categories mentioned above are permissible based only on the qualifying marks without including the grace mark procedure. (Subjected to be updated as per guidelines of Panjab University Chandigarh)
NCCS01	Computer Science and Engineering	Network & Information Security, Image Processing, Artificial Intelligence, Wireless Networks, Distributed Computing, Cloud Computing, Mobile Adhoc Networks, Wireless Sensor Networks, Vehicular Adhoc Networks, Internet of Things, Fog/Edge Computing, Data Science	
NCCE01	Civil Engineering	Structural Engineering, Geo-technical Engineering, Transportation Engineering, Concrete Technology, Construction Engineering and Management, Environmental Engineering, Computer Aided Design and Applications, Rehabilitation/Maintenance of Civil Engineering Structures	
NCEC01	Electronics and Communication Engineering	Soft Computing, Image Processing, Digital Signal Processing, Coding, Antenna, Microwave, VLSI Design and VLSI CAD, Optimization Techniques, Neural Networks, Video, Mobile Communication, Optical/Satellite Communication, MEMS, Bio-medical Signal Processing and other area of Electronics & Communication Engg.	
NCEE01	Electrical Engineering	Power System Operation & Control; Power Electronics, Microgrids, Smartgrids, Distributed Generation, Electric Vehicles, Hardware in Loop System, Real Time Simulation Studies using Opal-RT and Typhoon HIL, Wide Area Monitoring Studies, Electrical Machines & Drives; Process Control & Instrumentation, Applications of Artificial Intelligence Techniques in Electrical Engineering, Biomedical Instrumentation and Biometrics	

50. National Institute of Technology, Durgapur (West Bengal) - 713 209 - ND

Code	Department	Fields of Specialization	Minimum Qualification
NDBT01	Biotechnology	Microbial biotechnology, food bio-technology, Environmental bio-technology, nano- biotechnology, Bioprocess engineering, Bio-fuels, Heavy metal removal, fermentation.	M. Tech./ M.E / M. Pharm /M Sc in relevant discipline with at least 6.5 CGPA or 60 percent marks in aggregate in the M.E./ M. Tech. level or B. Tech/ B.E. / B Pharm in relevant discipline with at least 7.5 CGPA or 70 percent from a recognized technical institute or university/ government open university.
NDCH01	Chemical Engineering	Environment, Energy, Membrane Technology, Biochemical Reaction Engg, Multi-phase Flow, Transport Phenomena.	---Do---
NDCE01	Civil Engineering	Structural Engineering, Construction Engineering, Earthquake Engineering, Geotechnical Engineering, Water Resources Engineering, Environmental Engineering, Remote Sensing & GIS, Transportation Engineering.	
NDCS01	Computer Science & Engineering	Big data analysis, integrity and migration in Chip Multiprocessors.	---Do---
NDEC01	Electronic & Communication Engineering	Antenna/ Digital Signal processing/ MEMS/ Nanoscale Semiconductor Devices/ Power Line Communication/ Resistive Memory Devices/ RF and Microwave Engineering/ Semiconductor Process Technology/Underwater Acoustic Communication/ VLSI/ Wireless Communication/ Wireless relays andspace-time coding.	
NDEE01	Electrical Engineering	Power Systems, Power Electronics & Machine Drives, Control Systems, High Voltage Engineering, Instrumentation & Control.	M.Tech./ M.E.in relevant discipline with at least 6.5 CGPA or 60 percent marks in aggregate in the M.E./M.Tech. Level in relevant discipline and B.Tech/ B.E. in EE/EEE/ECE/CSE/EIE or relevant discipline with

			at least 7.5 CGPA or 70 percent from a recognized technical institute or university/ government open university.
NDME01	Mechanical Engineering	Manufacturing Engg, Machine Design, Thermal Engg.,Industrial Engg	--Do---
NDMT01	Metallurgical & Materials Engineering	Process Metallurgy/ Ferrous Processing/ Physical Metallurgy/ Heat Treatment and Phase Transformation/ Mechanical Metallurgy/ Aqueous and High Temperature Corrosion/ Powder Metallurgy/Composites and Ceramics/Materials Characterization/ Simulation and Modelling in Materials.	M.Tech/ M.E.in relevant discipline with at least 6.5 CGPA or 60 percent marks in aggregate in the M.E./ M.Tech. Level in relevant discipline or B.Tech/ B.E. in relevant discipline with at least 7.5 CGPA or 70 percent from a recognized technical institute or university/ government open university.

51. National Institute of Foundry and Forge Technology, Hatia, Ranchi – 834 003 – NF

Code	Department	Fields of Specialization	Minimum Qualification
NFME01	Mechanical and Manufacturing Engineering	Machining science, Metal forming, Mechanical behavior of metals, Computational metrology, Surface metrology, CAD/CAM, Reliability and safety engineering, Mechanical design, Welding technology, Industrial engineering, Quality control, Additive manufacturing, and Mechanical systems design.	M. E. / M. Tech. or equivalent from recognized Institute / University in Manufacturing Engineering, Manufacturing Science, Production Engineering, Manufacturing Science, Production Engineering, Mechanical Design, Welding Technology, CAD/CAM. At least 55% marks (6.0 CGPA) in CAD/CAM. At least 55% marks (6.0 CGPA) in CAD/CAM. At least 55% marks (6.0 CGPA) in creamy layer)/Differently-abled candidates.
NFMT01	Materials andMetallurgicalEngineering	Physical metallurgy, Extractive metallurgy,Composite materials, Nano materials, Weldingmetallurgy, Mechanical metallurgy, Surfaceengineering, Corrosion engineering, Powdermetallurgy, and Solidification.	M. E. / M. Tech. or equivalent from recognized Institute / University in Metallurgy & Materials Engineering, Mechanical, Production, ManufacturingEngineering and allied disciplines. At least 55% marks (6.0 CGPA) in aggregate is essential. A relaxation of 5% marks (0.5 CGPA) may be allowed for SC/ST/OBC (Non-creamy layer)/Differently- abled candidates.

52. National Institute of Technology, Hamirpur (Himachal Pradesh) – 177 005 – NH

Code	Department	Fields of Specialization	Minimum Qualification
NHCE01	Civil Engineering	Water resources, Structural and Transportation Engineering, Geotechnical Engineering & Geology, Environmental Engineering Remote Sensing.	Master Degree in Engineering/ Technology in the appropriate discipline. Open/EWS/OBC candidates must have secured minimum CGPI of 6.5 on a 10-point scale (or equivalent) or 60% marks in Master Degree. Whereas, in case of SC/ST candidates, a minimum CGPI of 6.0 on a 10-point scale (or equivalent) or 55% marks in Master Degree will be applicable.
NHCS01	Computer Science Engineering	Networking Artificial Intelligence, Information Security	Master Degree in Engineering/ Technology in the appropriate discipline. Open/EWS/OBC candidates must have secured minimum CGPI of 6.5 on a 10-point scale (or equivalent) or 60% marks in Master Degree. Whereas, in case of SC/ST candidates, a minimum CGPI of 6.0 on a 10-point scale (or equivalent) or 55% marks in Master Degree will be applicable.
NHME01	Mechanical Engineering	Design, Thermal, Production & Industrial.	Master Degree in Engineering/ Technology in the appropriate discipline. Open/EWS/OBC candidates must have secured minimum CGPI of 6.5 on a 10-point scale (or equivalent) or 60% marks in Master Degree. Whereas, in case of SC/ST candidates, a minimum CGPI of 6.0
NHEE01	Electrical Engineering	Power System, Signal Processing and Control, Instrumentation, Power Electronics & Derives, High Voltage Engineering	Master Degree in Engineering/ Technology in the appropriate discipline. Open/EWS/OBC candidates must have secured minimum CGPI of 6.5 on a 10-point scale (or equivalent) or 60% marks in Master Degree. Whereas, in case of SC/ST candidates, a minimum CGPI of 6.0 on a 10-point scale (or equivalent) or 55% marks in Master Degree will be applicable.
NHEC01	Electronics and Communication Engineering	VLSI Design, Communication and networks, RF and Microwave.	Master Degree in Engineering/ Technology in the appropriate discipline. Open/EWS/OBC candidates must have secured minimum CGPI of 6.5 on a 10-point scale (or equivalent) or 60% marks in Master Degree. Whereas, in case of SC/ST candidates, a minimum CGPI of 6.0 on a 10-point scale (or equivalent) or 55% marks in Master Degree will be applicable.

53. National Institute of Technology (NIT)-Srinagar-190 006, Jammu and Kashmir- NJ

Code	Department	Fields of Specialization	Minimum Qualification
NJCE01	Civil Engineering	**Structural Engineering:** Structural Engineering, Earthquake Engineering, Finite Element Analysis, Concrete Technology, Tall Buildings, Civil Engineering. Matls, Reinforced Concrete. **Water Resources Engineering:** Hydraulic Structures and Water Resource Engineering, Hydrology and Water Resource Engineering, Sediment Transport, Environment and Water Resources Engineering, Hydrology and Hydraulic Structures, Fluvial Hydraulics. **Transportation Engineering:** Pavement Engineering, Traffic Engineering & Transportation Planning. **Geotechnical Engineering:** Geotechnical Engineering, Soil Dynamics, Ground Improvement Techniques. **Geology** Engineering Geosciences and Rock Engineering. Power System Dynamics & Control, Stand Alone Power System, Application of Energy Storage Devices to Power Systems, Power Systems Operation & Optimization, Flexible AC Transmission System. Energy System Planning & Auditing, Wind Energy Conversion Systems, Power Electronics ,Power Quality, Electric Drives, Power System Control, Control Theory, Model Order Reduction, Finite Element Modelling of Distributed Parameter System.	**M.E./ M.Tech**in relevant field of Engineering with a minimum CGPA of 6.5 or not less than 60% for General Category and for SC/ST/OBC minimum CGPA of 6.0 or not less than 55% marks at Master's level or any other equivalent qualification recognized by the Institute. **OR** **B.E./ B.Tech with valid GATE score above the prescribed cut off level/ NET Qualification.** The candidates shall have a minimum CGPA of 8.0 or not less than 75% for General Category/OBC and for SC/ST minimum CGPA of 7.5 or not less than 70% at BE/B Tech level. **FOR GEOLOGY** **Master's degree in Applied Geology/Earth Sciences or an allied area, satisfying each of the following criteria:** a) A minimum of 65 percent marks/6.5 CPI in the master's degree. b) First division in bachelor's degree and c) With a valid Gate score or UGC/ CSIR NET/ NBHM or equivalent qualification in the relevant area tenable for the year of registration.
NJEE01	Electrical Engineering	Power System Dynamics & Control, Stand Alone Power System, Application of Energy Storage Devices to Power Systems, Power Systems Operation & Optimization, Flexible AC Transmission System. Energy System Planning & Auditing, Wind Energy Conversion Systems, Power Electronics, Power Quality, Electric Drives, Power System Control, Control Theory, Model Order Reduction, Finite Element Modelling of Distributed Parameter System.	**M.E./M.Tech** in relevant field of Engineering with a minimum CGPA of 6.5 or not less than 60% for General Category and for SC/ST/OBC minimum CGPA of 6.0 Or not less than 55% marks at Master's level or any other equivalent qualification recognized by the Institute. **OR** **B.E./B.Tech with valid GATE score above the prescribed cut off level/NET Qualification.** The candidates shall have a minimum CGPA of 8.0 or not less than 75% for General Category/OBC and for SC/ST minimum CGPA of 7.5 or not less than 70% at BE/B Tech level
NJEC01	Mechanical Engineering	Image Processing, Wireless Networks, Biometrics, Analog and Digital Communication, Optical Fiber Communication, Opto Electronic Devices, Microwave and Radar Engineering, Analog and Digital VLSI Design, Device modeling and Simulation, Novel MOS Devices for ULSI application. Molecular Nanosciences and Electronics. Computer Networks,Data and Computer Networks, Security, Sensor Networks, Data Communication, Embedded System, Radio frequency IC Design, and MOS Insulators, Digital Communication, Photovoltiacs. Insulators. Semiconductor opto –electronic devices, Optical Fiber Communication Systems, Communication System (RF domain).	**M.E./M.Tech** in relevant field of Engineering with a minimum CGPA of 6.5 or not less than 60% for General Category and for SC/ST/OBC minimum CGPA of 6.0 Or not less than 55% marks at Master's level or any other equivalent qualification recognized by the Institute. **OR** **B.E./B.Tech with valid GATE score above the prescribed cut off level/NET Qualification.** The candidates shall have a minimum CGPA of 8.0 or not less than 75% for General Category/OBC and for SC/ST minimum CGPA of 7.5 or not less than 70% at BE/B Tech level.
NJME01	Mechanical Engineering	Computational Mechanics, FEM, Thermo elasticity and Second Sound, Fracture Mechanics and Material Fatigue, Tribology and Maintenance Management, Tribology of Advanced Ceramics & Nano Ceramics, Life Cycle Engineering, Aircraft wing vibration, Smart Structures, Internal Combustion Engines, Combustion of Alternative Fuels,Emission control, MEMS, Ultrasonic Transducers, Dynamics and Control. Experimental Fluid Mechanics, Heat Transfer, Augmentation, Design of Thermal Systems.	**M.E./M.Tech** in relevant field of Engineering with a minimum CGPA of 6.5 or not less than 60% for General Category and for SC/ST/OBC minimum CGPA of 6.0 Or not less than 55% marks at Master's level or any other equivalent qualification recognized by the Institute. **OR** **BE/B.Tech with valid GATE score above the prescribed cut off level/NET Qualification.** The candidates shall have a minimum CGPA of 8.0 or not less than 75% for General Category/OBC and for SC/ST minimum CGPA of 7.5 or not less than 70% at BE/B. Tech level.

54. National Institute of Technical Teachers' Training & Research (NITTTR), Kolkata-700106 – NK

Code	Department	Fields of Specialization	Minimum Qualification
NKEE01	Electrical Engineering	Power Electronics and Drives, VLSI &Embedded System, Control Systems and Industrial Automation, Optical Commutation, Renewable Energy sources,Electrical Machines and Power System.	B.E./ B.Tech and M.E./ M.Tech in Electrical Engineering/Electronics and Communication/Instrumentation/ Mechatronics/ Robotics and

			relevant areas.
NKME01	Mechanical Engineering	Manufacturing Technology, Thermal Engineering, CAD/CAM, Fluid Mechanics, Materials and Composites, Welding Technology, Design, Computational Fluid Dynamics (CFD), Alternative fuels/energy resources, Power plant engineering, Turbomachinery.	B.E./ B.Tech and M.E./ M.Tech in Mechanical Engineering/Manufacturing/ Production/Thermal/ Automobile/ Design/Fluid Mechanics or equivalent with first class.
NKCS01	Computer science Engineering	Software Engineering/ Cloud Computing/ Computational Geometry/Operations Research/ Computational Intelligence/Computational Biology/ Image processing, Data Science, Machine Learning, Pattern Recognition.	B.Tech and M.Tech in Computer Science & Engineering, Information technology, Multimedia and software systems or equivalent, consistent with research area of the Department. Candidate must have 1st class or 1st division or equivalent CGPA all through.
NKCE01	Civil Engineering	Structural Engineering, Geotechnical Engineering, Highway &Transportation Engineering, Environmental Engineering.	B.E./ B.Tech in Civil Engineering/ Construction Technology or equivalent with M.E./ M.Tech in Civil Engineering.

55. The National Institute of Engineering, Mysuru- 570 008 – NM

Code	Department	Fields of Specialization	Minimum Qualification
NMCE01	Civil Engineering	Structural Engineering, Geotechnical Engineering, Water Resources &Environmental Engineering, Transportation Engineering, Remote sensing and GIS.	B.E./B.Tech in Civil Engineering or Equivalent degree with minimum 60% marks. M.E/M.Tech in Civil Engineering with at least 60% marks or equivalent grade.
NMEE01	Electrical Engineering	Power system, Distribution system, Renewable energy sources, Smart grid, Micro grid, Electric vehicles Battery Management system, Control & Instrumentation, Power Electronics & Drives	B.E./B.Tech in Electrical Engineeringwith 60% marks (aggregate of all years/ semesters), M.E./M.Tech in Electrical Engineering with at least 70% aggregate marks or equivalent grade.
NMIP01	Industrial& Production Engineering	Operations Management, Technology enabled education, Metal cutting, Industrial engineering and management, Manufacturing, Mechanical and wear characterization of advanced composites.	M.E./M.Tech in Mechanical/ Production/ Management and related branch with at least 60% marks or equivalent grade.
NMCS01	Computer Science &Engineering	Quantum Cryptography, Wireless Sensor Networks, High Speed Networks, Internet of Things (IoT), Data mining, Cloud computing, Network security, Big data analysis and related fields.	B.E./B.Tech in Computer Science & Engineering/Information Science & Engg with 60% marks (aggregate of all years/ semesters), M.E./M.Tech in Computer Science & Engineering/ Information Science & Engineering with a minimum of 70% marks or equivalent grade from UGC recognized universities..

56. Netaji Subhas University of Technology, New Delhi - 110 078 – NN

Code	Department	Fields of Specialization	Minimum Qualification
NNCS01	Computer Engineering	Soft computing, Machine learning, Expert system, Recommender system, Natural language processing, Sentiment and emotion analysis, Pattern recognition, Computer vision, Cloud computing, mobile computing, Broadcasting, Wireless sensor networks, Semantic web, Social network analysis, Watermarking, Network security, Internet of things, Topic modelling, Image processing, Databases, Data mining, Data warehousing, Big data analytics, Bio-informatics, Computational pedagogy, E-learning, Instructional software, Modeling and simulation, Data visualization, Human-computer interaction, Software testing, Software quality, Software metrics.	Master Degree in Engineering/ Technology in the relevant discipline (as per the AICTE Gazette notification dated April 28, 2017) or equivalent with a minimum 60% of marks or equivalent Cumulative Grade Point Average (CGPA) and Bachelor's Degree with a 60% of marks or equivalent CGPA. A relaxation of 5% marks, from 60% to 55%, may be allowed for those belonging to SC/ST/OBC (NCL)/ differently-abled and other categories or candidates in accordance with the policies of the Govt. of NCT of Delhi or as per the decision of the University Grants Commission from time to time. For details, the candidate may refer Ph.D. ordinance of Netaji Subhas University of Technology.
NNEC01	Electronics and Communication Engineering	Analog Signal Processing, and VLSI, Wireless and Optical Communications, Signal and Image Processing, RF and Microwave Engineering, Computer Networks, AI and Machine learning in computer vision, Nanoelectronics.	
NNIC01	Instrumentation & Control Engineering	Control System, Process Control, Robotics, Renewable Energy System, Electrical drives, Power Electronics, Hybrid Energy System, Transducer & Measurement, Biomedical Instrumentation, Biometric, Image and Signal Processing, Artificial Intelligence, Intelligent Control, Adaptive Control, Soft computing based Adaptive Control.	
NNME01	Mechanical Engineering	Advanced manufacturing processes, Micromachining, Hybrid machining and Additive manufacturing, Artificial Intelligence, Robotics, Industrial Engineering, Welding, Processing of Metals/Alloys, Composites, Processing of Polymer Composites, Mechanics of Smart materials, biomaterials, and sandwich structures, Nonlinear dynamics, Laser material Processing, Self-Healing Materials, Nanotechnology and Nanomaterials, Carbon Fiber Reinforced Polymer (CFRP) Composites, Composite materials, Tibobology, and Materials characterizations.	

NNBT01	Bio-Technology	Computational Biology & Bio-informatics, Molecular Microbiology & Drug Discovery, Cell and Molecular Biology, Biochemical Engineering, Nanobiotechnology & Nanomedicine, Cell Culture and Toxicoproteomics, Infection and Immunity, Production of Bioactive compounds.	

57. National Institute of Technology, Raipur, Chhattisgarh-492 010 – NR

Code	Department	Fields of Specialization	Minimum Qualification
NRWI01	Civil Engineering	Water Resources Development and Irrigation Engineering.	A Master's degree in Engineering / Technology, with minimum 60% marks or 6.5/10 CGPA/ CPI at Master's degree. However, a relaxation of 5% marks from 60% to 55% and from 6.5/10 CPI (CGPA) to 6.0/10 CPI (CGPA) may be allowed for those candidates belonging to SC, ST, OBC (Non Creamy Layer), Differently abled and those who had obtained their master's degree prior to 19.09.1991.

58. National Institute of Technology, Silchar (Assam) – 788 010 – NS

Code	Department	Fields of Specialization	Minimum Qualification
NSCE01	Civil Engineering	▪ Hydrology, Water Resources Engineering, Optimization methods, Sediment transport/River Mechanics Water &Wastewater Engineering, Surface Water Hydrology, Sediment Transport, Climate change, River Modeling, hydrological modeling, groundwater Engineering , Climate change impact in DRF ▪ Transportation planning, Transportation Engineering, Traffic Engineering, Pavement Engineering ▪ Geotechnical Engineering, Shallow foundation, deep foundation, machine foundation, soil dynamics, soil stabilization, Application of probability and reliability theory in geotechnical engineering, Ground improvement and Geosynthetics. ▪ Construction Materials &Structural Engineering, Earthquake Engineering, Vibroacoustics, Structural Dynamics and vibration control, Active Structural Acoustic Control (ASAC) ▪ Environmental Engineering	**(i)** M.E./M. Tech. or equivalent in an appropriate area with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60% of marks). For SC/ST candidates, a minimum CPI of 6.0 (on a 10 point scale) Or equivalent (55% of marks). **(ii)** B.E./B. Tech. with an excellent academic record and with a CPI of at least 8.0 (on 10 point scale) or equivalent (75% of marks). For graduate from IITs/NITs, the minimum CPI requirement is 7.0 (on 10 point scale). For SC/ST candidates, there is a relaxation of 0.5 CPI or 5% of marks.
NSCS01	Computer Science & Engineering	Machine Learning. Cryptography Big Data Networking. Image Processing Speech Processing NLP Soft Computing Techniques and Applications	**(i)** M.E./M. Tech or equivalent in an appropriate area with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60% of marks). For SC/ST candidates, a minimum CPI of 6.0 (on a 10 point scale) or equivalent (55% of marks). **(ii)** B.E./B. Tech. with an excellent academic record and with a CPI of at least 8.0 (on 10 point scale) or equivalent (75% of marks). For graduate from IITs/NITs, the minimum CPI requirement is 7.0 (on 10 point scale). For SC/ST candidates, there is a relaxation of 0.5 CPI or 5% of marks.
NSEE01	Electrical Engineering	▪ Power and Energy Systems ▪ Power Electronics and Renewable Energy	**(iii)** M.E./M. Tech or equivalent in an appropriate area with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60% of marks). For

		systems ▪ Electric Machines and Drives ▪ Renewable Energy ▪ Electric Vehicles ▪ Control Systems Industrial ▪ Automations ▪ Instrumentation ▪ Microelectronics ▪ VLSI and Image processing	SC/ST candidates, a minimum CPI of 6.0 (on a 10 point scale) or equivalent (55% of marks). **(iv)** B.E./B. Tech. with an excellent academic record and with a CPI of at least 8.0 (on 10 point scale) or equivalent (75% of marks). For graduate from IITs/NITs, the minimum CPI requirement is 7.0 (on 10 point scale). For SC/ST candidates, there is a relaxation of 0.5 CPI or 5% of marks.
NSEC01	Electronic & Communication Engineering	▪ Devices, Microelectronics And VLSI: Semiconductor Device And Modelling, Bio Sensor, Solid State Device Modeling And Simulation, Electronic Circuits, Nanoelectronics & Nanotechnology, Semiconductor Device And Modelling, VLSI Interconnects, Digital VLSI Design, Sensors, Stretchable Electronics, Machine Learning For Physical Design, Perovskite Solar Photovoltaics, Synthesis Of Nano-Particle And Application Of Nanotechnology, Analog Circuits, VLSI, VLSI Design, MEMS, MEMS-Piezoelectric Energy Harvesting, RF MEMS, Bio Sensor, Power Electronics. ▪ Signal Processing: Digital Signal Processing, Speech Processing, Image And Video Processing, Bio- Medical Signal Processing, Digital Image Processing, Medical Imaging Embedded Systems, Machine Learning and Eep Learning, Advanced Driver-Assistance Systems (ADAS), Sentiment Analysis, Design of Exoskeleton, Augmented Reality, computer Vision, Image Processing, Machine Learning/Deep Learning Applications in Image Processing And Computer vision, Pattern Recognition, Machine Learning and Deep Learning. ▪ Communication: Wireless Communications 5G Communication Techniques, Cross-Layer Issues In Wireless Sensor Networks, Cooperative Wireless Communications, AI-Assisted Self-Sustainable Energy Harvesting Wireless Communication, Next Generation (5G+) Networks, Power Line Communications, Underwater Networks, Free-Space Optical Communications, And Green Communications, Cognitive Radio Networks, Cooperative Communications, Resource Sharing RF-MAC And Enery Harvesting MAC Protocols, Target Channel Selection, MIMO And Massive MIMO Communications, mm-wave Communications, Cooperative MIMO Communications, NOMA, MIMO Communications, MIMO-OFDM Communications Signal Processing for Communications, Antenna Communications, Efficient Scheduling of Wireless Resources , and Various Aspects of all other Recent Forms Of Communications, Soft Computing Techniques in Communication and WSN, IoT, Signal Processing For Communications. ▪ Optical Communication: Optical Fiber Communication ▪ Opto-Electronic Devices, III-V Semiconductors, Photonic Integrated Circuits, Biosensors.	

		▪ Antenna: Resonators for RF Applications, Metamaterial-Inspired Structures for Antenna Application, Active & Passive Microwave Devices, Microwave Imaging, Smart Antenna Systems. ▪ Machine Learning: Machine Learning And Deep Learning, Soft Computing Techniques. ▪ Computer: Cyber Security, Cloud Computing	
NSME01	Mechanical Engineering	▪ Renewable Energy, Aerodynamics, Combustion ▪ Micro machining, advance machining and manufacturing processes ▪ Mechanical Behaviour of FRP Laminated Composites ▪ Molecular Dynamics ▪ IC Engine, Bio fuel ▪ Analytical heat transfer, Heat transfer augmentation Extended surface Electronic cooling, Heat transfer through porous surface, Solar collector, Renewable energy Optimization, CFD, Bioheat Transfer, Natural convection, Microfluidics, Micro-scale and Meso-scale Heat transfer ▪ Internal Combustion Engines, Combustion Kinematics, Pollutant formation mechanism, Fuel Hybridization, Emission after treatment. ▪ Kinematic and Dynamic Modelling of the Robotic Manipulator, Parallel Manipulator and Nonlinear Control of Robotic Systems, Mechanism, Compliant Mechanism, Shape Memory alloy Smart Actuation ▪ Arc based surface modification, Hard surface coating, Laser material processing ▪ Welding and Corrosion ▪ Multibody Dynamics, Rotor dynamics, Vibration analysis, Vibration control ▪ Tribology, Nano-lubrication, Composite Materials, Surface Engineering and Coatings ▪ Additive Manufacturing; Topology Optimization ▪ Thermal spray, MQL assisted machining, Abrasive machining, Coatings, Material Characterization	**(i)** M.E./M. Tech or equivalent in an appropriate area with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60% of marks). For SC/ST candidates, a minimum CPI of 6.0 (on a 10 point scale) or equivalent (55% of marks). **(ii)** B.E./B.Tech with an excellent academic record and with a CPI of at least 8.0 (on 10 point scale) or equivalent (75% of marks). For graduate from IITs/NITs, the minimum CPI requirement is 7.0 (on 10 point scale). For SC/ST candidates, there is a relaxation of 0.5 CPI or 5% of marks.
		Measurements, Sensors, Instrumentation & Biomedical Fields: Measurements and Instruments. Sensors & Transducers, Biosensors, smart sensors, nanosensors, soft sensors, Industrial instrumentation, Intelligent Instrumentation., Air and water quality monitoring systems based on nanosensors, Agricultural & Environmental instrumentation, Thin film supercapacitors for electrical vehicles, Biomedical Instrumentation & Signal Processing, Active transdermal drug delivery system, Modelling of human skin impedance parameters, Objective Pain Measurement, Virtual Realityin Pain Management, Pain Inducer, HumanFactors Engineering/ Automation, BCI, Neuroscience, Smart nanosensors for biomedical instrumentation, TechnologyforSocietal issues , IOT applications in Instrumentation & health care monitoring systems. **Control Systems & Process Control:** Linear and Nonlinear Multi-Dimensional Systems, Modeling of Dynamical Systems, Biological Control Systems, Modelling andcontrol of fractional order processes, Modelling and Control of an Autonomous Underwater Vehicle, Machine Learning Applications, Quadcopter based attitude control, Development of Robotic Vehicles,Robust and Adaptive Control, Decentralizedcontrol, Sliding Mode Control and its applications, Application of control in Bio-medical field. **Signal Processing and Electronics, VLSI & Communications**: Digital Signal processing and applications, Digital Image processing D2D communication, UAV and mmWave 5G communication and beyond Energy Harvesting issues for 5G communication, VLSI design, Emerging memories with artificial intelligence (AI) applications,Device Fabrication&Characterization, Advanced applications of non-volatile memories Nanoelectronics and modern semiconductor devices, applications of machine learning and artificial intelligence.	**(i)** M.E./M. Tech or equivalent in an appropriate area with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60% of marks). For SC/ST candidates, a minimum CPI of 6.0 (on a 10 point scale) or equivalent (55% of marks). **(ii)** B.E./B.Tech with an excellent academic record and with a CPI of at least 8.0 (on 10 point scale) or equivalent (75% of marks). For graduate from IITs/NITs, the minimum CPI requirement is 7.0 (on 10 point scale). For SC/ST candidates, there is a relaxation of 0.5 CPI or 5% of marks.

		Energy Systems: Renewable energy sources and devices, Development of energy storage devices, Energy harvesting systems, Control of Renewable Energy systems, Solar energy and Thin Film solar cells.	

59. University College of Engineering, Osmania University, Hyderabad-500 007 – OU

Code	Department	Fields of Specialization	Minimum Qualification
OUCE01	Civil Engineeing	Construction Engineering and Management Geotechnical Engineering, Infrastructure Engineering, Structural Engineering, Water and Environmental Engineering, Transportation Engineering.	First Class M.E/M/Tech in Civil Engineering.
OUCS01	Computer Science and Engineering	Cloud Computing, Data Mining, Distributed Computing, Cyber Security, Image Processing, Information Retrieval Systems, Mobile Computing, Network Security Parallel Processing Applications, Parallel Algorithms, Text Mining	First Class M.E/M/Tech in Computer Science and Engineering.
OUME01	Mechanical Engineering	Advanced Manufacturing, Additive Manufacturing (RPT) Advanced Energy Systems, Bulk Material Handling, CAD/CAM Design, Computational Fluid Dynamics, Composite Materials, Experimental Techniques in Turbomachines, Finite Element Methods, Industrial Engineering, Materials Forming, Production Engineering, Robotics, Severe Plastic Deformation, Thermal Engineering, Turbo Machinery.	First Class M.E/M/Tech in Mechanical Engineering.
OUEE01	Electrical Engineering	Application of Power Electronics to Renewable Energy Sources, Control of Electric Drives, Control and Automation, Distribution Automation, Electrical Machines, Hybrid Electrical Vehicles, Reactive Power Optimization, Soft Computing applications to Design and Control of Microgrid. **Power Systems:** Multilevel Inverter and its Applications, Power System Control and Optimization, Smart grid based Power Systems and Power Quality Problems, Power System Security, AI Applications to Power Systems, Power System Operation and Control, Power System Reliability.	First Class M.E/M.Tech in Electrical Engineering.
OUEC01	Electronics and Communication Engineering	Image Processing, GNSS, Signal Processing, Speech Analysis, VLSI.	First Class M.E/M/Tech in Electronics and Communication Engineering.

60. Indian Institute of Technology, Patna, Bihar 801 103 – PA

Code	Department	Fields of Specialization	Minimum Qualification
PAME01	Mechanical Engineering	Mechanical Engineering	As per IIT Patna Bihar norms (https: //www.iitp.ac.in/)
PACB01	Chemical & Biochemical Engineering	Chemical & Biochemical Engineering	
PACE01	Civil & Environmental Engineering	Civil & Environmental Engineering	
PACS01	Computer Science & Engineering	Computer Science & Engineering	
PAEE01	Electrical Engineering	Electrical Engineering	

60. PDPM Indian Institute of Information Technology Design & Manufacturing, Jabalpur (M.P.) - 482 005 – PD

Code	Department	Fields of Specialization	Minimum Qualification
PDCS01	Computer Science &Engineering	Software Engineering, Visual Cryptography, Big Data Analysis, I/O Efficient Algorithms, Soft Computing, Networking, Parallel Algorithms, Image Reconstruction, Biometrics, Image Retrieval, Security, Cloud Computing, Robotics and Automation, Computer Aided Design.	M.Tech./ M.E. in Computer Science & Engineering or Information Technology or a similar discipline with minimum of 65 percent marks OR a CPA/CGPA of 6.5 (on the Scale of 10.00
PDEC01	Electronic & Communication Engineering	Electronics & VLSI Design: Nano-electronics, Low Power System Design, Device Simulation and Modeling, SRAM Design; Control, Instrumentation and Power System: Identification and Control of Processes, Mobile Robot, Power Electronics, Power System Protection; Microwave and Communication Engineering, Electromagnetics, Antenna Design Fabrication and Testing, MMIC, Nanophotonics and Plasmonics, Wireless Communication, Fiber optic Comm system; Signal Processing: Multirate Signol Processing, Biomedical Signal Processing, Filter Bank Designing and Application.	M.Tech./M.E. in Electronics/ Electronics & Communication Engineering/ Electrical Engineering or a similar discipline with minimum of 65 percent marks OR a CPA/CGPA of 6.5 (on the Scale of 10.00).
PDME01	Mechanical Engineering	Mechanical Design, Vibrations, Fault Diagnosis and Condition Monitoring of Machines, Non-liner Dynamics, Smart Materials and Structures, Flapping Wing MAV, Mechatronics and Robotics, Composite Materials. Advanced Machining, Hybrid Machining, Dieless Forming, Additive Manufacturing, CNC Machining, Geometry, Microfuidics, Thermal &Fluid engineering, Heat Transfer,	M.Tech./ M.E. in Mechanical Engineering/ Production Engineering/ Industrial Engineering/ Production and Industrial Engineering or a similar discipline with minimum of 65 percent marks OR a CPA/CGPA of 6.5 (on the Scale of 10.00)

		Product Design, Geometric Modelling, Computational Support to Design, Knowledge-based Engineering Design, Supply Chain Management, Operations Management.	

61. **PSG College of Technology, Coimbatore 641 004 - PS**

Code	Department	Fields of Specialization	Minimum Qualification
PSME01	Mechanical Engineering	Machine Design, Finite Element Analysis, CAD/CAM, Automobile Engineering, Composite materials, Rapid Prototyping, Heat Power Engineering, Fluid Power Control & Automation, Energy Engineering, Simulation, Operations Management, Metal Forming, Casting Welding, Injection Molding, Precision Engineering Tolerance Engineering, Computer Aided Engineering, Smart Systems, Vibration & Noise Engineering, Product Life Cycle Management, Reliability Engineering, Machine Tool Design Safety Engineering, Innovation & Creativity, Value Engineering, Concurrent Engineering, Pneumatics, Manufacturing, Instrumentation, DFMA, TPM, Tribology, Ergonomics & Industrial Design, Refrigeration & Air Conditioning, Nano Technology.	A Master's degree in Mechanical Engineering/Production Engineering.
PSPE01	Production Engineering	CAD/ CAM, Laser Material Processing, FluidPower Control and Automation, IndustrialEngineering, Value Engineering, Systems Engineering, Total Quality Management, Agile Manufacturing, Innovative Management, Metal Forming, Concurrent Engineering, Manufacturing Systems Analysis, Virtual Manufacturing, Lean Manufacturing, Precision Manufacturing, Product Data Management, Product Life Cycle Management, Product Development, Metal Casting Injection Molding, Tool Design (Jigs & Fixtures), Welding. Management, Metal Forming, Concurrent Engineering, Manufacturing, Systems Analysis, Virtual Manufacturing, Lean Manufacturing, Precision Manufacturing, Product Data Management, Product Life Cycle Management, Product Development, Product Reliability, Metal Casting, Injection Moulding, Tool Design (Jigs & Fixtures), Welding.	A Master's degree in Mechanical Engineering/Production Engineering.
PSAU01	Automobile Engineering	Engine Manufacturing System, Alternate fuels/ Fuel Cells, Automotive materials, Solar Power Vehicles, Electric and Hybrid Vehicles, Automotive Acoustics, Product Life Cycle Management, IC Engines.	A Master's degree in Automobile Engineering/Mechanical Engg./Production Engineering.
PSEC01	Electronics and Communication Engineering	RF and Microwave antennas, RF MEMS, Wireless Communication, Image Processing, Signal Processing, Speech signal Processing, VLSI Design, Networking, Wireless Sensor Networks Communication, Nano Technology and related domain, Embedded Systems, Wireless Security.	A Master's degree in any of the following specializations: Communication Systems, Wireless Communication, Applied Electronics, Electrical Machines, Power Electronics & Drives, Embedded and Real Time systems, Computer Science and Engineering, Nanotechnology
PSBT01	Bio-technology	Human Genetics, Neuroscience, Cancer and Computation biology, Plant Molecular Biology and Biotechnology, Bio Process and Molecular Biology, Clinical Biotechnology & Microbiology, Environmental biotechnology, Plant Biotechnology, Biofuels and Biomass Energy.	A Master's Degree (M.E., M.Tech or M.Sc) in Relevant field.
PSBM01	Bio-medical Engineering	Medical Image Processing & Analysis includes quantitative analysis and visualization of medical images. BioSignal Processing & Analysis includes HRV (Heart rate Variability) analysis, EEG analysis tc. Medical Instrumentation applications include Equipmentsused in the medical tests for diagnosis, screening, and monitoring of diseases. Body Sensor Networks application includes monitoring, diagnostic, or therapeutic levels and implantable biomedical systems. 3D modeling & printing includes customized implants and orthopedic replacement parts. Biomechanics explores biological problems in Cardiovascular and Respiration, Artificial Organs Includes blood purification, cardiovascular intervention, biomaterials, artificial metabolic organs and more. Biosensors include immunosensors, enzyme- based biosensors, and organism. Computational Methodsin Biomedical Engineering - robust design solutions for artificial joints, stents, minimally invasive surgery, and assistive technology. Medical Data processing- details decision support systems using heuristic, algorithmic and/ or statistical methods.	A Master's Degree (M.E., M.Tech or M.Sc) in Relevant field.
PSIC01	Instrumentation and Control Systems Engineering	Control Systems, Image Processing.	A Master's degree (M.E./ M.Tech) in the following specializations: Control & Instrumentation Engg/ Process Control & Instrumentation Engg/ Control Systems Engineering/ Applied Electronics/ Communication Engineering.

62. Puducherry Technological University, Puducherry - 605 014 – PY

Code	Department	Area of Research	Minimum Qualification
PYEC01	Electronic & Communication Engineering	Wireless Communications and Wireless Security, Signal Processing and Image Processing for communication, Bio-medical Signal Processing, Wireless Networks, Optical Networks, Cryptography and VLSI System Design.	B.E./B.Tech. degree in Electronics and Communication Engineering and M.E/ M.Tech. degree in Electronics/ Communication Systems/ Electronics and Communication Engineering /any related specializations with an overall minimum aggregate of 55% of marks or equivalent in the qualifying examination M.E./ M.Tech.
PYCS01	Computer Science & Engineering	Computer Networks, Software Engineering, Software Architecture, Software Metrics and Testing, Cloud Computing, Service Oriented Architecture and Computing, Database Systems, Data Mining and Warehousing, Language Technology and Ontology, Internet Technology, Distributed Systems, Digital Image Processing , Data Compression, Multimedia Technology, Artificial Intelligence and Fuzzy Logic, Information Security.	B.E./B.Tech. degree in CSE/IT/ECE/EEE/E&I and M.E/ M.Tech degree in Computer Science and Engineering or Information Technology with a minimum of 55% marks.
PYEE01	Electrical & Electronics Engineering	Power systems, power electronics, machines and electro magnetics, signal processing and control, artificial intelligence and digital control /estimation and renewable energy systems.	B.E./B.Tech. degree in Electrical and Electronics Engineering/Electronics and Instrumentation and M.E./M.Tech. degree in Electrical and Electronics Engineering/ other related specializations with minimum of 55% of marks.
PYME01	Mechanical Engineering	Production Engineering, Thermal Sciences and Engineering, CFD, design and simulation of thermal systems, Renewable energy sources, Materials and Manufacturing, Modeling & Simulation studies in Mechanical Engineering, Internal Combustion Engines, Alternative Fuels, Heat Transfer and Corrosion Engineering Design, FEA, Tribology, Production Engineering, Production/ Operations Management, Computational Mechanics, Modeling & Simulation in Manufacturing & Thermal Systems, Internal Combustion Engines, Refrigeration & Air Conditioning & Renewable Energy Sources, Production Engineering, Nano materials, Nano Coating, Corrosion, Surface Engineering, Renewable Energy Systems.	(a) B.E./ B.Tech. Degree in Mechanical Engg. and M.E./ M.Tech. Degree in Mechanical Engg. / other related specialization listed here, with a minimum of 55 % of marks. Energy Engineering/Technology I.C. Engines Thermal Engineering Refrigeration & A.C Engineering Engineering Design CAD CAD/CAM Product Design and Manufacturing Manufacturing Engineering Production Engineering Foundry Engineering Welding Technology Logistics and SCM (b) M.E./M.Tech Degree in other branch of Engineering With a minimum of 55% of marks with specialization in: Chemical Engineering Ocean Engineering Nano Science and Technology Industrial Engineering/ Management Environmental Engineering Structural Engineering Industrial Metallurgy Automobile Engineering Aerospace Engineering Materials Science and Engineering a) B.E./B.Tech. degree and M.E/ M.Tech. degree in Civil Engineering with a minimum of 55% of marks or equivalent with specialization in: i)Structural Engineering ii)Geotechnical Engineering iii)Hydraulic & water Resource Engg. (iv) Ocean Engineering v)Environmental Engineering / Environmental Technology/ Advanced Construction Technology, vi) Geo informatics (b) B.E/B.Tech degree and M.E/ M.Tech Degree with a minimum of 55% or equivalent with specialization in: Energy Technology / Environmental Engineering / Environmental Management. Bio - Technology / Chemical Engineering / Industrial Biotechnology
PYCE01	Civil Engineering	Structural Engineering, Geotechnical Engineering, Industrial Waste Management & Environmental Engineering, Soil Mechanics & Foundation Engineering, Hydraulics & Water Resources Engineering.	

63. Rajasthan Technical University, Kota, Rajasthan-324010 –RA

Code	Department	Fields of Specialization	Minimum Qualification
RAXX01	RA	RA	As per Institute norms
RAXX01	RA	RA	

64. Rajiv Gandhi Institute of Petroleum Technology, Bahadurpur, Amethi, Uttar Pradesh-229304-RB

Code	Department	Fields of Specialization	Minimum Qualification
RBPG01	Department of Petroleum Engineering & Geoengineering	Reservoir engineering, Drilling engineering, Production engineering, Enhanced oil recovery, nanodrilling fluids, Petroleum systems,Geomechanics, Unconventional hydrocarbon resources (Gas Hydrates, Shale gas/oil, CBM)	a) Applicants with Master's degree in engineering in the discipline concerned or in an allied discipline/area must have a minimum of 60% marks or 6.0 CPI (on a 10.0 point scale) at the Master's degree level. b) Applicants with Bachelor's degree in engineering in the discipline concerned or in an allied discipline/area must have a minimum of 75% marks or 7.5 CPI (on a 10.0 point scale) at the Bachelor's degree level. Applicant with more than two years of professional experience, the minimum requirement shall be 70% marks or 7.0 CPI (on 10 point scale) at Bachelor degree provided the degree is from an Institution funded by the Central Government. c) Applicants with Master's degree in science as an allied discipline/area (where science is an allied discipline/area), must satisfy each of the following criteria: (i) A minimum of 65% marks or 6.5 CPI (on a 10.0 point scale) at the Master's degree level, A minimum of 60% marks or 6.0 CPI (on a 10.0 point scale) at the Bachelor's degree level.
RBCL01	Department of Chemical Engineering &Biochemical Engineering	Fuel cell, flow battery, microbial cell, energy storage, water splitting,photovoltaics, biomass conversion, biodiesel, CO2 capture and conversion, hydrogen storage by adsorption, adsorbed natural gas, liquid hydrates, nanocatalysis, photocatalysis, electrocatalysis, membrane separation, crystallization, process intensification,microfluidics, desulfurization, polymers, nanomaterials for energy applications, modelling &simulation of material structures and processes	

65. **Rajiv Gandhi Institute of Technology, Govt. Engineering College, Kottayam (Kerala) - 686 501 – RG**

Code	Department	Fields of Specialization	Minimum Qualification
RGEE01	Electrical Engineering	Power and Renewable EnergySystem, Industrial Drives, Control Engineering.	As per norms of APJ. Abdul Kalam Technological University, Trivandrum.
RGME01	Mechanical Engineering		
RGCE01	Civil Engineering	Transportation Engg, Structural Engineering Geotechnical Engg., Water Resource Engineering.	

66. National Institute of Technology Rourkela, Rourkela- 769 008 – RK

Minimum eligibility is Masters degree in Engineering Technology with at least 60% marks in aggregate.

Code	Department	Fields of Specialization	Minimum Qualification
RKCM01	Ceramic Engineering	Ceramic Engineering	B.E./ B.Tech./ M.Sc. in relevant discipline with minimum 65% marks in aggregate or 7.0CGPA. OrM.E./M.Tech. in relevant discipline with at least 60 percent marks in aggregate (or 6.5 CGPA) at both B.Tech./(or M.Sc.) and M.Tech. Levels.
RKCH01	Chemical Engineering	Chemical Engineering	
RKEC01	Electronics & Communication Engineering	Telematics & Signal Processing	
RKEC02		VLSI Design & Embedded System	
RKEE01	Electrical Engineering	Power Control & Drives	
RKME01	Mechanical Engineering	Experimental Stress Analysis	M.E./ M.Tech in Mechanical Engineering With at least 60% marks in aggregate.
RKME02		Vibration	
RKME03		Plastic Deformations of Metals	
RKME04		Heat Transfer	
RKME05		Cryogenics	
RKME06		Finite Element Techniques	
RKME07		Computer Aided Design	
RKME08		Computer-aided Manufacturing	
RKME09		Automation & Robotics	

RKMM01	Metallurgical & Materials Engineering	Metallurgy & Materials Engineering.	M.E./M.Tech. in Material Engineering/ Science or Met. Engineering or Mechanical Engineering. or Chemical Engineering or Ceramic Engineering With 60% marks in aggregate.
RKMI01	Mining Engineering	Mining Engineering.	B.E./ B.Tech / M.Sc. in relevant discipline with minimum 65% marks in aggregate or 7.0CGPA. Or M.E./ M.Tech. in relevant discipline with at least 60 percent marks in aggregate (or 6.5 CGPA) at both B.Tech./(or M.Sc.) and M.Tech. Levels.

66. Indian Institute of Technology, Ropar, Punjab 140 001- RO

Code	Department	Fields of Specialization	Minimum Qualification
ROME01	Mechanical Engineering	Mechanical Engineering	As per IIT Ropar, Punjab norms (www.iitrpr.ac.in/)
ROCS01	Computer Science and Engineering	Computer Science and Engineering	
ROCE01	Civil Engineering	Civil Engineering	
ROCH01	Chemical Engineering	Chemical Engineering	
ROEE01	Electrical Engineering	Electrical Engineering	
ROMT01	Metallurgical & Materials Engineering	Metallurgical & Materials Engineering	

68. **Shri Guru Govind Singh Institute of Engineering & Technology, Nanded - 431 606 – SG**

Code	Department	Fields of Specialization	Minimum Qualification
SGEC01	Electronics & Communication Engineering	VLSI and Embedded Systems.	M.E./ M.Tech degree in relevant discipline with minimum 55% marks or equivalent CGPA.
SGEC02		Signal Processing: Speech, Biomedical Signals.	
SGEC03		Image and Video Processing.	
SGEC04		Pattern Recognition.	
SGIC01	Instrumentation & Control	Process Control and Instrumentation	M.E./ M.Tech or Equivalent degree in Instrumentation, Instrumentation & Control, Electrical Engineering, Electronics, Electronics & Telecommunication, Electronics & Instrumentation, Electrical & Electronics Engineering, Biomedical Instrumentation with minimum 55% marks or equivalent CGPA
SGIC02		Signal and Image Processing	
SGIC03		Control Engineering	
SGIC04		Agriculture Instrumentation	
SGIC05		Biomedical Instrumentation	
SGIC06		Micro sensors and Systems	
SGIC07		Electrical Engineering	
SGPE01	Production Engineering	Micro-Manufacturing	M.E./ M.Tech. degree in Production, Mechanical or equivalent with minimum 55% marks or equivalent CGPA.
SGPE02		Advanced Manufacturing Technologies	
SGPE03		Modeling and Analysis of Manufacturing Processes: Machining, Casting, Welding and Metal Forming.	
SGPE04		CAE for Composites	
SGPE05		Robust Design and Simulation Analysis for Products and Processes	
SGPE06		Production/Operations Management and PLM	
SGPE07		Tool Condition Monitoring	
SGCE01	Civil Engineering	Hydraulics and / Water Resources Engineering	Master's degree in Hydraulics and/ or Water Resources/ Environmental Engineering or equivalent degree with minimum 55% marks or equivalent CGPA.
SGCE02		Environmental Engineering	
SGCE03		Geotechnical Engineering	
SGCE04		Structural Engineering	
SGME01	Mechanical Engineering	Micro Manufacturing	M.E./ M.Tech. degree In Mechanical/ Production Engineering or equivalent with minimum 55% marks or equivalent CGPA.
SGME02		Advanced Manufacturing Technologies	
SGME03		Tribological Characterization	
SGME04		Quality and Reliability	
SGME05		Production and Operation Management	
SGME06		Manufacturing Process Modeling and Analysis: Machining, Casting, Welding and Metal Forming	
SGME07		Thermo-Structural Analysis, Design and Analysis of Composites	

SGCS01	Computer Science and Engineering	Deep Learning	M.E./ M.Tech. degree In Mechanical/ Production Engineering or equivalent with minimum 55% marks or equivalent CGPA.
SGCS02		Cyber Security	

69. National Institute of Technology Karnataka, Surathkal 575 025 – SK

Admission to Ph.D. Programme shall be open to Indian Nationals who passed the qualifying degree in relevant field with a Cumulative Grade Point Average (CGPA) of at least 6.5 in the 0-10 scale grading system, or not less than 60% marks in the aggregate (taking into account the marks scored in all the subjects of all the public/ university examinations conducted during the entire prescribed period for the qualifying degree). However, this prescribed minimum shall be a CGPA of 6.0 or 55% marks in the aggregate for SC/ST/PwD candidates. The prescribed qualifying examination is as follows:

a. For Ph.D. in Engineering/Technology – Master's degree in relevant field.
b. For Ph.D. in Science – Master's degree in relevant field.
c. For Ph.D in Humanities, Social Science & Management – Master degree in relevant field, CA along with undergraduate degree.

If the evaluation system in qualifying degree is in both CGPA and Marks, CGPA value will be considered. Also Conversion from Grade point system to Percentage system will not be considered.

Code	Department	Fields of Specialization	Minimum Qualification
SKWO01	Water Resources and Ocean Engineering	Ocean and Coastal Engineering, Offshore Renewable Energy, Computational ydrodynamics, Structural Dynamics, Offshore Engineering, Marine Structures, Isotropic Elasticity in Marine Structure Analysis, Finite Element Analysis of marine and hydraulic structures	Master's degree i n Civil/ H yd r a u l i c s /Water Resources/ Aerospace/ Agricultural/ Ocean/ Environmental/ Coastal Engineering/ Remote Sensing/GIS.
SKWO02		Softcomputing Applications in Civil Engineering, Geo-informatics Applications in Civil Engineering: Hyperspectal Remote Sensing, Microwave Remote Sensing, Disaster management using advance surveying, GIS and UAV.	Master's degree i n Civil/ H yd r a u l i c s /Water Resources/ Aerospace/ Agricultural/ Ocean/ Environmental/ Coastal Engineering/ Remote Sensing/GIS.
SKWO03		Water Resources Engg & Management, Surface Water Hydrology, Hydrological modelling , Artificial Intelligence in water resources, Urban Hydrology, Urban water management, Sediment Transport.	Master's degree i n Civil/ H yd r a u l i c s /Water Resources/ Aerospace/ Agricultural/ Ocean/ Environmental/ Coastal Engineering/ Remote Sensing/GIS.
SKCE01		Structural Engineering	M.E./M.Tech./M.Sc.(Engineering) in Structural Engineering or related areas.
SKCE02		Geotechnical Engineering	M.E./M.Tech./ M.Sc. (Engineering) in Geotechnical Engineering (Soil Mechanics and foundation Engineering) or any other related fields.
SKCE03		Transportation Engineering, Environmental Engineering, Construction Technology & Management, Earth Sciences.	M.E./M.Tech./M.Sc. (Engineering) in the relevant Civil Engineering disciplines or related areas.
SKCH01	Chemical Engineering	Process Development, Particulate Systems, Environmental Engineering, Transfer Operations, Industrial Biotechnology, Energy, Modelling and Simulation, Computational Fluid Dynamics, Nanoscience/ Nanotechnology, Polymernanocomposites, Process dynamics and	Master's in Chemical Engineering/Biotechnology/Micro-biology/Biochemistry or related fields.
SKCS01	Computer Engineering	Computer Networks, Software Engineering, Distributed Computing, Data Mining, Information Security, High Performance Computing, Computer Vision, Cloud Computing, Image Processing, Speech Processing, Mobile computing, Cloud system, Internet of Things (IoT), Blockchain Applications, Computer Architecture, Machine Learning and Artificial Intelligence, Networks-on-Chip, Formal Verification, Cyber Physical Systems, Data Science, Precision agriculture and farming, Social Computing, Graph Theory, Big Data analysis, Network Function Virtualization, Information Centric Networking, 5G Core, Underwater Communication, Cryptography.	M.E./M.Tech /M.Sc. (Engineering) in Computer/ IT/E & C / Software Engineering /Networks, with B. E. / B. Tech. / B. Sc. (Engineering) in Computer/ E&C/IT/E&E
SKEC01	Electronics and Communication Engineering	Communication/VLSI Design / Signal Processing	Master's Degree in Engineering / Technology or Master's Degree in the field of specialization.
SKEE01	Electrical and Electronics	Adaptive and distributed signal processing for sensing and Image applications; Control system;	Master's Degree in Electrical Engineering or relevant field.

	Engineering	Electrical Machines and Machine Diagnosis; High voltage Engineering and field computations; Power Electronics & Drives; Power Systems; Renewable Energy technologies; Smart grid technologies; Machine Learning.	
SKMG01	School of Management	Strategic Management, International Business, Technology Management, Organizational Behaviour, HumanResource Management, Marketing, Corporate Finance, Capital Markets, Behavioural Finance, Development Economics, International Economics, Agriculture Economics, Rural Development, Applied Econometrics, Operations Management, Information Systems, E-Governance, English and Comparative Literature, Business Analytics, and Other related areas.	Master's Degree in relevant field. *M.Phil degree will not be considered
SKME01	Mechanical Engineering	Renewable Energy, Alternative Fuels, IC Engine &Combustion, Refrigeration and Air-conditioning, Heat Transfer, Fluid Dynamics, Fracture Mechanics and Fatigue, FEM, Stress Analysis, Tribology, Machine Dynamics and Vibration, Advanced Materials, Advanced Manufacturing, Mechatronics, MEMS, Nanotechnology, Robotics and Control, Product Design, Structural Acoustics, Polymer Nano Composites, Precision Manufacturing, Bio System Engineering, Cryogenics.	M.E./M.Tech./M.Sc. (Engineering) in the relevant field.
SKMI01	Mining Engineering	Rock Mechanics & Ground Control Engineering, Drilling &Blasting, Mine Planning, Environmental Management, Slope Stability, Design and Stability of Civil Excavations, Waste Management, Mineral Beneficiation, Computer Applications in Mining, Mine Health and Safety Engineering.	Master's degree in any Engineering and Applied Geology , Geophysics & related areas.
SKMT01	Metallurgical and Materials Engineering	Physical Metallurgy, Mechanical Metallurgy, Extractive Metallurgy, Beneficiation of Minerals, Welding, Surface Engineering, Corrosion, Polymer Nanocomposites, Ceramic and Polymeric Nanofabrics, Energy Conversion, and storage, Thin Films & coatings, Advanced Materials, Heat Transfer Studies.	M.E./M.Tech./M.Sc. (Engineering.) in the relevant field.

70. Sardar Patel College of Engineering, Mumbai (Maharashtra) - 400 058 – SM

Code	Department	Fields of Specialization	Minimum Qualification
SMCE01	Civil Engineering	Construction Management.	M.E/M. Tech. in Construction Management, Transportation Engineering, Geotechnical Engineering, Hydraulic andOffshore Engineering, Environmental Engineering.
		Transportation Engineering.	
		Hydraulics and Fluid Mechanics.	
		Environmental Engineering.	
		Structural Engineering.	Structural Engineering, Geotechnical Engineering.

71. **Sant Longowal Institute of Engineering & Technology (Deemed University), Longowal (Punjab) - 148 106 – SP**

Code	Department	Fields of Specialization	Minimum Qualification
SPME01	Mechanical Engineering	Industrial & Production Engineering (Quality & Reliability Engineering; Supply Chain Management, TPM, TQM), Thermal Engineering, Non-Conventional Machining, Hybrid Machining Process, Welding Engineering,Agri-WasteManagement, Simulation Vibration, Precision Metrology, Metal Machining/ Cutting, Product Design Management, Automobile Engineering, Composite & Advanced Materials.	M.Tech.
SPFE01	Food Engineering & Technology	Food Engineering, Food Processing & Preservation, Food Process Engineering, Food Processing Technology, Food Technology, Agricultural & Food Engineering, Food Science and Technology, Food Science or relevant field.	M.Sc./ M.Tech.
SPIE01	Electronics & Instrumentation Engineering	Biomedical Engineering Control Engineering Electrical Engineering	M.E. / M.Tech or equivalent

		Electrical Engineering (Power) Electrical Power Engineering Electronics Engineering Instrumentation & Control Engineering Instrumentation Engineering Instrumentation Technology Power Electronics Biomedical Instrumentation Control & Instrumentation Control System Engineering Instrument Technology Instrumentation & Process Control Medical Electronics Engineering Medical Instrumentation Medical Electronics	
SPCT01	Chemical Technology	Biomass and Bioenergy Conventional and Non-conventional Energy Sources Environmental Engineering Industrial Pollution Control Hydrogen Energy Biorefineries (Energy and Biomaterials) Biomaterials Controlled Drug Delivery Waste Water Treatment using Polymeric Materials Energy Conservation Polymer Engineering Modelling Simulation and Optimization Polymer Composites	1.(a) Candidate should have B.E./ B.Tech. or equivalent in Chemical Engineering/ Chemical Technology/ Chemical Engineering (Plastic & Polymer)/ Chemical& Polymer Engineering, Chemical & Alcohol Technology/ Chemical & Bio-Engineering or equivalent (b) The candidate must have secured at least 55% marks (50% for reserved categories) – aggregate in B.E. / B.Tech. 2. Candidate must have M.E./ M.Tech. in Chemical & allied fields with 60% marks (55% for reserved categories).

72. SRM Institute of Science and Technology, Chengalpattu, Tamilnadu-603203-SR

Code	Department	Fields of Specialization	Minimum Qualification
SRXX01	SR	SR	As per Institute norms
SRXX02	SR	SR	

73. S.V. National Institute of Technology, Surat - 395 007 -SS

Code	Department	Fields of Specialization	Minimum Qualification
SSCE01	Civil Engineering	Environmental Engineering, Water Resources Engineering, Urban Planning, Transportation Engineeringand Planning, Structural Engineering, Soil Mechanics&Foundation Engineering ,**Construction Technology and Management**.	Masters degree in relevant area of Engineering. Admission as per the norms available on the institute's website: www.svnit.ac.in
SSME01	Mechanical Engineering	Design andDynamics, Thermal And Fluid Engineering, Manufacturing and Industrial Engineering.	Masters degree in Engineering with Specialization inThermal and Fluid Engineering/Manufacturing and Industrial Engineering/Design and Dynamics/Robotics/ Mechatronics/ Energy Systems Engg./Automobile Engg./Aeronautical Engg./ Cryogenics/CAD/CAM/CIM/Production/ Tribology/Turbo Machines. Admission as per the norms available on the institute's website: www.svnit.ac.in
SSEE01	Electrical Engineering	Power Electronics & Electric Drives, Electrical Machines Modeling, Multi-phase Machines,High Voltage Engineering, Electric Vehicle Technology, Electrical Power Systems, Signal Processing System Theory, Control Theory, Control and Information Engineering, Instrumentation, Renewable Energy Systems.	Masters degree in relevant area of engineering. Admission as per the norms available on the institute's website: www.svnit.ac.in
SSEC01	Electronics Engineering	**Communication and Networking:** Communication Systems, Communication Networks and Internet, Computational Electromagnetics, Microwaves, RF and Antennas, Multimedia Systems, Optical Communication and Photonics, Wireless Communication, Wireless Sensor Networks, Information Theory and Coding. **Microelectronics**: Devices & IC Technology, Reliability of Electronics Devices and Circuits, Device Simulation and Modeling, VLSI and System Hardware Design, CAD Tools, MEMS Design and Technology (including Bio-MEMS), Flash Memory	M.E./M.Tech. or equivalent degree In Electronics, Electronics and Communication, Telecommunication, Bio-medical Engg. (M.E./M.Tech. in Electrical Engg. from IIT). Admission as per the norms available on the institute's website: www.svnit.ac.in

		Devices, Organic Semiconductor Devices, CMOS Devices, Spintronic Devices, Material Growth and Characterization. **Electronics Systems:** Electronic Instrumentation, Sensor Technology, Signal Processing Applications, Biomedical Electronics, Embedded System Design. **Signal Processing:** Speech Processing, Image Processing and Computer Vision, Bio Medical Signal Processing.	
SSCS01	Computer Science and Engineering	Information Security and Privacy, Software Requirement and Specifications, Computer Vision, Image Processing, Soft Computing, Computer Network, Theoretical Computer Science, Compiler, High Performance Computing, Artificial Intelligence.	Masters degree in Computer Engineering orallied fields. Admission as per the norms available on the institute's website: www.svnit.ac.in
SSCH01	Chemical Engineering	Catalysis in refining & petrochemicals processes, Catalysis in biomass conversion, Biofuels, Nanofuels, Wastewater treatments, Membrane separations, Metalrecovery methods, Multiphase flow, Syntheses and applications of metal/metal Oxide nanoparticles, Crystallization processes, Energy and environment management, CFD in Chemical Engg., Polymer nanotechnology and polymer nanocomposites, Fuel cells, Microbial fuel cells, Distillation, Nanofluidics, Powder technology, Extraction, Thin film Solar cells, Electrocoagulation, Green Chemistry, Nanomilling, Supercritical Fluid Extractions. Biosensor, Energy storage device.	Masters degreein Chemical Engineering or allied fields. Admission as per the norms available on the institute's website: www.svnit.ac.in

74. Samrat Ashok Technological Institute, Vidisha 464 001– SV

Code	Department	Fields of Specialization	Minimum Qualification
SVCE01	Civil Engineering	Building Technology& Materials, Retro fixing of Buildings, Sub Surface Technology, Transportation Engineering, Environmental Engineering, Structures and Fluid Mechanics, Soil Mechanics.	BE/BTech and Master's degree (ME/M.Tech.) in Civil Engineering with first division.
SVCS01	Computer Science and Engineering	Machine Learning, Artificial Intelligence, Image Processing, Computer Network Security.	BE/BTech and Master's degree (ME/ M. Tech.) in Computer Science & Engineering or Information Technology.
SVIT01	Information Technology	Machine Learning, Artificial Intelligence, Image Processing, Computer Network Security.	BE/BTech and Master's degree (ME/ M. Tech.) in Computer Science & Engineeringor Information Technology.
SVEE01	Electrical Engineering	Power Electronics, Drives.	BE/BTech and Master's degree (ME/M.Tech.) in Mechanical Engineering with first division.
SVME01	Mechanical Engineering	Ergonomics, TQM, SQC, Mechatronics, Production and Operation Management, Refrigeration & Air conditioning, Quality, Productivity, Six Sigma, SQC.	BE/BTech and Master's degree (ME/M.Tech.) in Mechanical Engineering with first division.

75. **TKM College of Engineering, Kollam (Kerala) - 691 005 – TK**

Code	Department	Fields of Specialization	Minimum Qualification
TKCE01	Civil Engineering	Structural Engineering, Structural dynamics and Earthquake Engineering, Hydrology, Hydroclimatlogy, Water Resources Engineering, Applications of Artificial Intelligence in Civil Engineering, Hydraulics, Concrete, Supplementary Cementing Materials, BuildingTechnology, Construction Management, Lean Construction, SustainableDevelopment Environmental Engineering, EnvironmentalGeotechnology, Water and Wastewater Treatment, Advanced Oxidation Processes,Environmental Science, Engineering Geology, Geotechnical Engineering	Master's degree in Civil Engineering with First division or equivalent.
TKME01	Mechanical Engineering	Thermal Management of Electronic Systems, Cryogenic Heat Transfer, Super Conductivity, Properties Studies at Cryogenic Temperatures, Heat and Mass Transfer in Multiphase & Single Phase Flows, Refrigeration, Thermo Acoustics, CFD, Computational Combustion, Micro/Nano fluids & Heat transfer, Alternate Energy, Solar Cooling Systems, Energy Storage, Green Buildings Fracture Mechanics, Biomechanics, Impact	Master's degree in Civil Engineering with First division or equivalent.

		Mechanics, Design Engineering, Tribology, MR Dampers Abrasive Assisted Surface Finishing, Novel Composite Materials, Nano Composites, Additive Manufacturing, High Entropy Alloys, Friction Stir Joints Supply Chain Management, Product Development, Optimization Techniques, Data analytics and Design of Experiments, Artificial Intelligence	

76. **Thiagarajar College of Engineering, Madurai -625 015 – TM**

Code	Department	Fields of Specialization	Minimum Qualification
TMCE01	Civil Engineering	Structural Engineering, Environmental Engineering, Infrastructure Engineering & Management, Hydrology and Water Resources Management, Geotechnical Engineering, Transportation Engineering, Pollution control, Construction materials, Repair & Rehabilitation, Mechanics of Materials, Damage and Fracture Mechanics	As per the affiliating University norms. ▪ M.E./ M.Tech. /M.S. (By Research) in the Technology and ▪ A minimum of 55% marks or CGPA of 5.5 on a ten point scale in the qualifying exam (50% marks or CGPA of 5.0 on a ten point scale for SC/ST candidates).
TMEE01	Electrical Engineering	Power Systems, Soft computing, Renewable Energy Resources, Energy Conservation and Management, Power Electronics and Drives, Electrical Machines, Optimisation Techniques, Smart Grid, Distributed Generation Systems, Special Machines, Control Systems, FACTS devices and controllers, AI and Expert Systems Applications.	
TMME01	Mechanical Engineering	Thermal Engineering, Computational Fluid Dynamics, Design Engineering, Composite Materials, Automation, CAD/CAM,CIM, MachineVision, Mechatronics, Rapid Prototyping, Quality Engineering, Reliability Engineering, Industrial Engineering, Manufacturing Management, Logistics and Supply Chain Management, Lean/Agile Manufacturing, Robotics, Micro channel cooling.	
TMEC01	Electronics & Communication Engineering	Wireless Communication, Digital Signal Processing, RF Circuits and Systems, Antennas., RFMEMS, Image Processing, Remote Sensing and GIS, VLSI Design, Embedded Systems, Sensors and Instrumentation, Wireless Networks, Medical Electronics, Optical Communication	
TMCS01	Computer Science & Engineering	Network Security, Data Mining, Artificial Intelligence, Multicore Architecture, Parallel Processing, Computer Networks, Knowledge Engineering, Machine Learning, Software Testing, Software Quality and Reliability, Grid Computing, Internet Technology, Compliers, Multimedia, Computer Vision, Biometrics, Multimedia And Graphics, Computer Algorithms.	As per the affiliating University norms. ▪ M.E./ M.Tech. /M.S. (By Research) in the relevant branch of Engineering & Technology and ▪ A minimum of 55% marks or CGPA of 5.5 on a ten point scale in the qualifying exam (50% marks or CGPA of 5.0 on a ten point scale for SC/ST candidates).

77. National Institute of Technology, Tiruchirappalli- 620 015 - TR

Minimum Qualifications: Master's Degree in Engineering/ Technology in appropriate branch with first class or minimum 60% marks (CGPA 6.5) or equivalent in UG or PG. for SC/ST candidates a mere pass in UG and PG is sufficient.

Code	Department	Fields of Specialization	Minimum Qualification
TREE01	Electrical and Electronics Engineering	Power Systems, Electrical Machines and Power Electronics, VLSI, Control Systems and Computer Science.	Master's degree in Engineering/ Technology in appropriate branch with first class or minimum 60% marks (CGPA 6.5) or equivalent in UG or PG. For SC/ST candidates, a mere pass in UG and PG is sufficient.
TRMT01	Metallurgical & Materials Engineering	Processing of Newer Materials, Metal Forming, Powder Metallurgy, Corrosion Engineering, Welding Engineering, Process Modeling, and Fracture Mechanics, Surface	Master's degree in Engineering/ Technology in appropriate branch with first class or minimum 60% marks (CGPA 6.5) or equivalent in UG

		Engineering, Geo Materials, Nano Materials, Process Metallurgy, Quality management.	or PG. For SC/ST candidates, a mere pass in UG and PG is sufficient. Regular Admission to Ph.D. We consider M.Sc., M.Tech. also.
TRPE01	Production Engineering	**Manufacturing**: Mechatronics/ Robotics, Micromachining, Surface Engineering, Tribology Intelligent Manufacturing, Composite Materials Processing, Advanced Welding, Non-traditional Machining, Rapid Manufacturing. Industrial Engineering: Simulation, Supply Chain Management, Lean manufacturing, Quality Engineering, Project Management, Industrial Engineering Management, Data Analysis & Management, Optimization Techniques, Resource Management.	
TRCH01	Chemical Engineering	Transfer Operation, Process Control. Bio-Chemical Engineering/Bio-Technology, Reaction Engineering, Particle Technology, Energy and Environmental Engineering, Thermodynamics, Computer Aided Design, Process Systems Engineering,Energy Engineering, Electrochemical Engineering, Polymer Engineering.Environmental Engineering	
TRCV01	Civil Engineering	Transportation Engineering& Management, Structural Engineering, Environmental Engineering, Geotechnical Engineering, GIS. Water resources Engineering and Ocean Technology	
TRCS01	Computer Science & Engineering	Computer Networks, Mobile Communication, Image Processing, Data Mining, Grid and Cloud Computing, Digital Forensics, Network Security, Wireless Networks.	
TRIC01	Instrumentation & Control	Mathematical Control Theory, Algorithms, Computational Complexity, Networked Control Systems, Mobile Robotics-UGVs and UAVs Estimation Theory, Kalman Filtering, Particle Filters, PIDS and Fractional Order Controllers, MEMS, Smart Material and Structures, Instrumentation Systems Control, Systems Design, Intelligent Control, Process Control, System Identification and Multirate Feedback Control, Biomedical Systems.	
TRME01	Mechanical Engineering	Signal and image Processing, Wireless communication, Wireless networks, Microwave engineering, Microwave integrated circuits, Antennas, Metamaterials, RFMEMS, Optical communication, Photonics, Electronic packaging, Pattern recognition and Computational intelligence, VLSI design and any emerging areas of Specialization related to ECE.	
TREC01	Electronics and Communication Engineering	Signal and image Processing, Wireless communication, Wireless networks, Microwave engineering,Microwave integrated circuits, Antennas, Metamaterials, RFMEMS, Optical communication, Photonics, Electronic packaging, Pattern recognition and Computational intelligence, VLSI design and any emerging areas of specialization related to ECE.	Master's degree in Engineering/ Technology in appropriate branch with firstclass or minimum 60% marks (CGPA 6.5) or equivalent in UG or PG. For SC/ST candidates, a mere pass in UG and PG is sufficient.

77. Tezpur University, Tezpur Assam -784 028 – TU

Code	Department	Fields of Specialization	Minimum Qualification
TUCS01	Computer Science & Engineering	Mobile and Wireless Networks, Network Security, Bioinformatics, Computational Biology, Computational Linguistics, Natural Language Processing, Speech Processing, Data Mining, Machine Learning, Pattern Recognition, Image Processing, Algorithms, Computational Geometry, Remote Sensing, Image Analysis, Analysis of Social Networks, Cognitive Radio Networks, Software Defined Networking, Trust and Reputation Model in Web, Knowledge Representation and Reasoning, Blockchain	

TUEC01	Electronics & Communication Engineering	Sensor Design, Machine Vision, Optical Networks And its Components, Wireless Communication, Bio-electronics, Biosensors, Neuro-bio-engineering, Microwave Antennas, Semiconductor, Bio-electronic Devices, Vehicular Electronics, Neuro-engineering, Computer Vision, Compressive Sensing MRI, Signal and Image Processing,	Sensor Design, Machine Vision, Optical Networks and its Components, Wireless Communication, Bio-electronics, Biosensors, Neuro-bio-engineering, Microwave Antennas, Semiconductor, Bio-electronic Devices, Vehicular Electronics, Neuro-engineering, Computer Vision, Compressive Sensing MRI, Signal and Image Processing,
TUEN01	Energy	Biofuels, Biomass Energy, Energy and Environment, Energy Management and Mathematical Modeling, Farm Mechanization, Fuel Cell, Hydrogen Technology and Redox Flow Battery, Solar Energy, Photovoltaic, Energy Systems, Biomass gasification, Thermal comfort, Building Energy	M.E./M.Tech/ M.Sc. degree in Energy Technology/ Energy Management/Energy related Engineering and Technology/Physics/Chemistry/ Agriculture Allied subjects.
TUFE01	Food Engineering and Technology	Rice Science and Technology, Product evelopment, Food Quality, Food Biochemistry, Fermented Foods,Food Process Modeling, Product Technology Development, Transport Processes in Food, Process and Food Engineering, Fruits and Vegetable Processing AndMachineries, Drying and Dehydration, Unit Operations, Isolation and Establishment of Probiotic Organism, Probiotic Food Formulation and Development.	M.Tech./M.E./M.Sc in Food Technology/Food Processing Technology/ Food Science and Technology/Food and Nutrition/ Microbiology/Food Microbiology/ Bio-chemistry/Chemistry/ Bio-technology/Food Engineering/Applied Microbiology/ Dairy Engineering/ Food Bio-technology Engineering.

79. University of Hyderabad, School of Computer and Information Sciences, Hyderabad -500 046, - UH

Code	Department	Fields of Specialization	Minimum Qualification
UHCS01	Computer and Information Science	Image Processing, Computer Vision, Neural Networks, Grid & Cloud Computing, Distributed Computing, Software Engineering, Natural Language Engineering, Computer Networks, Mobile Computing, Cryptography, Combinatorialoptimization,Computational modeling of Biological & Social Networks, Bio Informatics, Systems Security, Speech Processing, Data Mining, Neural Networks, Rough sets, Pervasive Computing, Pattern recognition, Machine Learning, Knowledge representation & reasoning, Network Forensics, Simulation & Modeling.	First Class Master's Degree in Engineering/Technology or equivalent in Computer Science.

80. **University Visveswaraya College of Engineering, Bangaluru- 560 056 - UV**

Code	Department	Fields of Specialization	Minimum Qualification
UVCE01	CivilEngineering	Structural Engineering, Geotechnical Engineering, Environmental Engineering, Construction Technology; Highway Engineering, Water Resources Engineering, Pre-stressed Concrete.	Structural Engineering, Geotechnical Engineering, Environmental Engineering, Construction Technology; Highway Engineering, Water Resources Engineering, Pre-stressed Concrete.

81. **Veer Surendra Sai University of Technology, Burla – 768 018 VB**

Code	Department	Fields of Specialization	Minimum Qualification
VBCE01	Civil Engineering	Geotechnical Engineering, Structural Engineering, Water Resources Engineering, Environmental Engineering, Transportation Engineering.	M.E./M.Tech with minimum of 6.75 CGPA in 10 point scale (or 60% or more in aggregate) in Master's level and minimum of 6.75 CGPA (or 60% mark in aggregate) at the Bachelor's level.
VBEE01	Electrical Engineering	Power System Engineering, Power Electronics & Drives, Control System Engineering, Renewable Energy Resources.	
VBEC01	Electronics & Communication Engineering	Signal Processing, Image Processing, Electromagnetics & Microstrip Antenna, Computational Intelligence, VLSI, Wireless Communication.	
VBME01	Mechanical Engineering	Machine Design, Fatigue & fracture, Production Engineering, Thermal Engineering, Surface Engineering, CFD Analysis, Vibration Analysis, Tribology, Engine Emission, Wear analysis, Supply chain management Composite Material, Non-Traditional machining, Advance Manufacturing System, Noise monitoring & Control, Compressible Flow, Reverse logistics, Additive manufacturing, Metal casting, Robotics, Solid mechanics, Friction stir welding , Ergonomic Design.	
VBPE01	Production Engineering	Robotics, Non-Traditional Machining, Manufacturing Systems, Advance Casting, Advance Welding, FMS, CIM, CAD/CAM, RP Operation Management.	

82. **Veermata Jijabai Technological Institute (VJTI), Mumbai (Maharashtra) – 400 019 - VM**

Code	Department	Fields of Specialization	Minimum Qualification
VMEE01	Electrical Engineering	HighVoltage, Partial Discharge, Controlsystem, Power System Stability, Smart Grid, Dynamic & Control, Renewable Energy.	M.E./M.Tech. (Electrical Engineering) or allied areas consistent with field of specialization.
VMCE01	Civil Engineering	Civil Engineering, Structural Engineering, Environmental Engineering, Construction Management, Construction Engineering, Earthquake Engineering, Transportation Engineering, Geospatial Technology, Remote Sensing, Geotechnical Engineering, Foundation Engineering, Geotechnical earthquake engineering, Water resource management, Civil Technology, Construction Engineering & Management, Construction Technology, Construction Technology &Management, Environmental Management, Environmental Science & Engineering, Environmental Science & Technology, Water Environmental Technology, Civil and Water Management Engineering, Building Construction &Technology, Infrastructure Engineering.	M.E./M.Tech. in Civil Engineering or allied areas consistent with field of specialization.
VMME01	Mechanical Engineering	Design, Vibration, Tribology, FEA, Mechatronics, CAD/CAM, Robotics, Solar Energy, Energy Management, Thermodynamics, Microfluidics, Thermal and Fluid Engg., Computational Fluid Dynamics, Refrigeration and Air conditioning, Materialscience, Manufacturing Engg., Nanotechnology, Composites etc.	M.E./M.Tech.(Mechanical Engineering) or allied areas consistent with field of specialization.
VMEC01	Electronics Engineering	Biomedical Signal Processing, Computer Architecture, Virtual Instrumentation, Smart Grid, Dynamics & Control, Computer Communication, Wireless Communication, Sensor Networks.	M.E./ M.Tech (Electronics Engineering/Electronics & Telecommunication Engineering) or allied areas consistent with field of specialization.
VMTX01	Textile Technology	Textile Technology, Textile Engineering, Fibre Science & Technology, Textile Chemistry, Fibres & Textile Processing Technology, Manmade Fibre Technology, Jute and Fibre Technology, Technical Textiles.	M.E./M.Tech in relevant branch.

83. **Visvesvaraya National Institute of Technology, Nagpur 440 011 – VR**

Code	Department	Fields of Specialization	Minimum Qualification
VREE01	Electrical Engineering	Power System Stability/ Operation /Protection, Power Electronics, HVDC/ FACTS, Electric Drives/ Renewable Energy Systems, Control System.	First Class Master's degree in Electrical Engineering, Power Systems / Power Electronics/ Electric Drives/ Control and Instrumentation/ Control System / Instrumentation.
VRMT01	Metallurgical Engineering	1.Alloy Development 2.Corrosion&High temperature oxidation 3.Development of: a) Ceramic &glasses b) Polymeric materials c) Composites 4.Fatigue and fracture behaviour of materials 5.High temperature deformation. 6.Wear behaviour of engineering materials 7.Weldingmetallurgy.	M.Tech./M.E. (Metallurgical Engg. OR Materials Science& Engineering OR Mechanical Engineering OR Polymer Engineering).

84. National Institute of Technology Warangal, Warangal 506 004 - WR

Minimum qualification: First class Master's degree in the appropriate branch with a minimum of 60% marks in aggregate. In case of SC/ST/PD Candidates, the Minimum aggregate marks is 55%.

Code	Department	Fields of Specialization	Minimum Qualification
WRCH01	Chemical Engineering	Biomass Gasification, Fuel Cells, Plate Heat Exchangers, Membrane processes,Bioreactors, Flow batteries, Reactive Distillation, ChemicalProcess scheduling, Microfluidics, Multiphaseflows, Interfacial Science, Chemical reactor analysis and design, Wastewater Treatment, Sustainable andenergy efficient technologies, Micro Reactors, Process control, Process Intensification, Non linear analysis, Nano materials, Computational Fluid Dynamics, Fluidized Bet Operations, modeling & simulation,heat transfer,Biochemical Engineering.	Master's degree in Chemical Engineering/Process Control/Process Instrumentation & Control/Industrial Automation/Control Systems/Environmental Engineering/Relevant discipline or its equivalent.
WRCE01	Civil Engineering	Structural Dynamics & Earthquake Engineering. Construction Technology & Management. Environmental Engineering. RS & GIS. Civil Engineering Materials. Hydrology & Water Resources	Candidates who have obtained admission into M.Tech./M.S. Programmes through GATE score (or) who already possesses a valid GATE score.

		Engineering. Transportation Engineering. Geotechnical Engineering.	
WRME01	Mechanical Engineering	Thermal Engineering/ Manufacturing Engineering/ Design Engineering/Industrial Engineering	Master's degree in Mechanical Engineering in the concerned specialization or its allied Branches of Engineering
WRMH01	Mathematics & Humanities	Fluid Mechanics/ Numerical Analysis/ Operations Research/Algebraic Coding Theory/ Biomechanics/ Mathematical Biology/ Hydrodynamic Stability/ Partial Differential Equations/ Functional Analysis/ Finite Element Method/ Cryptography/ Ordinary Differential Equations/ Computational Fluid Dynamics/ Mathematical Modelling	M.Sc. in Applied Mathematics/ Mathematics

85. Walchand College of Engineering, Sangli – 416 415 WS

Code	Department	Fields of Specialization	Minimum Qualification
WSCS01	Computer Science & Engineering	Artificial Intelligence, PatternRecognition, Machine Learning, Databases, Data Mining, Networking, Image Processing, Network Security,High Performance Computing,Cloud Computing, Computer Vision, GIS, Big Data, IoT, Soft Computing, Deep Learning,Distributed Ledgers, Object Identification and Digital Surveillance.	As per Shivaji University Kolhapur Norms (http://www.unishivaji.ac.in/)
WSEC01	Electronics Engineering	Digital Signal Processing, Electronic Communication Engineering, VLSI Design, Image Processing, Electronics System Design, Control Systems, Mobile Communication, Sensor Networks, Image Processing, Microwave Energy, Biomedical Electronics, Machine Vision	
WSCE01	Civil Engineering	**Civil Environmental Engineering:** Water and Wastewater Treatment, Modeling of Environmental Systems, Solid Waste Management, Air Pollution,ConstructedWetlands. **Civil Building Technology:** Structural masonry andmaterials, Constructionproject management,Energy Efficiency in Building, Passive design in building performance. **Civil Structural Engineering:** Earthquake Engineering, FiniteElement Analysis, Structuraldynamics, Concrete technology, Structural Engineering, Design optimization, Compositematerial, Smart material,Structural Health Monitoring, Rehabilitation and retrofittingof structures, Nano-machines and Nano-material, Pre-stressed concrete.	
WSME01	Mechanical Engineering	Heat Power Thermal Engineering, Cryogenics, Production EngineeringMechatronics, Micromachining, Manufacturing, Design Engineering, Condition Monitoring, IndustrialEngineering, Vibration and Acoustics, Non-conventional machining.	
WSEE01	Electrical Engineering	Power System Analysis, Operation, Control and Protection, Power Quality Issues, Power Electronics and Drives, High Voltage Engineering, Renewable Energy Sources, Control Systems, Non Liner and Digital Control Systems, Micro-grid, and Distributed generation.	As per Shivaji University Kolhapur Norms (http://www.unishivaji.ac.in/)

86. Bhabha Atomic Research Centre (BARC), Department of Atomic Energy (DAE) : DA

Code	Department	Fields of Specialization	Minimum Qualification
DAME01	Mechanical Engineering	Mechanical Engineering	As per DAE norms. The age of the candidate should be 35 years or below on January 01, 2021 for advance admission in the academic session 2021-22.
DAMT01	Metallurgical Enginering	Metallurgical Enginering	

87. Indian Space Research Organisation (ISRO), Department of Space (DoS) : DO

Code	Department	Fields of Specialization	Minimum Qualification
DOAE01	Aerospace Engineering	Aerospace Engineering	As per DoS (ISRO) norms. The age of the candidate should be 35 years or below on January 01, 2021 for advance admission in the academic session 2021-22.
DOXX01	Aerodynamics	Aerodynamics	
DOXA01	MEMS/Material Science/Thin Films	MEMS/Material Science/Thin Films	
DOXB01	Laser Spectroscopy/ Detectors/	Laser Spectroscopy/ Detectors/ Semiconductors/Semiconductor	

	Semiconductors/ Semiconductor Device Physics	Device Physics	
DOXC01	VLSI/Microelectronics/ Electronic Devices	VLSI/Microelectronics/Electronic Devices	
DOXD01	RF/Communication/ Microwave Engineering	RF/Communication/Microwave Engineering	
DOXE01	Control/Guidance	Control/Guidance	
DOXF01	Optics/Optical Engineering	Optics/Optical Engineering	
DOXG01	Structure	Structure	
DOXH01	High Performance Computing	High Performance Computing	
DOXI01	Big Data Analytics	Big Data Analytics	
DOXJ01	Computational Fluid Dynamics/Fluid Mechanics	Computational Fluid Dynamics/Fluid Mechanics	
DOXK01	Planetary Sciences	Planetary Sciences	
DOXL01	Oceanography	Oceanography	
DOXM01	Applied Geological Applications	Applied Geological Applications	
DOXN01	Microwave Remote Sensing	Microwave Remote Sensing	

88. Defence Institute of Advanced Technology (DIAT), Defence Research and Development Organisation (DRDO): DR

Code	Department	Fields of Specialization	Minimum Qualification
DRCY01	Chemistry	Applied Chemistry	As per DRDO norms The candidate should be 35 years or below on January 01, 2021 for advance admission in the academic session 2021-22.
DRME01	Mechanical Engineering	Mechanical Engineering	
DRCS01	Computer Science and Engineering	Computer Science and Engineering	
RKME01	Mechanical Engineering	Experimental Stress Analysis	M.E./ M.Tech in Mechanical Engineering With atleast 60% marks in aggregate.
RKME02		Vibration	
RKME03		Plastic Deformations of Metals	
RKME04		Heat Transfer	
RKME05		Cryogenics	
RKME06		Finite Element Techniques	
RKME07		Computer Aided Design	
RKME08		Computer-aided Manufacturing	
RKME09		Automation & Robotics	
RKMM01	Metallurgical& MaterialsEngineering	Metallurgy & Materials Engineering.	M.E./M.Tech. in Material Engineering/ Science orMet. Engineering or Mechanical Engineering. OrChemical Engineering or Ceramic Engineering with60% marks in aggregate.
RKMI01	Mining Engineering	Mining Engineering.	B.E./ B.Tech / M.Sc. in relevant discipline withminimum 65% marks in aggregate or 7.0CGPA. OrM.E./ M.Tech. in relevant discipline with at least 60percent marks in aggregate (or 6.5 CGPA) at bothB.Tech./(or M.Sc.) and M.Tech. Levels.

89. Academy of Scientific and Innovative Research (AcSIR), Council of Scientific and Industrial Research (CSIR): CS

Code	Department	Research Area	Minimum Qualification
CSST01	Structural Engineering	Structural Health Monitoring and Life Extension, DisasterMitigation, Advanced materials for Sustainable Infrastructure,Special and multifunctional structures.	As per CSIR norms The age of the candidate should be 35years or below on January 01, 2021for advance admission in the academic session 2021-2022
CSCH01	Chemical Engineering	Process Engineering , Fermentation Technology, FoodEngineering /Food Technology, Catalysis, Process Optimization, Biomass Valorisation, Chemical Engg., Nanotechnology and Nanomaterials, Surfaces and Interfaces Catalysis (Reactionkinetics), Bio-materials (Crystallization of Inorganic materials), Molecular Dynamics simulations, Modeling and simulations,Process development, Metabolic	

		Engineering and systemsbiology, Process Modelling , Chemical Plant Design	
CSBC01	Biochemical Engineering	Catalysis, Process Optimization, Biomass Valorisation, ChemicalEngg., Nanotechnology and Nanomaterials, Surfaces andInterfaces Catalysis (Reaction kinetics), Bio-materials(Crystallization of Inorganic materials), Molecular Dynamicssimulations, Modeling and simulations, Process development,Metabolic Engineering and systems biology,	
CSEV01	Environment Engineering	Environment Impact, assessment, Air pollution, Water pollution.	
CSEE01	Electrical Engineering	Water treatment Technologies, Electro-dialysis.	
CSIE01	Electronics & Instrumentation Engineering	Electrochemical and Optical devices. Cyber Physical Systems,Smart Sensors, Microwave Devices with indicative specializationsof IoT Technologies, Transducers and Actuators, MEMS Technology-based Sensors, Signal Analytics, Cognitive Computing, Integrated systems, Control and Automation,Photonics, Optoelectronics, Microwave Beam Dynamics, Beam-wave Interaction, Microwave Device Technology, Vacuum Microelectronic Devices, Plasma-base Devices, THz Devices	
CSME01	Mechanical Engineering	Food Engineering / Food Technology Computational Fluid Dynamics, Thermal Comfort, GeothermalEnergy, Mechanization and Automation in construction, Robotics,Fire Engineering	As per CSIR norms The age of the candidate should be 35years or below on January 01, 2021for advance admission in the academic session 2021-2022
CSFE01	Food Technology	Food Engineering/Food Technology	
CSFP01	Food Processing Engineering	Food Engineering/Food Technology	
CSPL01	Polymer Science and Engineering	Catalysis, Process Optimization, Biomass Valorisation, ChemicalEngg., Nanotechnology and Nanomaterials, Surfaces and Interfaces Catalysis (Reaction kinetics), Bio-materials(Crystallization of Inorganic materials), Molecular Dynamicssimulations, Modeling and simulations, Process development, Metabolic Engineering and systems biology.	
CSMT01	Metallurgical Engineering	Light Metals, Alloys, Composites and Functionally GradedMaterials, Material Beneficiation, Process Metallurgy, Material Processing, Physical Metallurgy, Mechanical Metallurgy,Advanced Structural Materials, Surface Engineering andCorrosion, Materials Modeling.	
CSMT01	Materials Engineering	Ceramics, Polymer and mineral Processing.	
CSEV01	Environmental Engineering	Computer Modelling and Simulation of Manufacturing Process and Product development.	
CSEC01	Electronic Engineering	Electronic Materials and Device Fabrication.	
CSCE01	Civil Engineering	Structural Engineering, Earthquake Engineering, Geotechnical Engineering, Prefabricated Housing: Cold-formed Steel (CFS) Structures, Heritage Structures, Concrete Technology, Structural Health Monitoring, Green Building and Renewal Energy, Building Energy Efficiency, Solar Energy, Heat Transfer, Computational Fluid Dynamics, Thermal Comfort, Geothermal Energy, Mechanization and Automation in construction, Robotics, Fire Engineering.	
CSCS01	Computer Science & Engineering	Cyber Physical Systems, Smart Sensors, Microwave Devices withindicative specializations of IoT Technologies, Transducers andActuators, MEMS Technology-based Sensors, Signal Analytics, Cognitive Computing, Integrated systems, Control andAutomation, Photonics, Optoelectronics, Microwave BeamDynamics, Beam-wave Interaction, Microwave DeviceTechnology, Vacuum Microelectronic Devices, Plasma-base Devices, THz Devices.	

QUALITY IMPROVEMENT PROGRAMME
Application for Advance Admission to Ph.D. Degree Programme 2022-2023
Copy of Principal Coordinator QIP

Specimen Application and NOT to be used for filling application

Affix Stamp Size Photo

1. Application Number:

2. Name:

3. Designation:

4. Department:

5. College Address:

6. Contact Address:

7. Phone (Office): **8. Mobile :**

9. Phone (Residence): **10. Email :**

11. Date of Birth: **12. Gender:**

13. Category: **14. Married:** **Yes/No**

15. Physically Disabled: **Yes/No**

16. UG Degree:

Year**:** University**:**

Class/Division**:** Overall Percentage/CGPA**:**

17. PG Degree:

Year**:** University**:**

Class/Division**:** Overall Percentage/CGPA**:**

18. Teaching Experience as on September 30, 2021:

19. Industrial / Research Experience as on September 30, 2021:

20. Number of QIP/ISTE/AICTE/IMPACT Courses Attended

a) 4 to 7 days Duration: b) Two weeks Duration: c) More than 2 weeks:

21. Number of Research Papers:
a) In Refereed journals: b) In Conference Proceedings:

22. Institutions and Departments to which Admissions are sought

	Name of the Institute	Choice of Specialization	
		First Choice	Second Choice
Preference 1			
Preference 2			
Preference 3			

23. Academic Data (Examination Passed B.E/B.Tech/B.Arch/B.Sc(Engg)/Equivalent)

Semester/Year	University	Year	Specialization	Class	Marks Obtained	Percentage	GPA

24. Academic Data (Examination Passed M.E./M.Tech. or Equivalent)

Semester/Year	University	Year	Specialization	Class	Marks Obtained	Percentage	GPA

25. Any other Qualification

Degree	University	Year	Specialization	Class	Marks Obtained	Percentage	GPA

26. Teaching Experience at Degree Level as on September 30, 2021

Sl.No	Name and Address of Employer & Institution	From (Date)	To (Date)	Years-Months	Designation

27. Industrial/Research Experience as on September 30, 2021

Sl.No	Name of the Organization	From (Date)	To (Date)	Years-Months	Designation

28. Short Term Courses attended

Sl.No	Name of the Course & Category	Organizer	Days	From	To

29. Research Papers/Book

Sl.No	Title of Paper/Book	Name of Author(s)	Name of Journal/Conference	Year	Vol.	Pages

Declaration

a. I declare that all the informations given by me in this application form are correct to the best of my knowledge and belief, and I understand that false or incomplete information would cause invalidation of the application.

b. I have uploaded my stamp size photo, signature, and soft copy of all the relevant certificates/documents on the online registration portal.

c. I shall abide by the decision of the National QIP Coordination Committee in all matters pertaining to admissions. The decision of the Committee shall be final and binding on me.

d. I shall abide by the rules and regulations of the Institutions to which I will be offered admission, if selected.

e. For all legal actions, suits and proceedings, the jurisdiction of a court of law shall be deemed to lie exclusively at the place at which the Institution considering me for admission is situated or the place where the office of the Principal Coordinator QIP is located and at no other court of place.

f. I understand the contents of this form and, particularly, this declaration being made here.

Place: Signature of the Applicant Date:

Certificate and Forwarding Note by the Principal/ Head of the Institution

a) Our Institution as well as the academic department, to which the applicant Mr./Ms. _____ _____ belongs, is approved by AICTE.

b) The applicant is a full-time regular/ permanent faculty member of our Institution and is not on deputation to any other Institution.

c) The applicant has _____ years and _____ months of teaching experience as on **September 30, 2021** at the graduate level (Certificates enclosed).

d) The applicant will be relieved full-time for the programme on deputation and will be paid full salary and allowances during the tenure of his/her sponsorship, if selected for admission.

Office Seal: **Signature of Principal or Head of Institution**
(with full contact details Name, Designation, Contact No., E-mail & AICTE affiliation No.).

_____
_____
_____
_____
_____

Date:--

Important Note:

- ☐ Conditional Recommendation will not be accepted.
- ☐ This Forwarding Note should be signed only by the Principal or the Head of the Institution.
- ☐ Any alteration made in the text of this Forwarding Note leads to automatic rejection of the application.
- ☐ Please attach separate experience certificate.
- ☐ Please attach a copy of the receipt of online payment.

For any further details please contact the zonal QIP Coordinators at address indicated below

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