

QUALITY IMPROVEMENT PROGRAMME

Advance Admission to Ph.D. Programmes

for the academic year 2012-2013 (Final Admission: 2013-2014)

(for teachers of AICTE approved Degree level Engineering Institutions, National Institutes of Technology and National Institutes of Technical Teachers' Training and Research)

INFORMATION BROCHURE

Sponsored by



All India Council for Technical Education
(A Statutory Body of Government of India)

Admission coordinated by



Principal Coordinator QIP
Centre for Continuing Education
Indian Institute of Science
Bangalore – 560 012

DATES TO REMEMBER:

Access to on line submission of applications	23 rd Sept 2011
Closing of on line applications access	21 st Oct 2011
Last date for receipt of duly forwarded application along with enclosures	31 st Oct 2011

****Applications will not be accepted/ considered without online submission.***

Dear Prospective QIP Scholar

Your interest in the 'Quality Improvement Programme (QIP)' sponsored by AICTE is appreciated. As you may be aware, the main objective of the programme is to upgrade the expertise and capabilities of the faculty members of AICTE approved degree-level engineering institutions, National Institutes of Technology (NITs) and National Institutes of Technical Teachers' Training and Research (NITTTRs) of the country. The programme launched by the Government of India in the year 1970, is now being implemented and monitored by the National QIP Coordination Committee, 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 and PhD degree programmes.
- Organizing Short Term Courses at the QIP Centres for updating / upgrading the knowledge of faculty members.
- Curriculum Development Cell activities which help to improve the class room teaching and learning.

Eight major QIP centres at IITs and IISc undertake the various activities listed above. Admission to Master and PhD programmes are also offered in selected areas in additional institutions recognized as minor QIP centres. A large number of teachers from engineering institutions from all over the country have pursued Master and PhD degree programmes under this scheme. These are aimed at improving the standard and quality of technical education through improvement of the qualifications of the faculty members of various engineering institutions.

A Curriculum Development Cell has been set up at major QIP Centres for improving the effectiveness of technical education in the country. Its activities include curriculum development and revision or preparation of monographs, textbooks, teacher's 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 Centers for the benefit of the faculty members of Engineering Institutions across the country.

The QIP web sites (<http://www.qip.cce.iisc.ernet.in>, www.iitb.ac.in, www.iitd.ac.in, www.iitg.ernet.in, www.iitk.ac.in, www.iitkgp.ernet.in, www.qip.iitm.ac.in, www.iitr.ernet.in, www.aicte.ernet.in) will give you necessary information about the programme as well as about the requirements and the procedure to apply for admission in Master / Ph.D. degree programmes. The details of the disciplines and specializations available at various centres are listed in the website and also available in the admission brochure to enable you to make appropriate choices. You can navigate through the links on the left hand side of the main web page for admission and can download the admission brochure.

Access to the on-line submission of application opens on September 23, 2011 (Friday). The last date for the on-line submission of the application is October 21, 2011 (Friday). Please note that the last date for the receipt of the hard copy of application at the office of the Principal Coordinator QIP, IISc Bangalore is October 31, 2011 (Monday).

The procedure of admission under QIP involves the following steps:

- Scrutiny of all applications in the office of the Principal Coordinator QIP.
- Short-listing by the QIP centres for interviews and dispatch of call letters to those selected for interviews.
- Recommendations by the QIP centres to NQCC.
- Final selection by the National QIP Coordination Committee (NQCC) and
- Offer of Admission by the Institution where the final selection has been recommended by NQCC.

The schedule of interviews at various QIP Centres is given in the above websites as well as in the brochure, so that you can plan your travel for attending the interviews at places of your choice. For further information about the QIP, the application form or any associated item, you may contact to the Principal coordinator QIP or any of the Coordinators of the QIP Centres listed in the website or brochure.

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

Keep in touch with our

website. Wishing you all the

best,

Principal Coordinator QIP, Centre for Continuing Education, IISc Bangalore.

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	4. Indian Institute of Technology Guwahati, Guwahati	
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	40. Veer Surendra Sai University of Technology, Buria	
	41. Visvevaraya National Institute of Technology, Nagpur	
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I. GENERAL INFORMATION

1. The major QIP Centres at IITs and IISc offer admission to Ph.D. degree programmes in several disciplines. In addition, institutions recognised as the minor QIP Centres also offer admission to Ph.D. degree programmes under QIP in some specific departments.
2. Prior to regular admission to the Ph.D. programme at a QIP Centre, a candidate is required to join a pre-Ph.D. contact programme. The duration of the pre-Ph.D. program is 60 days (Advance Admission Scheme) and that of the regular Ph.D. Degree Program is 3 years.
3. Candidate should visit the website <http://www.qip.cce.iisc.ernet.in> for submitting on-line 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 on-line application** and ii) sending the final print-out of application (duly forwarded by the Head of Institution).
5. Candidates have to first submit their application form on-line through <http://www.qip.cce.iisc.ernet.in> applications without on-line submission will not be considered. Candidate should make sure that proper Institute / Discipline codes are entered, all relevant details are duly filled in the respective fields. Access to the on-line submission of application opens on **September 23, 2011 (Friday)**. Last date for the on-line submission of application is **October 21, 2011 (Friday)**.
6. After filling the application on-line, candidates should send the **relevant number** of prints of the **on-line** completed form, duly forwarded by the Principal/Head of the Institution, as instructed along with all enclosures and a DD for Rs.500/- (Rs.250/- for SC/ST/PD) drawn in favour of '**IISc Bangalore QIP**', payable at **Bangalore**, to The Principal Coordinator QIP, Quality Improvement Programme, Centre for Continuing Education, Indian Institute of Science, Bangalore – 560 012.
7. The candidate and the Principal/Head of the Institution forwarding the application should ensure that the application is to be send to the Principal Coordinator QIP, IISc Bangalore so as to reach **on or before October 31, 2011 (Monday)**. **Applications received after this date will not be considered**. On receipt of the application, acknowledgement will be sent by email.
8. Information given by the candidate in all application print-outs should be same. 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. **Conditional recommendation** by the Principal/Head of the Institution will not be accepted. **Applications submitted without signatures of the candidate and the appropriate authorities with seal, and/or without the required enclosures will automatically be rejected.**
10. The application number allotted during the on-line registration should be quoted in all correspondences, and **such correspondences should be routed through the Principal/Head of the candidate's parent institution**. The application number may be changed in some unavoidable circumstances and will be intimated through email in such 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. **Interview schedule** is final and cannot be altered/changed under any circumstances. Candidate has to appear for interview at the Institute(s), where he/she would like to seek admission. Candidates may plan their travel accordingly.
13. Concessions, relaxation, and reservations for candidates belonging to SC/ST/OBC/Physically Disabled/Female candidates are as per rules. The reservation rules of GOI will be applied to overall admissions by the NQCC. The selection of a candidate is considered only after the recommendation of the major / minor QIP center.

II. INSTITUTIONS OFFERING MASTER DEGREE PROGRAMMES UNDER QIP AND THEIR CODES

Sl. No.	Name of the Institute/University	Code
Institutions having Major QIP Centres: The following institutions having QIP Centres which offer admission to Master degree (2- years)		
1	Indian Institute of Science, Bangalore – 560 012	BG
2	Indian Institute of Technology Bombay, Mumbai – 400 076	BM
3	Indian Institute of Technology Delhi, New Delhi – 110 016	DL
4	Indian Institute of Technology Guwahati, Guwahati – 781 039	GW
5	Indian Institute of Technology Kanpur, Kanpur – 208 016	KN
6	Indian Institute of Technology Kharagpur, Kharagpur – 721 302	KH
7	Indian Institute of Technology Madras, Chennai – 600 036	MD
8	Indian Institute of Technology Roorkee, Roorkee – 247 667	RR
Other Institutions having Minor QIP Centres: The following recognized institutions also offer admission to Master Degree (2 years) Programmes under QIP in some specific departments as given		
9	Anna University, College of Engineering Campus, Chennai – 600 025 (i) Civil Engineering, (ii) Electrical Engineering, (iii) Information and Communication Engineering, (iv) Mechanical Engineering Anna University, AC Technology Campus, Chennai – 600 025 (i) Chemical Engineering. (ii) Leather Technology Anna University, Madras Institute of Technology, Chennai – 600 044 (i) Aerospace Engineering, (ii) Automobile Engineering, (iii) Electronics Engineering, (iv) Instrumentation Engineering (v) Production Technology	AU
10.	Basaveshwar Engineering College, (Autonomous), S Nijalingappa, Bagalkot – 587 102 (i) Civil Engineering, (ii) Mechanical Engineering, (iii) Electrical Engineering, (iv) Electronics & Communication Engineering (v) Computer Science & Engineering	BB
11.	Bengal Engineering and Science University, Shibpur – 711 103 (i) Civil Engineering, (ii) Electrical Engineering, (iii) Mechanical Engineering, (iv) Mining Engineering.	BE
12.	B.M.S. College of Engineering, Bangalore – 560 019 (i) Machine Design, (ii) Electrical Engineering, (iii) Mechanical Engineering, (iv) (iv) Industrial Engineering, (v) Electronics & Communication Engineering.	BS
13.	Coimbatore Institute of Technology, Coimbatore – 641 014 (i) Civil Engineering, (ii) Mechanical Engineering, (iii) Electrical Engineering, (iv) Chemical Engineering.	CC
14.	College of Engineering, Pune(Maharashtra) – 411 005 (i) Civil Engineering, (ii) Mechanical Engineering, (iii) Electrical Engineering, (iv) Electronics & Communication Engineering.	CP
15.	College of Engineering Trivandrum, Thiruvananthapuram – 695 016 (i) Civil Engineering, (ii) Mechanical Engineering, (iii) Electrical Engineering, (iv) Electronics & Communication Engineering.	CT
16.	Delhi Technological University, Delhi (i) Civil Engineering, (ii) Mechanical Engineering, (iii) Electrical Engineering, (iv) Polymer Science & Chemical Technology	DD
17.	Govt. College of Engineering, Aurangabad 431 005 (Maharashtra) (i) Civil Engineering, (ii) Electrical Engineering, (iii) Electronics & Communication Engineering.	GA
18.	Govt. Engineering College Govt. of Kerala, Thrissur – 680 009 (i) Civil Engineering, (ii) Mechanical Engineering, (iii) Electrical Engineering.	GK

Sl. No.	Name of the Institute/University	Code
19.	Govt. Engineering College, Salem – 680 009 (TN) (i) Civil Engineering, (ii) Mechanical Engineering, (iii) Electrical Engineering.	GC
20.	Guru Nanak Dev Engineering College, Ludhiana – 141 006 (Punjab) (i) Civil Engineering, (ii) Mechanical Engineering, (iii) Electrical Engineering.	GN
21.	Indian School of Mines, Dhanbad – 826 004 (i) Fuel and Mineral Engineering, (ii) Mining Engineering	IS
22.	Institute of Technology, BHU, Varanasi – 221 005 (i) Metallurgical Engineering, (ii) Mining Engineering	VN
23.	Jadavpur University, Kolkata – 700 032 (i) Electrical Engineering, (ii) Electronics & Telecommunication Engineering, (iii) Mechanical Engineering (iv) Production Engineering	JU
24.	Madan Mohan Malaviya Engineering College, Gorakhpur – 273 010 (i) Civil Engineering, (ii) Electrical Engineering, (iii) Electronics & Communication Engg., (iv) Mechanical Engineering	MM
25.	Madav Institute of Technology & Science, Gwalior – 470 005 (i) Civil Engineering, (ii) Electrical Engineering, (iii) Computer Science & Engineering, (iv) Mechanical Engineering, & (v) Architecture	MG
26.	Malnad College of Engineering, Hassan – 573 201 (i) Civil Engineering	ML
27.	Manipal Institute of Technology, Manipal – 576 104 (i) Civil Engineering, (ii) Mechanical Manufacturing	MI
28.	Motilal Nehru National Institute of Technology, Allahabad–211 004 (i) Electrical Engineering, (ii) Electronics Engineering, (iii) Mechanical Engineering	MN
29.	National Institute of Technology, Calicut - 673 601 Offer admission to Master degree programmes in several disciplines	CL
30.	National Institute of Technology Karnataka, Surathkal – 575 025 Offers admission to Master degree programmes in several disciplines	SK
31.	National Institute of Technology, Rourkela – 769 008 (i) Ceramic Engineering, (ii) Chemical Engineering, (iii) Civil Engineering, (iv) Computer Science and Engineering, (v) Electrical Engineering, (vi) Electronics and Communication Engineering, (vii) Mechanical Engineering.	RK
32.	National Institute of Technology, Tiruchirappalli – 620 025 (i) Civil Engineering (ii) Computer Science & Engineering, (iii) Electrical and Electronics Engineering, (iv) Mechanical Engineering, (v) Metallurgical Engineering (vi) Production Engineering	TR
33.	National Institute of Technology, Warangal – 506 004 (i) Civil Engineering. (ii) Electrical Engineering. (iii) Electronics & Communication Engineering, (iv) Mechanical Engineering.	WR

Sl. No.	Name of the Institute/University	Code
34.	PSG College of Technology, Coimbatore – 641 004 (i) Computer Science and Engineering (ii) Electrical and Electronics Engineering (iii) Mechanical Engineering, (iv) Production Engineering, (v) Textile Technology	PS
35.	Samrat Ashok Technological Institute, Vidisha (M.P) (i) Civil Engineering, (ii) Computer Science & Engineering, (iii) Information Technology, (iv) Electrical Engineering, (v) Mechanical Engineering,	SV
36.	Shri G. S. Institute of Technology & Science, Indore – 452 003 (i) Civil Engineering, (ii) Electrical Engineering, (iii) Electronics & Communication Engineering, (iv) Computer Science & Engineering, (v) Mechanical Engineering, / (vi) Industrial & Production Engineering.	GS
37.	Shri Guru Gobind Singh Institute of Engineering & Technology, Nanded – 431 606 (i) Electronics & Communication Engineering, (ii) Instrumentation & Control, (iii) Production Engineering, (iv) Civil Engineering, (v) Mechanical Engineering,	SG
38.	The National Institute of Engineering, Mysore – 570 008 (i) Civil Engineering, (ii) Electrical Engineering, (iii) Industrial Engineering,/(iv) Production, (v) Computer Science & Engineering,/(vi) Information Technology	NM
39.	Thiagarajar College of Engineering, Madurai – 625 015 (i) Civil Engineering, (ii) Electrical Engineering, (iii) Mechanical Engineering, (iv) Electronics & Communication Engineering., (v) Computer Science & Engineering.	TM
40.	University Visveswaraya College of Engineering, Bangaluru – 560 056 (i) Civil Engineering	UV
41.	Veer Surendra Sai University of Technology, Burla (Orissa) (ii) Civil Engineering, (ii) Electrical Engineering, (iii) Electronics & Communication Engineering, (iv) Mechanical Engineering. (v) Production Engineering.	VB
42.	Visvesvaraya National Institute of Technology, Nagpur – 440 011 (i) Civil Engineering (ii) Electrical Engineering	VR
43.	Walchand College of Engineering, Sangli - 416 415 (i) Civil Engineering (ii) Mechanical Engineering (iii) Electrical Engineering (iv) Electronics & Communication Engineering, (v) Computer Science & Engineering	WS

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

Department/Centre	Code	Institution(s) Offering Ph.D. Degree Programme
Aerospace Engineering	AE	BG, BM, KH, KN, MD
Aeronautical Engineering	AE	AU
Agriculture & Food Engineering	AG	KH
Alternate Hydro Energy Centre	AH	RR
Applied Mechanics	AM	DL, MD
Applied Mechanics & Hydraulics	AM	SK*
Applied Research In Electronics	AL	DL
Architecture & Planning	AR	RR
Architecture & Regional Planning	AP	KH
Atmospheric & Oceanic Sciences	AS	BG
Atmospheric Sciences	AS	DL
Automobile Engineering	AU	AU
Biochemical Engineering	BC	DL
Biomedical Engineering	BM	DL
(School of) Biosciences & Bioengineering	BS	BM
Biotechnology	BT	GW,KH,MD,RR
Ceramic Engineering	CM	RK
Centre for Studies in Resources Engineering	CSR	BM
Centre for Sustainable Technology	ST	BG
Chemical Engineering	CH	AU, BG, BM, CC, DL, GW, KH, KN, MD, RK, RR, SK, WR,
Chemistry	CY	BM, DL, GW, KH, KN, MD, RR
Civil Engineering	CE	AU, BB, BE, BG, BM*, BS,CC, CL,CP,CT, DD,DL*,GA, GC,GK,GN, GS, GW, KH, KN*, MD*,MG, MI,MM,NM, RR*,SG, SK*, SV,TM, UV, VB,WR, WS
Computer Science & Automation	CS	BG
Computer Science & Engineering	CS	BM, BS,DL, GW, KH, KN, MD,MG,NM,SV,TM, WS
Cryogenic Engineering	CR	KH
Centre for Educational Technology	ET	KH
Design	DE	GW
Earth Science	ES	BM, RR
Earthquake Engineering	EQ	RR
Electrical & Electronics Engineering	EE	TR
Electrical Communication Engineering	EC	BG

Department/Centre	Code	Institution(s) Offering Ph.D. Degree Programme
Electrical Engineering	EE	AU, BG, BM*,CC, CL, DL, GA,GK,GS,GN,JU*, KH, KN, MD, MM,MN, RK, RR,WS
Electrical Engineering	EP	VR, MT
Electronics & Communication Engineering	EC	BB,BS,CL,CP,CT,DD,GA,GC,GW,GS,MG,MM, NM, RK, SG,SK.SV,TM,VB,WS,
Electronics & Computer Engineering	LC	RR
Electronics & Electrical Comm. Engineering	EC	KH, SK
Electronics & Telecommunication Engineering	EC	JU*
Electronics Engineering	EC	AU,MN
Electronic Design & Technology (centre)	ED	BG
Electronics & Communication Engineering	EE	GW
Energy (centre)	EN	GW
Energy Studies	EN	DL
Energy Science & Engineering	EN	BM
Engineering Design	ER	MD
Environment (centre)	EV	GW
Environmental Science & Engineering	EV	BM
Geology and Geophysics	GG	KH
G.S. Sanyal School of Telecommunication	GT	KH
Humanities & Social Sciences	HS	BM, DL, GW, KH, KN, MD, RR, SK
Hydrology	HY	RR
Industrial Tribology, Machine Dynamics & Maintenance Engineering	TR	DL
Industrial & Management Engineering	IM	KN
Industrial Engineering & Operations Research	IO	BM
Industrial Engineering & Management	IE	KH
Industrial Engineering & Production Engineering	IP	GS
Industrial Engineering	IE	BS
Industrial Design Centre	IDC	BM
Information & Communication Engineering	IC	AU
Information Technology	It	MM, SV
Instrument Design & Development	ID	DL
Instrumentation Engineering	IN	AU,
Instrumentation and Applied Physics	IN	BG
Instrumentation and Control	IC	SG
Leather Technology	LT	AU

Department/Centre	Code	Institution(s) Offering Ph.D. Degree Programme
Management Studies	MS	MD
Management Studies	MG	BG, RR,DL
Material Research Centre	MR	BG
Materials & Metallurgical Engineering	MT	KN
Materials Science	MS	KH, KN
Mathematics	MA	BG, BM, DL, GW, KH, MD, RR
Mathematics & Humanities	MH	WR
Mathematics/Statistics	MA	KN
Mechanical & Industrial Engineering	ME	RR
Mechanical Engineering	ME	AU, BB, BG, BM, BS, CC, CL, CP, CT, DD, DL, GK, GC, GS,GN, GW, KH, KN, JU*, MD,MG, MM, MN, PS, RK*, SG, SV,TM, VB, WR, WS,
Mechanical Manufacturing	MM	MI,
Metallurgical & Materials Engineering	MM	MD, RK, RR
Metallurgical & Materials Engineering	MT	KH, SK ,TR
Metallurgical Engineering & Materials Science	MM	BM
Metallurgical Engineering	MT	VN,VR
Materials Engineering	MT	BG
Mining Engineering	MI	IS, KH, RK, SK ,VN
Nuclear Engineering and Technology	NE	KN
Ocean Engineering	OE	MD
Ocean Engineering & Naval Architecture	ON	KH
Paper Technology	PP	RR
Product Design	PD	BG
Physics	PH	BG, BM*, DL, GW, KN, MD, RR
Physics & Meteorology	PM	KH
Polymer Science & Engineering	PS	DL
Polymer Science & Chemical Technology	PS	DD
Production Engineering	PE	CP, JU*, NM, PS, SG,TR, VB
Production Technology	PT	AU
Paper Technology	PP	RR
Reliability Engineering	RE	KH
Rubber Technology	RT	KH
Rural Development	RD	KH
Rural Development & Appropriate Tech.	RD	DL

Department/Centre	Code	Institution(s) Offering Ph.D. Degree Programme
School of Information Technology	IT	KH
School of Management	MG	BM
Super Computer Education & Research	SE	BG
Sustainable Technologies (Centre)	ST	BG
Systems & Control Engineering	SC	BM
Textile Technology	TX	DL
Water Resources Development	WR	RR

*Specialization have to be indicated while applying for the 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 lecturers, readers, asst. professors, associate professors and professors) with a minimum of three-years** teaching experience as full-time regular/permanent teachers of AICTE approved Degree level Engineering Institutions, National Institutes of Technology (NITs) and National Institutes of Technical Teachers' Training and Research (NITTTRs) as on **September 30, 2011 (Friday)** 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. The candidate should satisfy the minimum eligibility criteria prescribed by the individual Department (and/or the Institution) to which admission is sought.
3. 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**.
4. Teachers of the Major QIP Centres **are not eligible**.
5. Teachers of the Minor QIP Centres **are eligible to apply to Major QIP Centres**.
6. 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 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 admission during 2011-2012 session to the Pre-Ph.D. programme and on successful completion of this programme, he will be offered admission to the regular Ph.D. programme during 2012-2013. During the one-year period of the Pre-Ph.D. program, 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 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 2011, based on the performance of the candidate during the period of the advance admission.

VI. SCHOLARSHIP AND CONTINGENCY GRANT

The candidates admitted for the regular Ph.D. degree programme under QIP will receive a sum of Rs. 9,000 per month as Living Expenditure allowance and a contingency grant of Rs.10,000 per annum for three years.

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.
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 the 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 ON-LINE PPLICATION

General Instructions

29. 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.
2. Candidate can start filling up the on-line application by logging in through "View/Edit Application".
3. On-line application can be completed in one or more sessions by revisiting the website using the assigned application number and password.
4. The candidate should enter all required information correctly in all fields of the **on-line** application.
5. After filling the fields, the candidate can save the information in between by using the SAVE button. The candidate can edit data in any field till the final submission and printout is taken. The last date for the on-line submission of application is **October 21, 2011**.

Personal Information

29. For the Designation field, the candidate should choose one of the following designation codes from the combo box. For designations not covered, the candidate should specify the exact designation under the other designation field, failing which his / her application cannot be considered.

Designation	Code	Designation	Code	Designation	Code
Assistant Lecturer	1	Senior Lecturer	4	Associate Professor	7
Associate Lecturer	2	Reader	5	Professor	8
Lecturer	3	Assistant Professor	6	Other Designation	9

29. After completing the Name, Designation, Department and Address fields (using the pull-down menu) enter Date of Birth; Gender as 'Male' or 'Female'; the category by 'General', 'SC', 'ST', or 'OBC'; put 'Yes' if you belong to Physically Disabled Category and "No" if you do not; Married as 'Yes' if you are married and 'No' if you are single.

Educational Qualifications and Academic Data

29. 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.

9. 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).**
10. 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 attached.

Institute and Department Preferences

11. 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).
12. 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.
13. 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 'BGEC01' represents a particular field of specialization in the Department of Electrical Communication Engineering, IISc Bangalore.

Preview of Application

14. Once the complete details about the candidate are entered and saved, the on-line application can be printed. To preview the completed application, the candidate can print a draft copy of the application. He should check the completeness and correctness of the information; if needed, corrections can also be made before the final submission.

Final Confirmations and Printouts

15. After finalizing the contents of the application, the candidate should invoke the FINAL version of the application. Click here for printing 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).** The **print report** contains multiple copies of the application. The first copy corresponds to the 'copy for Principal Coordinator QIP, IISc Bangalore" and one copy each for the preference code **related to the number of institutions and departments, a candidate proposes to apply to.**
16. The following Table indicates the number of printouts to be taken and the number of sets of enclosures required as **related to the number of institutions and departments a candidate proposes to apply.**

No. of Institutions Chosen	Total No. of Departments (Streams or Specializations) Chosen	No. of applications to be printed and No. of sets of enclosures required
1	1	2
1	2	3
2	2	3
2	3	4
2	4	5
3	3	4
3	4	5
3	5	6
3	6	7

17. In each copy, the candidate should **affix his/her recent stamp-size photograph** in the space provided.

18. The candidate should thoroughly verify the contents of the printed documents and sign at the appropriate places.
19. In the “**Forwarding Note**” of the **Application Form**, the space provided for the **Name of the Candidate and Teaching Experience must be duly filled in and signed by the Principal / Head of the Institution along with Office Seal.**
20. 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. APPLICATION FEE

A demand draft for Rs 500/-for General/OBC Category and Rs. 250/-for SC/ST/PD candidates, drawn in favour of ‘**IISc Bangalore QIP**’ payable at **Bangalore** should be attached with the form marked 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 DD. Candidate should note that the fee paid other than DD i.e., **by IPO, cheques, etc. are not acceptable.** Application fees once paid cannot be refunded.

X. CHECKLIST FOR EACH COPY OF THE APPLICATION FORM

- **In Forwarding Note, the candidate should check his/her Name, years and months of experience, signature, date, and office seal.**
- *Photographs:* Affix recent stamp size photographs at space provided on all copies of Application Forms including **Copy for Principal Coordinator.**
- *Signatures of the Applicant:* The candidate should sign in all the print-outs at relevant places.
- Candidate should ensure that all information’s are properly filled in and required number of print-outs are taken and all copies are to be send to the Principal Coordinator QIP.

Enclosures

1. **Application Fee:** DD of Rs. 500/- for General/OBC Category and Rs. 250/- for SC/ST/PD candidates should be enclosed with the **copy of the Principal Coordinator QIP form** only.
2. Candidates belonging to SC, ST or 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. Enclose attested copies of all the relevant certificates
 - *Certificates of the Qualifying Examination (Bachelor and Master)and other Degrees*
 - *Age proofing Certificate*
 - *Mark Lists of all years/semesters of qualifying examination (mark sheets clearly showing total marks obtained out of maximum marks according to semester or year)*
 - *Teaching Experience*
 - *Industrial/Research Experience Certificates.*
 - *The certificates of Short Term Courses attended.*
 - *All Research Publications.*
 - *Any other Academic qualifications/Awards etc.*

XI. INSTRUCTIONS FOR DESPATCHING

1. For the convenience of the candidate, a check list is also printed as the last page. One can use this list and ensure the completeness of application. Once completed, the entire bunch (all copies) is to be dispatch to the Principal Coordinator QIP, IISc Bangalore along with the DD of the relevant amount.
2. **Before mailing the completed forms, please ensure that each copy of application form and its 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 Office of the Principal Coordinator QIP well within time so as to reach **on or before October 31, 2011 (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 on-line application) to office@cce.iisc.ernet.in furnishing the following details: Application Number, Name of the Candidate, Date of Birth, Address for correspondence, Gender and Category. After verification, the candidate will be informed the password through email only.

5. The requisite number of the print-outs of the application submitted on-line, along with the required number of enclosures, as mentioned, should be sent to **The Principal Coordinator QIP, Quality Improvement Programme Centre, IISc Bangalore, Bangalore – 560 012**, preferably by **Speed Post or Courier Service**, to reach the Office **on or before October 31, 2011 (Monday)**. **Applications received after this date will not be considered**: All the completed forms along with enclosures should be sent only to the Principal Coordinator QIP, IISc Bangalore. For any clarification contact: Phone: 080 22932491; Fax: 080 23600911, Email: office@cce.iisc.ernet.in

XII. LAST DATE

The last date for on-line submission of application is **October 21, 2011 (Friday)**. Print-outs of on-line filled-in application, including the Copy for Principal Coordinator, with its enclosures, complete in all respect should reach **The Principal Coordinator QIP, Quality Improvement Programme Centre for Continuing Education, Indian Institute of Science, Bangalore – 560 012, on or before October 31, 2011 (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, then finally at the Department/Institute concerned. Interview letters will be sent to the short-listed candidates by the Department/institute concerned.
2. **Interviews** will be conducted in the Departments at the individual Institutions. **Schedule of interviews** is provided in the next page. Please note that **No TA/DA will be paid to candidates for attending the Interviews**.
3. **Selections** will be made by the National QIP Coordination Committee based on the recommendations of various institutions.
4. **Final Results** will be available at the web site: <http://www.qip.cce.iisc.ernet.in>
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

The following dates of interview at various QIP Centres, finalized by National QIP Coordination Committee, are final and cannot be altered under any circumstances.

S.No	Institute	Interview Date	Day
1	National Institute of Technology, Warangal	16-01-12	Monday
2	National Institute of Technology, Calicut	18-01-12	Wednesday
3	IIT Madras	20-01-12	Friday
4	Anna University, Chennai	23-01-12	Monday
5	College of Engineering Trivandrum, Thiruvananthapuram	24-01-12	Tuesday
6	PSG College of Technology, Coimbatore	25-01-12	Wednesday
7	National Institute of Technology, Tiruchirapalli	27-01-12	Friday
8	UVCE, Bangalore	30-01-12	Monday
9	IISc Bangalore	01-02-12	Wednesday
10	Manipal Institute of Technology, Manipal	02-02-12	Thursday
11	National Institute of Technology Karnataka, Surathkal	03-02-12	Friday
12	Visvesvaraya National Institute of Technology Nagpur	06-02-12	Monday
13	IIT Bombay	08-02-12	Wednesday
14	SGS Institute of Technology & Science, Indore	13-02-12	Monday
15	National Institute of Technology, Rourkela	15-02-12	Wednesday
16	Madan Mohan Malaviya Engineering College, Gorakhpur	16-02-12	Thursday
17	Bengal Engineering and Science University, Shibpur	17-02-12	Friday
18	Jadavpur University, Kolkata	22-02-12	Wednesday
19	IIT Guwahati	27-02-12	Monday
20	Guru Nanak Dev Engineering College, Punjab	29-02-12	Wednesday
21	Indian School of Mines, Dhanbad	02-03-12	Friday
22	IIT Kharagpur	05-03-12	Monday
23	Institute of Technology, BHU, Varanasi	07-03-12	Wednesday
24	Motilal Nehru National Institute of Technology, Allahabad	12-03-12	Monday
25	IIT Kanpur	13-03-12	Tuesday
26	IIT Delhi	14-03-12	Wednesday
27	IIT Roorkee	16-03-12	Friday
28	Shri Guru Gobind Singh Institute of Engineering & Technology, Nanded	19-03-12	Monday
29	Govt. College of Engineering, Aurangabad	20-03-12	Tuesday
30	Walchand College of Engineering, Sangli	21-03-12	Wednesday
31	Coimbatore Institute of Technology, Coimbatore	22-03-12	Thursday
32	Basveshwar Engineering College, Bagalkot	23-03-12	Friday
33	BMS College of Engineering, Bangalore	26-03-12	Monday
34	The National Institute of Engineering, Mysore	27-03-12	Tuesday
35	Malnad College of Engineering, Hassan	28-03-12	Wednesday
36	National Institute of Industrial Engineering, Mumbai	29-03-12	Thursday

S.No	Institute	Interview Date	Day
37	Madhav Institute of Technology & Science, Gwalior	30-03-12	Friday
38	Govt. Engineering College, Kerala	02-04-12	Monday
39	Thiagarajar College of Engineering, Madurai	03-04-12	Tuesday
40	Govt. College of Engineering, Salem	04-04-12	Wednesday
41	College of Engineering, Pune	05-04-12	Thursday
42	Veer Surendra Sai University of Technology, Burla	06-04-12	Friday
43	Delhi Technological University, Delhi	09-04-12	Monday
44	Smrat Ashok Technological Institute, Vidisha	10-04-12	Tuesday

XV. DEPARTMENTS & FIELDS OF SPECIALIZATION AT VARIOUS INSTITUTIONS

- The departments offering admission to Ph.D. degree programmes at various institutions and the fields of specialization in the departments 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 admissions 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, Avionics, Radar and Electromagnetic Systems, 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 Propellants, Composite Structures, Smart structures, Non-destructive Evaluation, Finite Element Methods, Fracture Mechanics, Structural Integrity and Reliability, Structural Dynamics and Aeroelasticity, Rotor CraftS Dynamics.	ME/M.Tech. or equivalent degree in Aerospace, Mechanical, Electrical, Electronics, Chemical, Computer Science, Civil.
BGAS01	Centre for Atmospheric & Oceanic Sciences	Monsoon Dynamics, Tropical Convection and Satellite Meteorology, Dynamics of Oceans, Coupled Ocean-atmospheric Systems; Climate Modeling, Laboratory Modeling, Planetary Boundary Layer, Stochastic Modeling, Aerosols and Climate.	ME/M.Tech. or equivalent degree in Mechanical, Civil/Aerospace / Chemical Engineering, Atmospheric and Oceanic Sciences.
BGCH01	Chemical Engineering	Biochemical Engineering; Catalysis, Colloids, Complex Fluids; Environmental Pollution, Fuel cells, Gas Hydrates, Granular Flow, Microfluidics, Modelling of Diseases, Molecular modeling, process modeling, Nano structures, Nano architectures, Optimization & Control, Polymer degradation, Self assembled systems, Simulation techniques, Solar energy, Suspensions, Super Critical fluids, Theoretical Biology, Water Treatment.	ME/M.Tech. or equivalent degree.
BGCE01	Civil Engineering	Geotechnical Engineering: Earthquake Geotechnical Engineering, Geo environmental Engineering, Physico-chemical Aspects and Constitutive Modeling of Soil Behavior, Foundations, Earth and Earth Retaining Structures, Ground Improvement Techniques, Geosynthetics, Mechanics and Granular Media, Numerical Modeling of soils and rocks, Risk and Reliability Assessment of Geohazards, Soil Dynamics, Rock Mechanics. Water Resources and Environmental Engineering.: Water Resources Systems, Climate Hydrology, Surface and Ground Water Hydrology, Vadose Zone Hydrology, Open Channel Flows, Urban Water Distribution Systems, River Mechanics, Environmental Hydraulics, Water Quality Modeling, Contaminant Transport in Surface and Ground Water Flows. Structural Engineering: Structural Mechanics, FEM Techniques, RC and Prestressed Concrete, Masonry Structures, Structures 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. Transportation & Infrastructure Engineering: Transportation Planning, Public Transportation Planning and Management, Optimization of Transportation Systems, Application of Geo-informatics in Transportation Engineering, Driver Behavior and Road Safety, Traffic Management, Infrastructure Engineering, Seismic Hazard and Seismic Microzonation of Urban Centres.	ME/M.Tech. or equivalent degree in Civil.
BGCS01	Computer Science and Automation	Theoretical Computer Science: Design of Algorithms, Coding theory, Cryptography, Formal Verification, Graph theory, Logic Randomized Algorithms, Computational Geometry, Computational Topology. Systems and Software: Compilers, Computer Architecture, Computer Networks, Databases, Distributed Computing, Embedded Systems, Energy-Aware Computing, Mobile & Wireless systems, Operating Systems, Real-Time OS, Storage Systems, Systems Security, Visualization, Graphics, Programming Languages. Automation: Auctions and Mechanism design, Bioinformatics, Data Mining, Electronic Commerce, Game Theory, Intelligent agents, Machine Learning, Pattern recognition, Reinforcement Learning, Stochastic Control and Optimization, Stochastic Simulation.	ME/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.

Code	Department	Fields of specialization	Minimum Qualification
BGEC01	Electrical Communication Engineering	<p>Communication and Networking: Information theory, distributed joint source-channel coding; error control coding including space-time codes, network coding, coded modulation and pseudorandom sequences, Wireless mobile communication, CDMA, multiuser detection, MIMO, OFDM, cooperative communications. Communication networking: modeling, analysis, optimization and control of resource allocation in wireline and wireless networks; scheduling in networks; quality of service in heterogeneous networks; cross-layer design in wireless networks; energy efficient protocols. Wireless sensor networks: Self organization, and distributed signal processing, system architectures for various applications, distributed computing algorithms for sensor networks. Communication protocols-specification and verification, AI applications to communication networks and their management, mobile agents. Multimedia communication.</p> <p>Nanoelectronic and VLSI: Nano-CMOS technology, non-classical transistor design, transistor variability in nanoelectronics, adaptable circuit design, integrated MEMS sensors, VLSI architectures for high performance computing, low power techniques in hardware for embedded systems and system-on-chip, formal and informal verification technologies, fault-tolerant and self-healing system design, bio-electronics, Technologies for pattern recognition classification, and machine learning.</p> <p>Photonics: Fibre Optics communication, DWDM networks, Integrated optics, MOEMS; Fiber Bragg grating Sensors, Nano-photonics, Bio Photonics.</p> <p>Signal Processing: Speech and audio coding, speech recognition and enhancement, Music classification, auditory modes and Hearing aids. Wavelets: application to data transmission, signal detection and denoising. Multirate signal processing, filter bank design. Statistical signal processing; signal detection and estimation, space-time (MIMO) signal processing algorithms with applications to wireless communications, underwater acoustic systems, acoustic signal separation. Biomedical signal processing. Processing of biomedical signals using nonlinear dynamical techniques. Abnormality detection in ECG and EEG signals. Connectivity study of networks in the brain.</p> <p>Microwave Engineering: Passive and active circuits (RF and microwave). Microwave antennas, Fractal designs in electromagnetic, MEMS and micromachining (RF MEMS), Composite materials for microwave applications, Computational electromagnetics.</p>	ME / M.Tech. or equivalent degree in Electrical Communication, Electronics and Communication, Telecommunication, Electronics, Electronic Instrumentation, Biomedical Engineering, Computer Science and Engineering, Electrical Engineering.
BGEE01	Electrical Engineering (Power Systems and Power Electronics, Systems Science & Signal Processing and High Voltage Engineering)	<p>Power Systems and Power Electronics: Computer Based Analysis, Design, Control & Protection of Power Systems; Energy Systems; Distribution Systems; Intelligent System Applications to Power Systems; Reactive Power Control, Voltage Stability, FACTS Applications, De-regulated Power System Management, Power Electronics & Drives; Power Quality, Switched Mode Power Supplies.</p> <p>High Voltage Engineering: EHV Power Transmission, Overvoltage Protection, Lightning Protection, Computational Electromagnetics, Gas Insulated Systems, Partial Discharges, Insulation Engineering, Condition Monitoring and Diagnostics for HV Power Apparatus, Nanodielectrics.</p> <p>System Science and Signal Processing: Machine Learning and Data Mining; Computer Vision, Image/Video Processing; Sensor Networks; Real Time and Fault Tolerant Systems; DSP and Multimedia; Bio Signal Processing; Bio Medical Imaging; Bioinspired Signal Processing.</p>	ME / M.Tech. or equivalent degree in Electrical, Electronics Communication, High Voltage Engineering, Instrumentation, Computer Science, Information Technology or Biomedical Engg. Or related disciplines.
BGED01	Centre for Electronic Design & Technology	Communication Network, Embedded Systems, POWER ELECTRONICS & DRIVES , VLSI Design, Electronics systems packaging (package electrical design, thermal design, package substrates).	ME / M.Tech. or equivalent degree with Electronics as one of the subjects of study.
BGIN01	Instrumentation and Applied Physics	Sensors and related instrumentation, Tomographic imaging for biomedical and other applications, Lasers and optical metrology, Switching devices for information storage, Mass spectrometry, Photovoltaics, Electrical and thermal contact resistance, Microelectromechanical Systems (MEMS), Fibre-Bragg Grating Sensors; Plasma processes & thin films	ME / M.Tech. or equivalent degree OR M.Sc. or equivalent degree in Physics / Applied Physics / Materials Science
BGMG01	Management Studies	Applied Statistics, Energy and Environmental Management, Human Resource Management, Industrial Economics, Industrial Relations, Information Systems Engineering, Management of Intellectual Property & Innovation, Management of R&D, Marketing, Operations Management, Operations, Research, Organizational Behavior, Public Policy, Quality Control and Reliability, Strategic Management, Supply Chain Management, Technology Management.	ME / M.Tech. or equivalent degree or MBA or equivalent PGDBM or BE / B.Tech. or equivalent degree or Master's Degree in Commerce, Computer Science / Application, Economics, Mathematics, Operations Research, Psychology, Social Work, Statistics.

Code	Department	Fields of specialization	Minimum Qualification
BGMR01	Materials Research Centre	Preparation of Advanced Materials by Physical, Chemical and Nonequilibrium Routes. Ferroelectric and Semiconducting Thin Films, Multilayers and Hard Coatings; Nanomaterials and Composites, Self Assembly and Nanopatternings; Theoretical and Computational Materials Science. Ferroic materials, glasses and glass-ceramics, Electro and Nonlinear Optics.	M.Sc. or equivalent degree in Materials Science, Chemistry or Physics or ME/ M.Tech/ MSc. (Engg) or equivalent degree in materials Science / Engg, Ceramic Engg and Technology.
BGMA01	Mathematics	Partial Differential Equations, Homogenization, Controllability, Nonlinear Dynamics and Chaos, Time Series Analysis with Applications to Neuroscience, Applied 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	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).
BGME01	Mechanical Engineering	Experimental Stress Analysis and Fracture Mechanics, Tribology and Noise Control; Mechanisms, Robotics and CAD, Fluid Mechanics, Turbulence, Heat Transfer, Combustion, Internal Combustion Engines, Refrigeration and Air Conditioning, Dynamics, Micro Electro-Mechanical Systems (MEMS), Nano Tribology, Structural Optimization and Design, Mechanical Properties of Materials, Biomechanics.	ME / M.Tech. or equivalent degree or M.Des in Product Design & Manufacturing or equivalent.
BGMT01	Materials Engineering	Mineral Processing, Biohydrometallurgy, Electrometallurgy; Extractive Metallurgy, Thermodynamic Properties, Sensors, Process Modeling and Analysis; Physical Metallurgy, Phase Stability and Transformation, Diffusion, Metallic Glasses; Mechanical Metallurgy, Creep and Fatigue, Fracture, Wear, Deformation Processing, Polymer, Ceramic & Metal-Matrix based Composites, Ceramics, Organic Electronics, Organic Photovoltaics.	ME / M.Tech. or equivalent degree in Metallurgical, Mineral, Chemical, Ceramics or Mechanical, Electrical, Electronics or Materials Science/ Engineering or Biotechnology, Polymers
BGPD01	Product Design	CAE tools for Product Design, Vehicle Crash Safety, Occupational health and safety, Product Safety, computer Aided Ergonomics, Human Physiology Digital Human modelling Biomechanics, Kinesiology, Biosensors, Computer aided fit 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.	ME/M Tech or Equivalent degree in Design any branch of Engineering, Architecture, Instrumentation and medicine or BE / B Tech or equivalent degree in Design, any branch of Engineering, Architecture Instrumentation and medicine or Master's degree in physics, Mathematics, Computer Sciences, Physiology Psychology, Management.
BGPH01	Physics	(A) Experimental studies in I. Condensed Matter Physics II. Atomic, Optical Physics, and III. X-ray Crystallography of Biomolecular Structures, 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 nanomaterials, Superconductivity in bulk as well as thin films, Semiconductors, Ferroelectricity, Crystal Growth Studies, Nonlinear Optical Materials, Phase Transition Studies, High Pressure and Low Temperature Studies, Study of Low Dimensional Materials, Amorphous Systems, Soft Condensed Matter: colloids, surfactants and biological materials, Peptide and Protein Crystallography, Complexation Studies and Drug-Nucleic Acid Interactions, Molecular Modeling, Database Analysis, Polymer Physics, Surface X-ray scattering, surface phase transitions, 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(Engg) or equivalent degree or M.Sc. or equivalent degree in Physics, Biophysics, Biotechnology, Mathematics, Chemistry or Polymer Science or B.E./ B.Tech. or equivalent degree or B.Sc or equivalent degree followed by AMIE, Grad, IETE, AMIChE, AMIIM, AMAeSI.

Code	Department	Fields of specialization	Minimum Qualification
BGSE01	Super Computer Education and Research Centre	Compiler Optimization, Computer Aided Design for VLSI Systems, Computational Electromagnetics, Computer Architecture, Database Systems, Embedded System-on-Chip Architectures, Grid Applications, Grid Computing and Grid Middleware, High Performance Computing, Graphics and Scientific Visualisation, Mathematical Software /Libraries, Multimedia, Network Security, biomedical diagnosis/imaging, photonics,Pervasive Computing, Quantum Computing, VLSI testing, verification, and fault tolerant computing Scientific Computing.	ME/M.Tech. or equivalent degree in any discipline
BGST01	Centre for Sustainable Technologies	Water quality and sustainable supply; Water and sanitation; Renewable energy; solar, biomass combustion and gasification, biomethanation, bio-fuels, etc.; Energy planning, demand side management, energy efficiency; Alternative building technologies and materials, energy efficient and environmentally sound technologies; Climate-responsive architecture/building technology; Building Integrated Photovoltaics (BIPV) and Green Buildings; Building-comfort studies in tropical regions; Waste management; reuse and recycling; Natural Resources Management; Climate change mitigation; Aquatic biodiversity; Ecotoxicology and remediation.	M.Arch or M.E./M.Tech/M.Sc. (Engg.) In Mechanical, Civil, Chemical including Renewable Energy, Environmental Engineering, Energy Studies or MSc (Environmental Sciences)

2. Indian Institute of Technology Bombay, Mumbai 400076 – BM

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 (Min. 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).

Code	Department	Fields of Specialization	Minimum Qualification
BMAE01	Aerospace Engineering	<ul style="list-style-type: none"> • Aerodynamics • Dynamics and Control • Aerospace Propulsion • Aerospace Structures 	Master's degree in Aerospace, Mechanical, Civil Engineering Electrical/ Electronics. (If academic credentials are exceptional and the candidate has proven research capabilities, Bachelor's degree (First Class) in the mentioned disciplines may be acceptable). Graduates with Electrical / Electronics background will be considered for Dynamics & Control specialization only.
BMCE01	Civil Engineering (Code no. of specialization to be indicated in the datasheet)	Transportation Systems Engineering	M.Tech or Equivalent degree in Civil Engg.
BMCE02		Geotechnical Engineering	
BMCE03		Water Resources Engineering	
BMCE04		Structural Engineering	
BMCH01	Chemical Engineering	<p>Research Areas</p> <p>i. 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.</p> <p>ii. Biotechnology & Bio-Systems Engineering: Metabolic & Genetic Engineering, Bio-separations, Bioinformatics, Systems Biology, Drug Discovery, Enzymology, Bioprocess Development. Vermiculture for Water Management, Dehydration of Food Systems, Controlled Atmosphere Storage, and Process Development of Food Systems.</p> <p>iii. 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.</p> <p>iv. Catalysis & Reaction Engineering: Catalysis, Multiphase Reaction, Bio-reaction Engineering and Reactor Modelling. Process intensification & reactive distillation.</p> <p>v. Transport, Colloids & Interface Science: Fluidization, Granular flows. Power Mixing, Membrane Separations, Rheology of Complex Fluids, Colloids, Sol-gels, Emulsions & Foams, Paints and Coatings, Microstructural Engineering, Aerosols, Electrohydrodynamics, Fluid Mechanics & Stability, Computational Fluid Dynamics, Heat & Mass transfer, Porous media, and Surfactants.</p> <p>vi. Energy and Environment: Climate change, Coal Gasification, Energy Integration, Green Engineering, Renewable Resources, Waste Management, Pollution Control, Air Pollution Prediction & Control and Vermiculture.</p>	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
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, Programming 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 biologically inspired computing.	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.

Code	Department	Fields of specialization	Minimum Qualification
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.	M.Sc. or equivalent degree in Chemistry/ Physics/ Biochemistry / Life Sciences / Pharmacy / Materials Science / Biotechnology. Candidates with Master degree in science must have valid GATE score to become eligible for the Teaching/ Research Assistantship provided by the Institute.
BMES01	Earth Sciences	Mineralogy Geochemistry and Ore Deposits, Structural Geology, Igneous and Metamorphic Petrology, Engineering Geology, Hydrogeology and Environmental Geology, Sedimentology, Stratigraphy and Micro-Paleontology, Geomorphology and Remote Sensing, Mathematical Geology and Geostatistics, Rock Magnetism and Geology, Seismology and Exploration Geophysics, Geothermal Energy Resources, Geomagnetism, Well- logging, Petrophysics.	M.Sc / M.Tech degree in Geology/ Geophysics / Geo-Chemistry
BMEE01	Electrical Engineering	Communications: Fiber optic communication, Signal processing, Speech processing, Image processing, Computer vision, Multimedia Systems. Wireless and Mobile communication, Wavelets, Microwaves Antennas, Embedded Systems, Communicating Network and Internet Engineering.	(i) .E / B.Tech. / M.E M.Tech or equivalent degree in Computer Science, Computer Sc. & Engg. Computer Engg. Electrical Engg, Electronics, Telecommunication Engg, Instrumentation, Biomedical Engg. (ii) Master of Science in Mathematics, Physics with an interest in Electrical Engg. These candidates are eligible for research areas consistent with their academic background and special interest.
BMEE02		Control & Computing: Algorithms in Linear Systems Theory, Optimal Control & Optimization, Systems Modelling & Realization Theory Control of Distributed parameter Systems. Non-Linear Systems, Modern fiber & Network Theory.	
BMEE03		Power Electronics & Power Systems: Power Systems computation, Switch Gear and Protection Control and Automatics FACTS HVDC and Power Quality, Substation Automation, Deregulation in Power Industry, Electric Machine Modelling, Design and Control, Electric Drives, DSP Application and EMI issues, Efficient Utilization of Non-conventional Energy Sources, Power Electrons Converters and Invertors.	
BMEE04		Microelectronics: Devices & IC Technology, Reliability Studies in Devices, Semiconductor Device Simulation & Modelling, Power Semiconductor Devices. VLSI Digital Design, System Hardware Design, analog VLSI Design, Embedded Systems, Reconfigurable Systems, CAD tools in VLSI, and Nanotechnology, MEMS Design and Technology (including Bio-MEMS)	
BMEE05		Electronics Systems: Signal Processing Application, Speech Processing, Embedded Systems Design, Electronic Instrumentation, Biomedical Electronics.	
BMMA01	Mathematics	<p>Algebra: Commutative Algebra, Hilbert functions, Blowup algebras, Local cohomology, Hopf, Algebras, Coxeter Groups.</p> <p>Analysis: Functional Analysis, Operator Theory, unbounded subnormals, Hilbert modules, Numerical Functional Analysis, Approximate Solutions of operator equations and eigenvalue problems, Spline Theory, Numerical Functional Analysis, Real Analysis, Mean periodic functions, Generalized integrals.</p> <p>Combinatorics: Combinatorics, Posets, Generating functions, Polyhedral Combinatorics.</p> <p>Geometry and Topology: Algebraic Geometry and Combinatorics, Schubert varieties, Linear codes, Varieties over finite fields, Algebraic Topology, Operads, Differential Geometry, Harmonic Manifolds, Algebraic & Differential Topology, Topology of Matrix varieties.</p> <p>Number Theory: Number Theory, Automorphic Forms, Representation theory of p-adic groups. Representations of Algebraic Groups, L-functions, Converse Theorems.</p> <p>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.</p> <p>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, Modelling bivariate distributions, Stochastic Differential Game Theory, Risk-sensitive control theory, Stochastic control Mathematical Finance, Applied Probability, Poisson and compound poisson approximations, Estimation after selection, Reliability test plan.</p>	First Class Master degree in Maths/ Statistics/ Computer Science

Code	Department	Fields of specialization	Minimum Qualification
BMME01	Mechanical Engineering	Thermal and fluid Engineering: Convective and Radiative Heat Transfer, Two-Phase Flow, Design of Thermal Equipments and Systems, Numerical Techniques, Modelling and Analysis, combustion and Flames, Fuel injection, petrol and diesel Engines, Power Plant, Nuclear Engg, Reactor Neutronics Reactor Heat Transfer, Steam Generator, Fluid Mechanics, Fluid Machinery, Hydraulic controls, Micro Fluidics, Fuel Cells, Computational Fluid Dynamics, Refrigeration, AC Systems Cryogenics, Absorption, Heat Pumps	For all fields of Specialization: i) B.Tech / M.Tech for equivalent degree in Mechanical Engineering with First Class (or 60% minimum) at UG & PG levels (55% for SC / ST) ii) B.Tech. / M.Tech. degree or equivalent in Production Engineering / Industrial Engineering / Aerospace Engineering with First Class (or 60% minimum) at UG & PG levels (55% for SC / ST) may be considered. iii) Candidates with an outstanding academic record and a Post-Graduate degree in other branches of Engineering / Technology may also be considered for research areas consistent with their academic background and special interests of the Development.
BMME02		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 Modelling, 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.	
BMME03		Manufacturing Engineering: Machining, Casting, Welding and Forming Processes. Tool Design, Rapid Prototyping and Tooling, Modelling and Simulation of Manufacturing Processes, Manufacturing Automation and Control, CAD/CAM, CNC, Feature Based Modelling, Computer Aided Process Planning Intelligent Product Design and Manufacturing Applications of AI in Manufacturing, Flexible Manufacturing Systems, Modelling and simulation of Manufacturing Systems, CIMS product Lifecycle Management, Inventory and Supply Chains Management, Quality Engineering, Planning Scheduling Queuing, Management of Operations, Maintenance Management.	
BMMM01	Metallurgical Engineering and Materials Science	<p>Kinetics of metal extraction & refining processes, Iron and steelmaking processes, physical and mathematical haracte of processes, welding and joining processes, levitation materials processing.</p> <p>Phase Transformation, Thermomechanical processing Grain growth and texture development, Non-equilibrium solidification. Deformation and microstructural evolution including superplasticity sheet metal forming.</p> <p>Mechanical alloying power consolidation and sintering mechanisms. Zirconia and alumina ceramics, nanocrystalline materials, metal-matrix and metal, ceramic and polymer matrix composites, ceramic matrix composites Metallic magnetic alloys, gaint, magnetoresistance and colossal magnetoresistance, oxide ceramics, material design and characterization, grain boundary and interfacial engineering.</p> <p>Semiconductor and dielectric thin films, Opo electronic and photovoltaic devices, MEMS, plasma processing, chemical vapor deposition, physicalvapor deposition II – VI compound semiconductors and heterostructures</p> <p>Oxide and sulphate ionic conductors, polymeric ionic conductors, oxide superconductors, Dielectric & magnetic ceramics, Nano Technology Polymers and polymer matrix composites.</p> <p>Biomaterials, Microwave Materials.</p> <p>Stress Corrosion Cracking, Corrosion fatigue, wear of materials, fracture mechanics, failure analysis, Aqueous and high temperature corrosion.</p> <p>Surface modification by plasma spray coatings for thermal barriers wear and corrosion resistance. Sol-gel processes.</p> <p>Instrumentation and process control in material processing.</p> <p>Passivity Environmentally assisted cracking, weld decay, Protective coatings development of new alloys. High Temperature Oxidation and Sulfidation. Surface Modifications. High Temperature Coatings Using Thermal Spray and Laser Treatment.</p>	B.Tech / M/Tech. in Metallurgical Ceramic, Chemical, Electrical, Electronics, Electrochemical Engg/ Physics, Materials Science, Mechanical OR M.Sc. in Chemistry M.Tech. in Surface Science and Colloids.
BMPH01	Physics	Condensed Matter Physics (Theory)	M.Sc. (first Class) / M.Tech. / B.Tech.
BMPH02		Condensed Matter Physics (Experimental)	
BMPH03		Laser, Optics and Spectroscopy	
BMPH04		Nuclear Physics (Experimental)	
BMPH05		Particle Physics	
BMPH06		Statistical Physics	

Code	Department	Fields of specialization	Minimum Qualification
BMHS01	Humanities and Social Science	<p>Economics: Industrial Economics, Money, Banking and Finance, Economic Systems, Gandhian Thought, Managerial Economics, Applied Econometrics, Economic Development, Environmental Economics, International Trade & Finance International Business Indian Economy, Corporate Investment and Econometric Application, Financial Economics & Time Series Analysis.</p> <p>English: Postcolonial Literature, Women's Literature, Modern Critical Theory, Aesthetics, Linguistics & ELT, Indian And Western Drama, Language and Cognition, Theory of Novel, Cultural Studies.</p> <p>Philosophy: Cognition Science, Philosophy of Language, Contemporary Western Philosophy, Metal-Ethics, Philosophy of Mind, Buddhism, Classical Indian Philosophy, Comparative Philosophy, Comparative Religion, Vedanta Philosophy, Applied Ethics, Modern Western Philosophy, Modern Indian thinkers.</p> <p>Psychology: Stress Management, Women's Studies and Psychology, Social Psychology, Organizational Behaviour, Human Resource Development, Health and Clinical Psychology. Psychosomatic Disorders, Stress & Coping, Subjective Well-being. Ergonomics, Cross-Cultural Personality, Culture and Ethics in Organizations, HR issues in the B.P.O. Industry in India. Cognitive and Human Factor Psychology, Neuro Psychology, Dyslexia, Consumer Behaviour.</p> <p>Sociology: Political Sociology, Sociology of Development, Rural Sociology, Environmental Sociology, Sociology of Science, Technology and Society, Sociology of Development and Change, Urban Sociology, Sociology of Religion, Political Sociology. Global Studies and International Relations, Sociology of Stratification, Caste Studies, Sociology of Social Movements, Sociology of Development and Environment Studies.</p> <p>Sanskrit: Paninian grammar, Philosophy of Language, Indian Astronomy / Mathematics</p>	M.A. / M.Com. / M.Sc. / B.Tech. with minimum of 60% marks for equivalent grade) at the qualifying examination. In case of SC/ST category of Candidates. It is 55%
BMBS01	Biosciences & Bioengineering	<p>BIOTECHNOLOGY (BT)</p> <p>Research Areas: Enzyme kinetics and enzyme secretion, microbial metabolism and regulation, aromatic hydrocarbon metabolism and genetic engineering, enzyme inhibitor design, peptide synthesis, protein structure, function and engineering; yeast molecular biology, transcriptional regulation of gene expression; microtubule dynamics and cancer chemotherapy, immunology, signal transduction, Glycobiology; molecular and membrane biochemistry; proteomics and systems biology, bacterial cell division, protein aggregation and neurodegenerative diseases, computational biology of nucleosome dynamics, Chromatin assembly and statistical dynamics, cytoskeletal dynamics, chromosome segregation during mitosis and meiosis in yeast. Regulation of gene expression in the malaria parasite, bioinformatics of parasite genomes.</p>	<p>Minimum Eligibility for Admission:</p> <p>i) First Class or 60% marks (55% for SC/ST) in M.Sc or equivalent degree in subjects related to Life Sciences / Physics / chemistry or B.Tech Biotechnology with</p> <p>a) A valid GATE score (eligible for Institute Taship / RAship) or A valid CSIR / UGC / DBT JRF (eligible for FA category) or</p> <p>b) A valid ICMR JRF (not linked to ICMR project) (eligible for FA category)</p> <p>or</p> <p>c) Two years of relevant post M.Sc research experience (eligible only for project positions)</p> <p>or</p> <p>d) UGC / CSIR (Lectureship) eligible only for project position</p> <p>ii) First Class or 60% marks (55% for SC/ST) in M.Tech of equivalent degree in Biotechnology.</p>
BMBS02	Biosciences & Bioengineering	<p>BIOMEDICAL ENGINEERING (BME)</p> <p>Research Areas: Currently fundamental and applied research is being conducted in the broad areas of. Bioinstrumentation for diagnostics and therapeutics, Biomaterials, prostheses and medical devices, Physical system modeling and analysis. Bioinstrumentation for early detection of diseases, Biomedical transducers and sensors including biosensors and bio MEMS devices, Cardiac electrophysiology and muscle mechanics, Development and validation of novel biomaterials and implantable devices, Neurophysiology, prosthetic devices including aids for the handicapped, Signal processing, Telemedicine and knowledge based systems. Nano medicine, Drug delivery, Nano biotechnology.</p>	<p>Minimum Eligibility for Admission:</p> <p>M.Tech / M.E. or B.Tech / B.E. in Biomedical, Chemical, Computer Science, Electrical, Electronics, Telecommunications, Instrumentation and Mechanical Engineering, and Engineering Physics. M.Sc. or equivalent in biochemistry, Biophysics, Biotechnology, ceramics, Chemistry, Electronics, Ergonomics, Material Science, Mathematics, Molecular Biology, Physics and Physiology</p> <p>First Class / Division in MBBS / BDS degree, occupational Physiotherapy, with AIMS (PG Entrance Test) / MCI entrance examination for MD / MS (for Medical graduate) / MBBS with MD / MS, MDS M.Pharm</p> <p>Applicants desiring Institute financial support should have cleared GATE (for engineering and science graduates) or AIIMS / MCI / GIPMER / PGI-Chandigarh / AFMC – Pune post graduate entrance examinations. Eligibility / rank certificates are required for all such entrance examinations.</p>

Code	Department	Fields of specialization	Minimum Qualification
BMEV01	Environmental Science and Engineering	Environmental Monitoring, Industrial Air & Water Pollution Control, Solid and Hazardous Waste Management, Air & Water Quality Modelling, Environmental Systems Optimization, Environmental Microbiology & Biotechnology, Bioremediation, Indoor Air Quality, Aerosol Science and Technology, Environmental Impact Assessment and Global Issues.	Bachelor of Engineering degree in Aeronautical / Aerospace, Agricultural, Chemical, Civil, Energy, biotechnology, Environmental, Mechanical Metallurgical and Mining Engineering or a Master of Science degree in Atmospheric Science, Biochemistry, Biotechnology, Chemistry, Earth Sciences, Environmental Toxicology, Environmental Sciences, Meteorology, Microbiology and Physics and for Science graduates, Mathematics is mandatory at Higher Secondary / Intermediate / (10+2) level.
BMIO01	Industrial Engineering and Operations Research	<p>The group is interested in research related to modeling, quantitative analysis and optimal resource allocation from decision problems in deterministic and stochastic contexts. Broad areas of application are in supply chains, logistics, transport including railways, manufacturing systems, finance, services, infrastructure and other industrial systems; application of quantitative methods in quality and maintenance management systems; development and application of decision support, intelligent and knowledge-based systems.</p> <p>The specific problems of research interests include: production planning, scheduling and control systems; management of inventories in production, distribution and service systems; industrial scheduling, facilities planning, project management, quality management, materials management and productivity management; operations planning and control related to CMS, MRP, ERP, flexible assembly, FMS, JIT; Supply chain analysis, reverse logistics, closed-loop supply chains and RFID applications, product variety management.</p> <p>Operations Research applications in management of technology and resource allocation; Convex optimization; mixed-integer programming; Markov decision processes; optimal control in deterministic and stochastic systems; (differential) game theory; applications of game theory; modeling and simulation of supply chains, manufacturing and service systems; theory and applications of distributed and hybrid simulations, discrete event and system dynamics simulations; applied stochastic models; scheduling and control of railways and other transport operations; time tabling of services, crew and vehicle scheduling for transport operations; optimization and design problems arising from e-commerce, including auctions and mechanism design for electronic exchanges; risk analysis and contract design; revenue management; quantitative models for financial engineering. Theory and applications of neural nets and fuzzy systems in manufacturing and management; development and applications of modern information systems for managing manufacturing, supply chain and service organizations.</p> <p>The IEOR programme is unique in its contemporary flavor, with new courses in Financial Engineering, Supply Chain Management, Game Theory, Markov decision process, System Dynamics, Neural Networks and Fuzzy Logic, Services Management, Manufacturing systems to name a few. The programme is equally strong in background building, with updated courses in Optimization Techniques, Stochastic Models, Simulation, and Knowledge-based systems.</p>	<p>a) First class Master's degree in any branch of Engineering with adequate exposure to Industrial Engineering and Operations Research.</p> <p>b) First class M.Sc. in Mathematics, Statistics or Operations Research with excellent academic record</p> <p>c) First Class Bachelor's degree in any branch of Engineering with an excellent academic record.</p>
BMSC01	Systems and Control Engineering	Modeling and Simulation of various types of dynamic systems, Linear and Nonlinear controls, Variable structure systems and sliding mode control, Control of large size nuclear reactor, System identification, Adaptive and learning systems, Robust and optimal control, Statistical dynamic of system, Aircraft control systems, Process control systems, Robotics control systems, Fuzzy logic systems and Neural network based control systems, Reliable computing, Quantitative feedback theory, Geometric mechanics and control, Under actuated systems.	<p>First class M. E. or M.Tech. in Aerospace / Chemical / Electrical / Electronics / Instrumentation / Mechanical / Metallurgical Engg. / Systems & Control Engg.</p> <p>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.</p> <p>This is a pre- requisite for short-listing</p>

Code	Department	Fields of specialization	Minimum Qualification
BMEN01	Department of Energy Science and Engineering	<p>Energy Efficiency / Improvements in conventional Energy Systems: Heat pumps, Energy integration, Process integration for resource optimization, 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, Electronics 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, Hydrogen Generation and Storage</p> <p>Renewables: Biomass Gasifier Design, Development and Testing, Pyrolysis for liquid fuels and chemical, CNG Kit development, Testing of Solar Collector and systems, Passive Solar Architecture, Development of Carbon PV cell, Decentralised Power Systems-Grid Integration Issues, Hybrid Systems for Rural Electrification, Wind Energy, Low Cost Solar Drier, Fuel Cells, Thin film solar cells, Carbon nano tubes for hydrogen storage, Solar photovoltaic concentrator, Development of Engines for SVO, Biodiesel, Dual fuelling etc., Biodiesel manufacturing process.</p> <p>Clean Coal Technologies : (UCG, Chemical Looping, Combustion) Co₂ requestrations</p> <p>Nuclear : Nuclear Safety, Nuclear Waste management, Thermal Hydraulics Research, Computer Simulation Models for Analysis of Transients in Pressurised Heavy Water Reactor.</p>	<p>M.Tech. Degree in any of the following branches of engineering: Aeronautical/ Aerospace, Chemical, Civil, Electrical, Mechanical, Metallurgical.</p> <p>M.Tech. in Energy Studies</p> <p>M.Sc. in Chemistry/ Physics/ Mathematics with a good academic record and a minimum of two years of relevant engineering experience in an energy- related field in Energy Studies.</p>
BMMG01	School of Management	Accounting, Economics, Innovation and Entrepreneurship, Financial Management, General Management, Human Resource Management, Information Systems, Intellectual Property Rights, International Business, Management of Information Technology, Marketing Management, Operations Management, Organization Behaviour, Project Management, Quality Management, Statistics and Operations Research, Strategy and Business Policy, Technology Management, Organisational Excellence Competitiveness.	<p>i) B.E./B.Tech. or equivalent with 70% Marks / 7.5 CPI (65% marks/7.0 CPI for SC/ST) and valid score in GATE / CAT/JMET/GMAT/UGC-CSIR JRF Examination</p> <p>M.E./M.Tech./M.Phil or equivalent degree with 60% marks / 6.5 CPI (55% marks / 6.0 CPI for SC/ST) at graduation and post graduation level</p> <p>OR</p> <p>ii) Master of Management / M.B.A. or equivalent with 60% marks / 6.5 CPI (55% marks / 6.0 CPI for SC/ST) at graduation and post graduation level</p> <p>OR</p> <p>iii) M.Sc/M.A/M.Com/LLM/MCA or equivalent with 60% marks / 6.5 CPI (55% marks / 6.0 CPI for SC/ST) at graduation and post graduation level and a valid score in GATE/CAT / JMET/ GMAT/ UGC-CSIR JRF examination.</p> <p>OR</p> <p>v) CA / CFA (USA) with 60% marks / 6.5 CPI (55% marks / 6.0 CPI for SC/ST) in the preceding degrees and a valid score in GATE/CAT/JMET/GMAT / UGC-CSIR JRF examination.</p>

Code	Department	Fields of specialization	Minimum Qualification
BMIDC01	Industrial Design Centre	<p>Some of the specific areas include:</p> <ul style="list-style-type: none"> ❖ Studies in Objects and Cultural notions ❖ Indian product tradition ❖ Environments for Learning ❖ Information Visualization ❖ Perception and Cognition ❖ Product Semantics ❖ Cognition, Mental Imagery and Design Problem Solving ❖ Bioonics ❖ Materials and Processes ❖ Design Strategy and Innovation ❖ New Product Development ❖ Collaborative Methodology for Innovation ❖ Human-Computer Interaction ❖ HCL – Software Engineering Overlap ❖ Interaction Design for Indian Needs ❖ Print Media, Illustrations, Multimedia, E-learning, ❖ Story Telling in Traditional & Digital Media, ❖ Design Management and Design Methods ❖ Collaborative Social and Learning Environments ❖ Product Interaction Design Innovation ❖ Graphic Language and Information Visualization ❖ Way-Finding and Navigation Systems <ul style="list-style-type: none"> ❖ Typography and Typefaces ❖ Culture and Story Telling ❖ Form and Product Aesthetics ❖ Repositioning of Bamboo Craft ❖ Creativity and Product Innovation ❖ Holistic Thinking in Design ❖ Automobile, Consumer and Furniture Ergonomics ❖ Workstation Ergonomics and Design ❖ Musculoskeletal Disorders ❖ Manual Material Handling ❖ Products for the People with Special Needs 	<p>First Class or 55% marks (50% for SC /ST) In</p> <p>M.Des / M.Arch / M.Tech. / M.Phil / MFA / Post-Graduate Diploma in / Design of NID, Ahmedabad and equivalent OR</p> <p>B.Des / B.Arch / B.FA / MA /M.Sc / Under - Graduate Diploma in Design of NID, Ahmedabad or Equivalent degree with related work with a valid CEED Score</p> <p>Candidate with a minimum of three years of relevant professional experience CEED Score can also be considered.</p>
BMCSR01	Centre of Studies in Resources Engineering	<p>Research Areas</p> <p>I) Application Area</p> <ol style="list-style-type: none"> a) Water Resources b) Terrain Evaluation, Land-use planning and monitoring c) Rural Development and Agro-informatics d) Minerals Exploration e) Natural Hazard of Droughts, Desertification, f) Landslide, Avalanche, Earthquake, Tsunami etc. g) Marine Resources and Ecology h) Snow, Glaciers and Atmosphere i) Applications of Microwave Remote Sensing <p>II) Theoretical Areas</p> <ol style="list-style-type: none"> i) Digital Image Processing ii) Digital Photogrammetry and Cartography iii) Geospatial Technologies iv) SAR Interferometry and Polarimetry v) Mineral Systems Studies vi) Global Positioning Systems vii) Climate Change Studies 	<p>Candidates with First Class or 60% marks (55% marks for SC/ST) in</p> <ul style="list-style-type: none"> • B.Tech / B.E in any branch of Engg. OR • M.Sc. in any branch of Science with Mathematics as a subject upto 10+2 level OR • M.Tech. / M.E. in any branch of Engineering

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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 a minimum of 60% (6.75 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/PD category candidates, the minimum performance in the qualifying degree is relaxed from 60% to 55% (from 6.75 to 6.25 CGPA).

Code	Department / Centre	Fields of specialization	Minimum Qualification
DLAM01	Applied Mechanics	<p>(a) Design Engineering: Design Engineering, Design Method and Engineering alternatives, Reliability Engineering.</p> <p>(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-Stokes etc.), Internal Flows-Aircraft engine intake ducts and combustors, 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 and Hypersonic Flows, Turbulence, Turbulent boundary-layer stability and control, Two phase flows.</p> <p>(c) Materials Science: Crystallography, Fracture Mechanics, Metal foams, physical metallurgy, severe plastic deformation, grain growth, phase transformations.</p> <p>(d) Solid Mechanics: Composite structures and materials, Computational methods in solids, Dynamics and Non-linear analysis of structures, Experimental stress analysis, Impact mechanics, Functionally graded materials and structures, Smart structures damage mechanics, Fluid Structure Interaction, Buckling / Post buckling of plates and shells.</p>	Master's degree in Mechanical, Civil, Chemical, Aeronautical, Metallurgy, Naval Architecture, Applied Mechanics, Engineering Mechanics or Design Engineering.
DLAS01	Centre for Atmospheric Science	Monsoon dynamics, Micro meteorology, General circulation and climate modeling, Meso-scale studies and local weather prediction, Limited area modeling, Air Pollution Studies, Environmental modeling, Air quality models, Impact assessment and Environment risk assessment studies, Wind driven ocean circulation, Ocean circulation, Air-sea interaction, Coastal ocean circulation and upwelling, Estuarine dynamics, Storm Surge prediction, Oceanic fronts and tides.	M.Tech / M.Sc. / B.Tech (with valid GATE Score) degree in Mechanical, Civil, Chemical & Computer Science Engineering, Physics, Chemistry, Mathematics, Statistics, Oceanography, Environmental Science, Engineering Physics, Atmospheric Science, Meteorology and related fields. For B.Tech or equivalent the minimum eligibility is 70% marks or 7.5 CGPA.
DLAL01	Centre for Applied Research in Electronics	<p>(a) Microelectronics Technology, MEMS, Solid-state devices, Surface acoustic wave techniques, Silicon sensors, Thermo-Acousto-Optic Non-destructive Characterization, Magnetic Nano Materials and Biosensors, Organic Electronics.</p> <p>(b) Microwave Circuits, Antennas, RF MEMS, Ultra wide band systems, MMICS, RFID, Device Modeling, Wireless Communication.</p> <p>(c) Signal processing and underwater electronics, Speech and Audio Signal Processing, Communications.</p>	<p>Master's degree with the preceding degree in appropriate area with First class throughout.</p> <p>Master's degree with the preceding degree in Electrical, Electronics, or Communication Engineering with First class throughout.</p>
DLBM01	Centre for Biomedical Engineering	Medical Electronics, Biomaterials in medicine, Rehabilitation Engineering, Technology in mass health care, physiological system analysis and modeling, Biomechanics, Polymers used in medicine and surgery, Drug delivery systems, Biosensors, Bioimaging, Vascular Research Reproductive Bio-engineering Telemedicine, Biomechanics, Medical Devices Simulation.	Master's degree in any branch of Engineering / Science / Pharmacology / M.B.B.S. with 60% MD /MS with first class and B.Tech or equivalent having above 70% are also eligible to apply.
DLBC01	Biochemical Engineering & Biotechnology	<p>Bioprocess Engineering.: Engineering analysis of enzymatic, cellular, metabolic processing involving bioprocess kinetics, Modeling and design of bioreactors, Monitoring and control of process parameters, Operational strategies and process integration, Animal cell Technology, Plant Cell Technology, Metabolic flux analysis, Bioenergetics.</p> <p>Downstream Processing: Novel product separation strategies based on sorption, Liquid-liquid extraction, Ultra-filtration, Affinity methods.</p> <p>Molecular Biology and Recombinant DNA Technology: Development of recombinant cultures for hyper production of metabolites and commercially important enzymes (cellulase, β-glucosidase, protease, xylanase), Development of novel expression systems for industrially important genera such as <i>Corynebacterium</i> and <i>Bacillus</i>, Protein folding pathways, Protein Engineering.</p>	M.Tech / M.S. degree in Chemical / Biochemical Engineering, Industrial Biotechnology, Food Technology.

Code	Department / Centre	Fields of specialization	Minimum Qualification
DLEN01	Centre for Energy Studies	Electric Power Systems, Energy Planning, Fuel Technology, Fuel Cells, Biomass Utilization, Utilization of alternative fuels in IC engines, Solar Thermal Utilization, Photovoltaic, Plasma Science & Technology, Energy Conservation, Energy and Environment Management.	Master's degree in Mechanical, Civil, Agriculture, Chemical, Electrical / Electronics or Energy Environment Instrumentation & Control Engineering or in Physics or Chemistry, Automobile Engineering.
DLMG01	Management Studies	General Management, Economic Development, Indian Financial System, International Business, Competitiveness, Corporate Planning, Corporate Governance, Organization Management and Development, Organizational Behavior, Human Resources Management, Organizational Culture, Leadership and Business Ethics, Financial Management, Corporate Finance, Portfolio Management, Security Analysis, 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, Longitudinal and Lateral Thinking, Information Systems & Technology, E-Business, E-Governance, Telecom Systems Management, International Telecom Management, Flexible Systems Management, Management of Change, Entrepreneurship Management & Development, Creativity and Innovation Management, R&D Management, Managerial Ethics, Environment Management, Management of Technology.	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.
DLPS01	Centre for Polymer Science & Engineering	Polymer Science and Technology	M.Tech in Polymer Science & Engineering or Plastic & Rubber Technology or Chemical Engineering or Fiber Science & Technology or M.Sc. in Chemistry or Physics.
DLRD01	Rural Development & Appropriate Technology	Artisanal technologies and rural industries, Biogas Production and enrichment and animal power, Dairy and food processing, Renewable energy technologies, Clean Cookstoves, Rural energy systems, Biomass and Environment, Microbial Biotechnology, Ecological Sanitation. Traditional Knowledge, Bamboo based housing, Bioremediation, Waste Management, Biofertilizers and Biopesticides, Tissue culture, Mushroom technology	Master's degree in any discipline of Engineering / Technology or Science.
DLCH01	Chemical Engineering	Reaction Engineering, Thermodynamics, Process Dynamics and Control, Projects related to energy, Environmental Engineering, Computer Aided Design, Separation Processes, Fluid Particle Mechanics, Modeling and Simulation, Biomass Conversion, Petroleum Technology, Nano-technology, Thin films, Fuel Cells, Interfacial Engineering, Bioseparation, Biotechnology.	Master's degree in chemical Engineering.
DLCY01	Chemistry	Physical Chemistry, Organic Chemistry, Inorganic Chemistry, Biochemistry, Analytical Chemistry, Theoretical Chemistry, Materials Chemistry	Master's degree in Chemistry with at least 60% marks or CGPA of 6.75 on a ten point scale.
DLCE01	Civil Engineering (code number of the specialization to be indicated in the data sheet)	Construction Engineering and Management	Master's degree in Civil Engineering or MBEM, SPA or equivalent.
DLCE02		Engineering Geology	Master's degree in Civil Engineering or in Applied Geology.
DLCE03		Environmental Engineering	Master's degree in Civil or in Environmental Science or Chemical Engineering or Biochemical & Biotechnology.
DLCE04		Offshore Structures.	Master's degree in Civil Engineering
DLCE05		Rock Engineering.	Master's degree in Civil or Mining Engineering or in Applied Geology
DLCE06		Geotechnical and Geoenvironmental Engineering	Master's degree in Civil Engineering
DLCE07		Structural Engineering	Master's degree in Civil Engineering
DLCE08		Remote sensing	Master's degree in Civil, Agricultural, or Mining Engineering
DLCE09		Transportation Engineering	Master's degree in Civil Engineering
DLCE10		Water Resources Engineering	Master's degree in civil or Agricultural Engineering.

Code	Department / Centre	Fields of specialization	Minimum Qualification
DLCS01	Computer Science and Engineering	Computer Architecture and Parallel Processing, Design Automation and VLSI, HW-SW Codesign, Embedded Systems Design, Image Processing, Artificial Intelligence, Computer Vision, Computer Graphics and Animation, Semantics of Programming Languages, Machine learning, Data Bases & Information Retrieval, Data Mining, Computer Networks, Wireless Networks, Network Security, Distributed Processing, Design and Analysis of Algorithms, Optimization, Computational Geometry, Computational and Systems Biology, Computer Security, Computational Logic, Operating Systems, Information Technology for Development Concurrency, Mobile Computation, Verification code generation and Optimization. Verbalization.	Master's degree in Computer Science, Electronics Engineering, Mathematics or Physics with formal background in Computer Science or MCA. Excellent academic record i.e. $\geq 72.5\%$ or 8.0 CGPA in qualifying degree.
DLEE01	Electrical Engineering	Computer Architecture, Parallel Processing, Multimedia, Computer and Communication Networks, Communications, Signal Processing, Image processing, Computer Vision, Pattern Recognition, Machine Learning, Biometrics, Bioinformatics Optical Communications, Control Systems, Intelligent Control, Nonlinear Control, Robotics, Systems Theory, VLSI, Neural Networks, Electrical Machines and Drives, Power Electronics, Power Systems, Power quality generation, Distributed generation & Power generation from renewable sources.	Master's degree in an appropriate discipline with excellent academic record.
DLHS01	Humanities and Social Sciences	Development Economics, Macroeconomics, Microeconomics, Sociology of Culture and Knowledge, Sociology of Development Environmental Sociology. Sociology of Social movements, Globalization and Transnationalism, Sociology of Religion, Sociology of Agriculture Technology and Rural Development policy, Sociology of Information and Communication Technologies (ICTS) for Development. Visual Anthropology / Sociology, Economic Sociology, Technology, Work and Society, Gender Studies, Cultural Studies, Performance Studies, New Media Studies, Science and Technology policy, Energy and Environmental policy, Modernist and Postmodernist Literature, Indian English Theatre, Indian Writing in English Contemporary Fiction, Postcolonial Literature, (Formal Syntax and Semantics, Language Acquisition), Cognitive Studies, Philosophy of Language, Epistemology, Metaphysics, Ethics, Aesthetics, Continental Philosophy of Language, Epistemology, Philosophy of Science, Philosophy and Film, Philosophy of Mind and Cognition, Wittgenstein; Metaphysics of the Self, Religion and Development, Buddhism (including Buddhism in the Himalayas and Political Buddhism), Philosophy of Culture and History, Social and Political Philosophy.	MA with 1 st class in the relevant subject.
DLID01	Instrument Design and Development Centre	Computer Aided Design, Simulation of Electronic Instrumentation Systems, Digital Signal Processing, Microprocessor Applications, Power Electronics, Electromagnetic / Ultrasound based Instrumentation, Digital Holography, Digital Speckle Pattern Interferometry, Optical Coherence Tomography, Flame Tomography, Fiber Optic Sensors, Optical Tweezer and their applications. High Resolution Moire Photography, Photo & Electro-Photo Chemical Machining, Solid Mechanics, Composite Materials, Experimental Stress and Strain Analysis, Design Methodology & Management, Computer Aided Product Design, Ergonomics, Graphic Design, Passive Solar Architecture, Design for Handicapped.	Master's / Bachelor's degree in Electrical, Electronics, Mechanical, Applied Optics, Instrumentation, Opto-electronics, Design Engineering, Physics, OR M.Des. degree. For B.Tech or equivalent the minimum eligibility is 70% marks or 7.5 CGPA.
DLTR01	Industrial Tribology, Machine Dynamics & Maintenance Engineering	Tribology: Tribology of materials & machine components, Wear Mechanisms and wear modeling, Surface Engineering, Boundary & Hydrodynamic lubrication, EHD lubrication, Lubricant characterization & analysis, Pneumatic conveying of bulk materials, Operational problems like erosion & degradation, etc. Maintenance Engineering and Machine Dynamics: Condition based maintenance, vibration, acoustic emission, temperature and wear debris monitoring techniques, maintenance planning and control, computer aided maintenance, Maintenance audit, Reliability, Availability and Maintainability (RAM) engineering, Vibration & noise analysis and control, Risk analysis and safety, Non-destructive testing, Failure analysis & residual life estimation, Performance and Dynamic studies of machine elements and equipment like pumps, compressors, turbines, etc, Design for maintenance, etc.	Master's Degree in Engineering (Mechanical, Chemical, Industrial).

Code	Department / Centre	Fields of specialization	Minimum Qualification
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, M.Tech in Computer Applications / M.Tech in Computer Science. For B.Tech or equivalent the minimum eligibility is 70% marks or 7.5 CGPA.
DLME01	Mechanical Engineering	Design, Production, Thermal Engineering	Master's Degree in Mechanical Engineering / Relevant engineering discipline to be approved by the department.
		Industrial Engineering	Master's Degree in any Engineering discipline / any relevant non-engineering discipline i.g. MBA, MCA etc.
DLPH01	Physics	<p>Condensed Matter Physics: Experimental & Theoretical Solid State Physics: Thin Films, Materials and Devices, Nanomaterials, Lattice Dynamics, Semiconductors and Amorphous Materials, Electronics Ceramics, Microwave Materials, Quantum Functional Materials, Spintronics, Superconductivity, Photovoltaics, Laser Spectroscopy and Applications; Laser Processing.</p> <p>Optics and Photonics: Holography, High Density data storage, liquid crystals, Nonlinear Phase Conjugation, Optical Information Processing, Optical data security, Nonlinear Optics, Nonlinear guided wave optics, Quantum Optics, Fiber optics, Integrated Optics, Fiber Optics Sensors, Fiber optics components, Nanophotonics, Singular optics, Optical design.</p> <p>Plasma Physics: Particle acceleration, Nonlinear waves and instabilities in plasma, Thermo Nuclear Fusion; Microwaves and Plasma Interaction, Solitons in Plasma, Space Plasmas.</p> <p>Theoretical Physics: Mathematical Physics, Statistical Mechanics and Computational Physics; Nuclear and particle physics, cosmology.</p>	M.Sc. Physics / B.tech. Engineering Physics / M.Tech. in Applied Optics or Solid State Materials.
DLTX01	Textile Technology	Mechanical Processing of Textiles, Textile Chemical Processing, Fiber Science and Technology, Technical Textiles, Textile Machine Design.	M.Tech or Equivalent degree in Textile Technology, Textile Chemistry, Fiber Science and Technology, Textile Engineering, Chemical or Mechanical Engineering, Polymer Science and Technology, Plastic and Rubber Technology, M.Sc. in Physics and Chemistry.

4. Indian Institute of Technology Guwahati, Guwahati 781039 –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/Centre	Fields of specialization	Minimum Qualification
GWBT01	Biotechnology	All areas of Biotechnology	M.Tech. degree or equivalent in an appropriate area with minimum CPI of 6.5 or 60% marks or MSc Degree in Bio Technology/ Life Science/ Agricultural Sciences/ Chemistry with minimum CPI 7.5/10 or 70% marks.
GWCH01	Chemical Engineering	All areas of Chemical Engineering	M.Tech. degree or equivalent in an appropriate area with minimum CPI of 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 or 60% marks.
GWCE01	Civil Engineering	Construction Management, Environmental Engineering, Geotechnical Engineering, Structural Engineering; Transportation Engineering and Water Resources Engineering.	M.Tech. degree or equivalent in an appropriate area with minimum CPI of 6.5 or 60% marks.
GWCS01	Computer Science & Engineering	Algorithms; Computational Geometry; Systems Biology (Bio-computing); Bio-inspired Robotics and related algorithms; Mobile Agent Based Systems; Machine Learning; Speech Processing; Image Processing, Information Retrieval and Web Mining; Formal Verification; Embedded Systems, CAD for VLSI; Multi-processor Computer Architecture; Computer Security; Networks; Operating Systems; Distributed Systems; and Human-Computer Interactions.	M.Tech. degree or equivalent in an appropriate area with minimum CPI of 6.5 or 60% marks.
GWDE01	Design	Product Design; Ergonomics; Usability Engineering including Human Computer Interaction (HCI); Design Pedagogy; Design Management; Design Theory; Form and Perception Studies; and Design and Visual Culture	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/Psychology with minimum CPI 6.5/10 or 60% may also be considered.
GWEC01	Electronics & Communication Engineering	All areas of Electrical, Electronics and Communication Engineering	M.Tech. degree or equivalent in an appropriate area with minimum CPI of 6.5/10 or 60%marks.
GWEN01	Energy	Screening and Genetic improvement of Bio-fuel crops, biodiesel from microalgae, bio-fuel cell, solar cells; photovoltaic materials and devices, biogas based power generation, combustion and detonation, energy efficiency in electric machine, wind energy, waste heat recovery.	M.Tech. degree or equivalent in an appropriate area with minimum CPI of 6.5/10 or 60% marks, OR M.Sc. in Physics, Chemistry, Biotechnology, Environmental Science or in relevant field with minimum of CPI 6.5/10 or 60% marks.
GWEV01	Centre for Environment	Environmental Biotechnology; CO2 Capture/storage; Treatment of pollutants using toxic liquors; Environmental Economics; Environmental Engineering; Water Treatment Supply; Waste Water Treatment; Atmospheric Chemistry; Air Quality; Environmental Hydraulics; Environmental Genomics; and Other emerging areas of Environment with Interdisciplinary Application of Science, Technology, Arts and Humanities.	M.Tech. degree or equivalent in an appropriate area with minimum CPI of 6.5/10 or 60% marks, OR, M.Sc. in Physics, Chemistry Biotechnology, Environmental Science or in relevant field with minimum CPI of 6.5/10 or 60% marks.

Code	Department/Centre	Fields of specialization	Minimum Qualification
GWHS01	Humanities and Social Sciences	Economics, History, Linguistics and Psychology.	Masters Degree in the relevant discipline with a minimum of 55% marks or equivalent.
GWMA01	Mathematics	Algebra, Algebraic Geometry, Algebraic Number Theory, Graph Theory, Combinatorial Matrix Theory, Analysis, Numerical Analysis, Fluid Dynamics, Probability and Statistics, Applied Stochastic Processes, Formal Languages and Automata Theory	Masters degree in the relevant discipline with a first class or a minimum CPI 6.5/10 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 Aerodynamics; 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 CPI of 6.5 or 60% marks.
GWPH01	Physics	<p>Condensed Matter Physics – biomaterials, cold atoms and quantum computation, computational materials physics, ferroelectric materials, organic semiconductors, semiconducting materials, smart magnetic materials, soft condensed matter physics, spintronics, statistical physics, strongly correlated systems, superconductivity topological insulators.</p> <p>Laser and Photonics – Applied Optics, Fiber Optics, Laser Matter Interaction, Nonlinear Optics, Quantum Optics.</p> <p>High Energy Physics – Collider Phenomenology, beyond the standard model and cosmological connections, B-Physics, CP violation, Neutrino physics.</p> <p>Astrophysics – Astrophysical flows, ultra high energy cosmic rays</p>	Masters degree in the relevant discipline with a first class or a minimum CPI 6.5/10 or 60% marks.

5. Indian Institute of Technology Kanpur, Kanpur 208016 –KN

The basic qualification for admission to the Ph. D. programme 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	<p>Aerodynamics: Boundary Layers, Transition, Turbulence, Wind Tunnel Testing, Unsteady Aerodynamics, Aerodynamic Noise, Computational Aerodynamics, Fluid Dynamics, High Speed Jets, Rarefied Gas Flows, Real Gas Effects, Wind Energy.</p> <p>Flight Mechanics: Stability and Control, Aeroservoelasticity, Active Controls, Optimal Control, Aircraft Systems, Spacecraft Trajectory and Attitude Dynamics and Control, Hypersonic Flight Mechanics. Propulsion: Jet Propulsion, Gas Turbines, Engine Control, Burning Mechanisms of Propellants, Flame Holders.</p> <p>Structures: Aeroelasticity, Helicopter dynamics, High temperature problems in solid mechanics, Composites, Structural stability, Structural dynamics, Structural optimization, Stochastic problems, Random vibrations, Control of flexible structures, Smart materials and structures.</p>	Master's degree in: (1) Engg. (Aeronautical, Aerospace, Mechanical, Civil, Chemical, Naval Architecture Electronics). OR (2) Science with a minimum of 3 years of relevant R&D experience in Aerospace Engg.
KNCH01	Chemical Engineering	Transport phenomena, Chemical Reaction Engg., Applied Kinetics and Catalysis, Thermodynamics, Membrane Separation Processes, Process Systems Development, Computer Aided Design, Optimization and Control, Petroleum Engg., Pulp and Paper Tech., Polymer Science and Engg., Environmental Pollution and Control, Adsorption, Safety and Reliability, Dynamics of Nonlinear Systems, Zeolite Catalysis, Colloids and Interface Engg. CFD, Rheology, Non-Newtonian Fluid Mechanics, Nanotechnology, Numerical Methods for Engineers, Mathematical Methods in Chemical Engineering, Modeling and Simulation in Chemical Engineering, Bioinformatics, Modeling and Simulation of Separation Processes.	First class Master's degree in Chemical Engineering or equivalent.
KNCY01	Chemistry	<p>Inorganic: Bio-inorganic, Coordination, Fullerene chemistry, N-P-Si chemistry, Polymers and organo-metallic.</p> <p>Organic: Bio-organic, Medicinal, Organic photo'-chemistry, Organic synthesis and reaction mechanism, Organometallic.</p> <p>Physical: Bio-physical, Chemical kinetics, Magnetic resonance, Mass spectrometry, Physical photochemistry, Plasma chemistry, Solid state chemistry, Molecular spectroscopy.</p> <p>Theoretical: Molecular dynamics, Quantum chemistry, Statistical mechanics of liquids.</p>	High second class Master's degree in Chemistry or Physics; <i>Note: Candidates must have had Bachelor's degree with Chemistry and preferably Mathematics as one of the subjects.</i>
KNCE01	Civil Engineering (Code no. of the specialization to be indicated in the data sheet)	Engineering Geosciences	a) For Engineering Geosciences, M.Tech./M.E. in Civil Engg./ M.Tech. or M.Sc. degree in Earth Science streams.
KNCE02		Environmental Engineering.	b) For Environmental Engineering, a Master's degree in Civil/ Environmental/ Chemical / Mechanical/ Metallurgical Engg. Or related engineering branch.
KNCE03		Geoinformatics	c) For Geoinformatics, M.Tech./ M.E. in Civil/ Mining/ Electrical/ Computer Science Engg./ Information Technology or M.Tech/ MSc. Degree in Earth Science streams/ Geography/ Physics/ Mathematics/ Environmental Sciences
KNCE04		Geotechnical Engg.	d) For Geotechnical Engg. B.Tech./ B.E. and M.Tech./ M.E. degree in Civil Engg.
KNCE05		Hydraulics & Water Resources Engg.	e) For Hydraulics and Water Resources Engg., M.Tech./ M.E. degree in Civil/ Aerospace/ Agricultural Engg.
KNCE06		Structural Engg.	f) For Structural Engineering: M.Tech./ M.E. degree in Engg. Some candidates with Master's degree in Architecture, Building Construction and allied subjects may also be considered.

Code	Department	Fields of specialization	Minimum Qualification
KNCE07		Transportation System Engg.	g For Transportation Engg., M.Tech./ M.E. degree in Civil Engg. In addition to the above, candidates with B.Tech./ B.E. degree in Engg. with a minimum overall 75 percent marks/ 7.5 CPI and a valid GATE score or Master's degree in science or an allied area with exceptional academic records may also be considered for admission directly into the Ph.D. programme.
KNCS01	Computer Science & Engineering	Theory: Complexity Theory, Complexity of Number theoretic and Algebraic Computations, Logic, Quantum Computing Algorithms: Deterministic, Parallel, and Approximation in Graphs, Computational Biology, Data Streams, Geometry, Vision, Biometrics. Artificial Intelligence: Machine Learning, Language Acquisition, Natural Language Translation, Knowledge Management. Software Technology: Software Architecture Security: Operating Systems, Network, Infrastructure, Smart-Card, Protocol Design. Compilers: Compilers for High Performance Architecture Networks: Internet Technology, Grid Computing, Mobile Computing. Architecture: VLSI: Design including floor-planning and routing, Testing, Fault Tolerance, Embedded systems (tools and design)	First class Master's degree in Engg. Must possess adequate Computer Science background. (Note: Outstanding candidates)
KNEE01	Electrical Engineering	Microelectronics, VLSI and Display Technologies, Power and Control, RF Engineering and Photonics, Signal Processing, Communications and Networks.	Master's degree in Electrical, Electronics or Communication Engg. Or equivalent.
KNHS01	Humanities and Social Sciences	Economics Industrial Organization and Policy, Environmental Economics, Environmental Impact Assessment, Development Economics & Policy, Microeconomics, Inter-Industry Economics, Project Evaluation/BCA, Regional Economics, Macroeconomic Theory & Policy, Monetary Economics, Managerial Economics, Transport Economics, Law and Economics, Health Economics. English Literature American Literature, British Literature, Commonwealth Literature, Ethnic Literatures, European Literature, Indian Writing in English, Literary Movements, Literary Theory, Teaching of Literature. Linguistics: Linguistic Theory, Cognitive Linguistics, Computational Linguistics, Communication studies, Sociolinguistics, Applied Linguistics and English Language Teaching. Philosophy: Twentieth Century Philosophy, Logic, Ethics, Philosophy of Language, Philosophy of Social Sciences, Indian Philosophy, Philosophy of Mind, Philosophy of Cognitive Sciences, Philosophical Aesthetics, Philosophy of Religion Ethics. Psychology: Social Cognition, Personality, Experimental Social Psychology, Organizational Behavior, Human Cognitive Processes, Consumer Psychology, Cross-cultural Psychology, Health Psychology and Neuropsychology, Cultural Issues in Psychology, Disaster Mental Health. Sociology: Sociology of Religion, Urban Sociology, Social Demography, Environmental Sociology, Sociology of Development, Science, Technology and Society, Social Movements, Third Sector Non-government and Voluntary development Organization, Human Rights, Social Gerontology, Sociology of Education and Disability Studies.	55% marks in Master's degree in the respective area with consistently good academic record.
KNIM01	Industrial and Management Engineering	Economics, Infrastructure & Public Systems, Finance & Control Systems, Information & Knowledge Systems, Management of Innovation and Entrepreneurship, Marketing, Operation Management, Operations Research and Quant. Methods, Organization and HRD Strategy and Policy.	The applicant must have a master's degree in management or relevant disciplines in engineering/ technology with marks/CPI not below the specified minimum. Applicants with a Bachelor's degree in engineering with a minimum of 75 percent marks/ 7.5 CPI, or master's degree in science/ arts/ commerce, satisfying each of the following criteria may also be considered. (a) a minimum of 65 percent marks/ 6.5 CPI in the master's degree, (b) first division in bachelor's degree, and (c) JRF/95 percentile or higher in GATE

Code	Department	Fields of specialization	Minimum Qualification
KNMA01	Mathematics/ Statistics	Algebraic coding theory, Biomathematics, Biomechanics, complex analysis, Fractals and Complex Dynamics, Differential and integral equations, Fluid mechanics, Functional analysis. Harmonic analysis, Nonlinear analysis, Numerical analysis, Stability theory, Tribology, Mathematical Modeling, Computational Fluid Dynamics, Non Linear Control Systems, Algebra, Multivariate analysis, Order statistics, Nonlinear regression, Signal processing, Ranking and selection procedures, Data analysis, Estimation theory, Decision theory, Time Series, Reliability, Optimisation and variational analysis, Logic, Parallel Computing, wavelets. Reliability Theory, Rough Set Theory, Differential Geometry, Fouvier Analysis, Econometrics	High second class Master's degree in Mathematics or Statistics, with a t least 55% marks or equivalent.
KNME01	Mechanical Engineering	<p>Solid Mechanics: Composite Materials, Fracture Mechanics, Multiscale simulation, Stress Waves, Non-Destructive Testing, Large Deformation Elasto-Plastic Analysis, Impact Contact Problems, Smart Structures-Materials and System, Microelectro-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, <u>noise & acoustics</u></p> <p>Fluid Mechanics: Active flow control, Turbulence Measurements, Wake Dynamics, Laser-based Techniques, Computational Fluid Dynamics, Computerized Tomography, Transport in Hierarchical Porous Media, Holographic PIV.</p> <p>Thermal Sciences: Computational Heat Transfer, Heat Pipes, drop-wise Condensation, Gas Turbine Blade Cooling, Heat Exchangers, Turbomachinery, Emission from IC Engines, Biofuels, Hydrogen Technology and Fuel Cells. Manufacturing Sciences: Metal Cutting, Metal Forming, Machine Tools, Unconventional Machining, Computer Aided Manufacturing, Computer Integrated Manufacturing System, Netshape Manufacturing. Control Systems: Hydraulic Control, Optimal Control, Non-linear System Analysis.</p> <p>Mechatronics: Manipulators Dynamics, Task Structuring and Path Planning, Collision Avoidance and Navigation, Sensor Based Intelligent Robotics, Industrial Robotics.</p>	<p>First class or equivalent Master's Degree in Mechanical Engg./ Master's degree in Production Engg. Is admissible for Manufacturing Science.</p> <p><i>Note: In exceptional cases applicants with first class Master's degree in other branches of Engg. May also be considered.</i></p>
KNMS01	Materials Science (Interdisciplinary programme)	<p>Electronic, Magnetic, Opto-electronic, Piezoelectric, Ferro-Electric Organic Semiconductor and Energy Storage/ Conversion Materials.</p> <p>Ceramic Processing, Structural Ceramics and Composites.</p> <p>Nanoscale Materials and Processes, Thin Films, Electron Microscopy, Display materials.</p> <p>Superionic/Fast-ion conductors, Solid electrolytes, High Density and Ni-Metal Hydride Batteries.</p> <p>Polymer processing and Rheology, High Performance Plastics, Polymer Blends-alloys & Composites.</p> <p>Optical Spectroscopy (Raman, IR, Photo luminescence), multiferroics.</p>	M.E., M.Tech., M.Sc. (Engg.) Degree in Materials Science or any equivalent branch of engg./ technology; or B.E., B.Tech., B.Sc. (Engg.) with a minimum of 75% marks or Cumulative Point Index (CPI) of 7.5/10 in any relevant branch of Engg./ technology, or M.Sc. degree in an allied area with , Exceptional academic records.
KNMT01	Materials and Metallurgical Engineering	<p>Modeling & simulation of mineral processing systems, Fluid Flow,</p> <p>Heat and Mass Transfer in Metallurgical Systems, Process design and Development in Extractive Metallurgy, Simulation of Metallurgical Processes, Steel Making, Injection metallurgy, Process control and process optimization in iron and steel-making, Applications of Artificial Intelligence Methods in Metallurgical Processes, Electrometallurgy, Electrochemical cleaning of soil, Aluminum electrolysis, Electrodeposition, Physical Metallurgy, Alloy Development, Thermodynamics and Kinetics of phase Transformations, Heat Treatment, Solidification of Metals and Alloys, Interfacial Processes, Mechanical Processing, Thermomechanical Processing of Steels and Titanium Alloys, Processing-Structure-Property Relations in Materials, Intermetallics, Nanostructural Materials, Microstructural characterization and Stereology, Electron microscopy, Evolution and characterization of textures during processing, Environmental Degradation of Materials, Materials-hydrogen interaction, Processing of powders and particles, Discrete Element Method (DEM), Powder Metallurgical Processing, Modeling of P/M Processes, Solid State and Liquid Phase sintering, Structural Ceramics Composite materials, Metal Matrix Composites, Tribology of Advanced Materials, Welding Processes, Magnetic Materials, Electromagnetic materials and Processing, Thin Film Technology, Characterization and Applications of Opto-Electronic Materials and Devices, Materials Processing by Solid State Chemistry, Ferroelectric Ceramics, Electronic materials, White Light Illumination, Display Materials and Technologies, Biomaterials.</p>	B.Tech./ M.Tech. degree in Metallurgical Engg. Or in Materials Sciences.

Code	Department	Fields of specialization	Minimum Qualification
KNNE01	Nuclear Engineering & Technology	Nonlinear Dynamics and Control, Bifurcation Theory, Transport and Kinetic Theory, Fusion Plasma Simulation, Reactor Safety, Numerical Methods, Radiation Measurements and Nuclear Instrumentation, Reactor Analysis and Design, Radioisotope Applications, Waste Disposal, Non Invasive Imaging, NDT, Computed Tomography.	First class Master's degree in any branch of Engg., preferably with some knowledge in Nuclear Engineering or equivalent.
KNPH01	Physics	<p>High Energy Physics: Field Theory, Phenomenology, String Theory, Gravitation Cosmology.</p> <p>Ion Beams & Nuclear Techniques: Low Energy Accelerator Based Nuclear and Materials Research. Mossbauer & Positron Spectroscopies for Materials Research.</p> <p>Statistical Mechanics and Condensed Matter (Theory & Expt.): Strongly Correlated Systems, High temperature Superconductivity, Electronic Structure, Disordered Systems, Nanostructures, Porous Silicon, Molecular Dynamics, Monte-Carlo Simulations, Non-Equilibrium Statistical Mechanics, Driven Lattice Dissipative Systems and Applications, Soft and Bio Materials, Nonlinear Dynamics, Condensed Matter Experiments, Amorphous Semiconductor, Fast Ion Conductors Magnetism, Superconductivity, Low Temperature Physics, Thin Films, Bio-physics, Superionic Conductors, Inorganic and Organic Semiconductors, Scanning Tunneling Microscopy, Nanomaterials, Carbon based Nanostructures.</p> <p>Lasers & Optics: Lasers and Laser Spectroscopy, Quantum optics, Laser Applications in Medical Physics</p>	First class Master's degree in Physics or first class Master's degree in a related subject or first class Bachelor's degree in Engg.

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	Aerospace Engineering	Fluid dynamics and Aerodynamics, Computational fluid dynamics, Experimental methods, Aircraft structures, Composite structures and Smart structures, Structural dynamics and aeroelasticity, Aircraft propulsion, Thermal sciences and Engg., Combustion, Flight mechanics and control.
KHAG01	Agricultural and Food Engineering	<p><u>Farm machinery and power</u>: Ergonomics, Biofuels, Soil dynamics in tillage and traction.</p> <p><u>Land and Water Resources Engineering</u>: Watershed Modeling and Management, Irrigation Systems Manatement, Groundwater Modeling, Rainwater Harvesting, Flood Modeling, Non-point Source Pollution, Climate Change, Soft Computing in Water Resources, Green House Technology, Application of Remote Sensing in Natural Resources Management.</p> <p><u>Food Process Engineering</u>: Dairy and Food Engineering Food Processing and Preservation, Food Science and Technology, Mechanized Processing of Food, Physical and Thermal Properties of Food, Preservation and Packing of Fruite and Vegetables.</p> <p><u>Agricultural Biotechnology</u>: Microbial and Enzyme Technology; Plant Tissue Culture, Algal Biotechnology, Biotechnology of Medicinal and Aromatic Plants.</p> <p><u>Agronomy</u>: Climate Change Impact Assessment on Crop Yields, Organic Farming, Tea Cultivation and Processing.</p> <p><u>Soil Science</u>: Water and Nutrient Management, Plant Nutrition, Soil Physics.</p> <p><u>Aquacultural Engineering</u>: Waste Utilization and Agro Environmental Technology, Aerators, Cage Aquaculture, Fish Processing Technology</p>
KHAR01	Architecture and Regional Planning	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, Green Architecture, Energy Efficient and Cost-effective Building Technology, GIS and Remote Sensing, Heritage studies and Conservation, Housing and Community Planning, Infrastructure Planning and Systems Management, Metropolitan Planning, Recreation and Tourism Planning, Regional Planning, Spatio-environmental Planning and Design, Transportation Planning and Traffic Engineering, Urban Development Management, Urban Open Space, Water Sensitive Planning.
KHBT01	Biotechnology	<p>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.</p> <p><u>Minimum Qualification</u> : Minimum 60% of marks (or equivalent Grade point average) is required in case of M.Sc./M.Tech. degree.</p>
KHET01	Center for Educational Technology	Image Processing, Speech Processing, Data Communication, E-learning, Instructional Design, Distance Education, Evaluation and Assessment.
KHCH01	Chemical Engineering	Transport Operations, Membranes and other Separation Processes, Reaction Engineering, Particulate Technology, Fluidization Engineering, Process Dynamics & Control, Fuel and Mineral Processing, Petroleum Refining & Petrochemicals, Industrial Pollution Control, 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, Synthetic Organic Chemistry, Surface Chemistry & Catalysis, Nano Crystalline semi conducting magnetic metal chalcogenides and magnetic Ferrites, Biologically Active Compounds: Stereo selective Synthesis, Isolation and characterization 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 metallahelicates in coordination chemistry, Organometallic Chemistry, Homogeneous Polymer Anchored Catalysis, Photochemistry & Photophysics in Organized Assemblies, Carbohydrates and Nucleosides Biological Dual Perspectives, Enantiomeric Separation Using Capillary Electrophoresis, Density Functional Theory: Quantum Chaos, Chemical Reaction Dynamics in Liquids and Biological Systems, Computer Simulations of Complex Systems with Applications in Biology and Materials Science, Electrocatalysis, Electrochemical Biosensors, Chemical Reactivity, Quantum toxicology.
KHCE01	Civil Engineering	Structural Engineering, Hydraulic and Water Resources Engineering, Geotechnical Engineering, Transportation Engineering, Environmental Engineering and management.
KHCS01	Computer Science and Engineering	Artificial Intelligence, Speech and Language 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, Computational Complexity, Theoretical Computer Science, Bioinformatics, Assistive Technology, 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, Air Breathing Propulsion, Magnetic Refrigeration Materials, Nanofluids, Spintronics, Superconducting Magnets and Applications, Thermo physical Properties of Nanoscale Materials, Cryobiology, Magnetic Sensors, Vacuum Technology and Process Applications. Helium Liquefaction and Refrigeration, Oxygen Safety, Superconducting Magnetic Energy Storage, Cryogenic/Superconducting/Vacuum aspects for nuclear fusion

Code	Department	Fields of specialization
KHEE01	Electrical Engineering	<p>1. Machine Drives and Power Electronics: Control of drives, Switched mode and resonant mode power supplies, Power Converters, Medium voltage converter topology and drives, Digital control of SMPS, Energy Efficient drives, Electro-magnetic Levitation, Micro Motors including digital devices, Variable Speed Constant Frequency Generation Systems, Automated Electrical Vehicles, Non-linear Phenomena in Power Electronics, Bifurcation and Chaos in Hybrid Dynamical Systems.</p> <p>2. Control System Engineering: System identification and modeling, Fault detection and diagnosis, Robust control, Intelligent control, System Theory, Fault tolerant control, Large-scale systems, Reduced order modeling, Fuzzy control, Periodic controllers, Attitude and orbit control of launch vehicles and satellites.</p> <p>3. Power & Energy Systems: Power Systems Analysis, Dynamics, Modeling and Control, Power System Stability, Protection, Real-time Simulation, High Voltage Engineering, Photovoltaic, Wind Energy, Energy modeling and Management, Insulation Engineering, Condition monitoring of power apparatus, Digital relaying, Power Quality, Electrical Power distribution systems, Power System deregulation, FACTS design including devices, Distributed generation, Microgrid.</p> <p>4. Instrumentation: Sensor design and modeling, Signal conditioning circuits, Embedded systems, Opto-electronic Instrumentation, Biomedical Instrumentation, Image based measurement, Image and Speech Processing, Analog and mixed signal processing, Digital signal processing, MEMS sensors and actuators, VLSI design and testing, Bio-reactor control, Wireless sensors.</p>
KHEC01	Electronics and Electrical Communication Engineering	<ul style="list-style-type: none"> ◆ Device modeling, Technology CAD, Silicon heterostructures, MEMS and Nanotechnology, Mixed signal design, Low voltage low power circuit design, Low power RF IC design, Design of VLSI based signal processing chips, SOC based embedded system for biomedical instrumentation, Fault analysis. ◆ 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, VLSI Architecture, Parallel and distributed Processing, Audio coding, Computer architecture, embedded systems. ◆ Wireless Communications and Networking – Multi-user Receiver, Multi-band OFDM, Channel Coding, Link Adaptation Techniques, MIMO Systems, Capacity Mobile Adhoc Networks, Wireless Sensor Networks, Optical Communications and Networking, WDM Transmission, Fibre Nonlinearities, Wavelength-routed Networks, Passive Optical Networks, Optical Burst Switching, Cognitive radio 4G Cellular ◆ Architectural Optimization, Adaptive Filters, Wavelets and Multirate-DSP, DSP Application in Wireless Communication, Biomedical Signature Analysis, Voice Signature Analysis, Detection and Estimation, Modeling of Signals and Systems
KHGG01	Geology and Geophysics	Igneous and Metamorphic Petrology, Ore Petrology, Geochemistry and Mineralogy, Isotope Geology, Precambrian Geology and Tectonics, Structural Geology, Microtectonics, Stratigraphy and Sedimentary Geology, Basin Analysis, Applied Micropaleontology, Paleoceanography and Paleoclimatology, Coastal and Quaternary Geology, Mineral Exploration 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, Landslide Hazards, Biogeochemistry of trace metals in soil and water, Gravitational, Magnetic and Electrical Fields (including modeling and numerical analysis), Seismic and Electromagnetic wave Propagation (including modeling and numerical analysis), Nuclear Geology and Geophysics, Geophysical Exploration of minerals, ground water and hydrocarbons, Earthquake Hazard Assessment and Seismic Microzonation, Geotomography, Pattern Recognition in Geophysics, Strong Motion Seismometry, Computational Geophysics,
KHGT01	G. S. Sanyal School of Telecommunication	Wireless Communications System and Networks, Optical Communications Systems, and Networks Telecommunication ICs, RF Design.
KHHS01	Humanities and Social 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 of German, Econometrics and Applied Economics, Economic Planning and Policies, Managerial Economics, Organizational and Development Economics, Agricultural Economics, Manpower Planning, Human Resource Development and Management, Organizational and Social Psychology, Interpersonal Communications, Clinical Psychology and Neuropsychology, Philosophy of Mind, Logic, Applied Ethics, Rural and Urban Sociology, Sociology of Development and Sociology of Health.
KHIM01	Industrial Engg. and Management	<p>Operations Research, MIS, Facilities Planning and Design, Quality Engineering and Management, Production-Inventory Systems, Logistics and Supply Chain Management, Ergonomics and Human Factors Engineering, Safety and Risk Analysis, New Product Development, Intelligent DSS, Small World Networks, Software Project Management, Production Design, Lean/Agile Manufacturing, System Dynamics and E-Business.</p> <p><u>Minimum Qualification :</u> Master's degree in Engineering/ Technology MBA with graduation in Engg /Technology or equivalent with minimum of 60% marks (or equivalent grade point average)</p>

Code	Department	Fields of specialization
KHMS01	Materials Science	<p>Polymer Physics and Engineering., Rheology, Composites, Polymer Synthesis, Characterization and Application, Plastic/Rubber Science and Technology, Adhesion, Biomaterials, Semiconductor Materials; Crystal Growth, Opto-electronic Materials, Semiconductor, Wide Band Gap Semiconductors, Synthesis and Processing of Glass and Ceramics, Nano-ceramics and Nanocomposites, Thin and thick Film Ceramic coatings, Magnetic Ceramics, Solid Oxide Fuels, Near net Shape Forming of Ceramic Components, Electronic ceramics, New materials, Chemical and Biological Sensors, Electronic Polymers, Lithium ion Batteries, Magnetic Materials, Organic Semi-conductors, MOCVD growth of III-V Semiconductors. Ferroelectric Thin Films, Nanofluids, Nanopastes/glues.</p> <p><i>Minimum Qualification :</i> B.Tech/B.E Degree in Chemical Engg./ Technology, Ceramic and glass Technology, Materials Technology, Plastic and/or Rubber Technology, Polymer Science and Technology / Biotechnology With 60% marks minimum.</p> <p>M.Sc. in Physics, Solid State Physics, Chemistry, Material Science, Polymer Chemistry, Electronic Science. With 60% marks minimum</p>
KHMA01	Mathematics	Fluid Mechanics, Numerical Analysis, Statistics, Operation Research, Computer Science, Functional Analysis, Complex Analysis, Computational fluid dynamics, Image processing, Algebra, Fuzzy Mathematics, Artificial Intelligence, Data Base Management Systems. Cryptography.
KHME01	Mechanical Engineering	<p>Fluid mechanics.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 CO₂ and natural refrigerant based heat pumps, Thermal systems modeling and optimization, Solar energy, Optical diagnostics of thermo-fluid systems, Thermal hydraulics of nuclear plants, Micro-fluidics and Micro- scale transport processes.</p> <p>Casting, Welding and Metal forming, Maching and grinding, Machine tools, Cutting tools and coatings, Tool condition monitoring, Plasma-spray ceramic coating, Electrophysical machining processes, Precision manufacturing and laser processing, Computer aided design and manufacturing, Numerical Modeling of Manufacturing Process.</p> <p>Systems, Modeling and design using Bond Graphs, Modeling and control of Microsystems, MEMS, Automotive Engg., Noise Vibration Control, Signal Processing in Mechanical Systems. Finite Element Method and Boundary Element Method, Computational solid mechanics, Non-linear Mechanics, Fracture mechanics, Composite materials, Smart materials and Structures, Biomechanics, Industrial, bio- and nano- Tribology, Surface Engineering. Mechanical Systems Dynamics, Rotor Dynamics, Vehicle Dynamics ,Bifurcation and Chaos, Condition monitoring and Fault tolerant control, Mechanical handling systems and Industrial automation, Industrial fluid power and control.</p>
KHMT01	Metallurgical and Materials Engineering	Physical Metallurgy, Extractive Metallurgy and Mineral Processing, Steel Technology, Process Modeling, Corrosion Science and Technology, Mechanical Metallurgy, Structural Integrity, Casting and Solidification, Powder Metallurgy, Welding Metallurgy, Computational Material Science and Technology, Nanostructured Materials, Bulk Metallic Glasses, Biomaterials, Electronic and Magnetic Materials, Functionally graded Materials, Intermetallics, Composites. Tribology and Surface Engineering, Thin films and coatings.
KHMN01	Mining Engineering	Experimental and computational geomechanics, Ore body modeling and Geostatistics, Advanced Surveying, GIS and remote sensing; Subsurface and surface environment (heat, air, water and soil), Fly ash characterization and utilization, Occupational health and safety, Mining systems and management, Mineral economics and appraisal of mineral property. Surveying, Safety Engineering, Material- Rock Interaction, Mine and Plant Evaluation, Mineral Quality Control, Slope Stability, Environmental Impact Assessment and Management, Waste Remediation, Mining Machinery & Bulk Slides Handling, MSc & M.Tech in Chemistry,Geo-informatics & Gep-Physics, M Sc in Physics, Applied Geology, Mathematics & Geo-informatics, B.Tech/BE in Mining Engineering, Petroleum Engineering, Chemical Engg, Mineral Processing, Mining Machinery.
KHOE01	Ocean Engg. 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 Modelling, CFD.
KHPH01	Physics and Meteorology	Astrophysics & Cosmology, Condensed Matter Physics, Ferroelectrics & Dielectrics, Fibre Optics, Magnetism, Multiferroics, Nanoscience & Nanotechnology, Nonlinear Optics, Nonlinear Instability, Nuclear Physics, Quantum Mechanics & Field Theory, Radiation Measurements, Semiconductor Devices, Solid State Ionics, Thin Films, Renewable Energy Sources.
KHRT01	Rubber Technology	<p>Polymer blend & alloys, Composites, Polymer and Rubber Processing, Product Development, Polymerization, Development of Novel Polymers, Structure-Property Correlation, Waste Polymer Recycling, Thermoplastic Elastomer, Adhesion and Surface Treatment, Nanocomposites, Polymer Rheology.</p> <p><i>Minimum Qualification :</i> Master's degree in Science/ Engineering/ Technology or its equivalent with minimum 60% marks.</p>
KHRD01	Rural Development	Transfer of technology; Socio-economic aspects of Rural Development, Planning and development models, Crop, water and land use planning; Information Technology in Rural Development, Tribal Development, Upgradation of technology.

Code	Department	Fields of specialization	
KHRE01	Reliability Engineering	System Reliability assessment, Reliability and design, Reliability simulation, Machinery Fault Diagnosis, Maintenance Engg. & Management, Risk and Safety Assessment, Software reliability.	<u>Minimum Qualification :</u> Minimum 60% marks (or equivalent Grade point average) in Electrical, Electronics, Civil, Computer Science ,Mechanical and allied branches of the above.
KHIT01	School of Information Technology	Computer Security, Computer Vision, Image Processing, Pattern Recognition , Data Mining, Distributed Systems, E-Commerce, E-Learning, Geographical Information Systems, Human Computer Interaction, Information and Database Systems, Internet Technologies, Mobile Computing, Multimedia Systems, Software Engg., VLSI Design, Speech Processing. Wireless adhoc networks, Wireless Sensor network, Vehicular abhoc networks	<u>Minimum Qualification:</u> M.E/M.Tech.in Information Technology or Comp. Sc & Engg. or Electronics & Communication Engg. Or Electrical Engg.
KHID01	Ranbir and Chitra Gupta School of Infrastructure Design and Management	The RCG School of Infrastructure Design and Management.	

7. Indian Institute of Technology Madras, Chennai 600036 –MD

The minimum educational qualifications for admission to the Ph.D. programme of the Institute are as follows:

- **Ph.D. in Engineering:** Candidates with a Master's degree in Engineering/Technology with a good academic record or a Master's degree by Research in Engineering/Technology with a good academic record. Candidates with Master's degree in Sciences with a good academic record and of exceptional merit where eligible, for the relevant Engineering discipline.
- **Ph.D. in Sciences:** Master's degree in Sciences with a good academic record. Master's degree in Engineering/Technology where eligible with a good academic record.
- **Ph.D. in Humanities and Social Sciences:** Master's degree in an eligible discipline with a good academic record.
- **Ph.D. in Management:** Master's degree in an eligible discipline with a good academic record

Code	Department	Fields of specialization	Minimum Qualification
MDAE01	Aerospace Engineering	<p>Aerodynamics: Subsonic, Transonic, Supersonic, Hypersonic, Rarefied Gas flows (Theoretical and Experimental), 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.</p> <p>Aircraft Structures: Finite Element Methods, Numerical Methods, Photo Elasticity, Moire and Holographic Methods of Structural Analysis. Composite Structures, Fatigue and Fracture Mechanics, Contact Mechanics, Vibration and Impact Mechanics.</p> <p>Aerospace Propulsion: Rocket Propulsion and Solid Propellant Combustion, Airbreathing Propulsion and Combustion, Cascade Flows, Multiphase Flow Simulation, Combustion Instability, Optical Flow/Combustion Diagnostics.</p>	<p>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 atleast five years experience in Aerospace industry / Research Organisation.</p>
MDAM01	Applied Mechanics	<p>Plates and Shells, Finite and Boundary Element Techniques, Experimental Stress Analysis including Holography, Image processing techniques, Digital Photo Mechanics, Fatigue of Materials, Fracture Mechanics, Reliability of Structures, High Temperature Design, Composite Structures, Plasticity, Smart Materials and Structures, Constitutive Modelling, Granular Materials, Biomaterials, Fluid Mechanics, Aerodynamics, Stability, Transition, Turbulence, Turbulence Modelling, Turbulent Convection, Computational Fluid Dynamics (CFD), Bluff body and Industrial Aerodynamics, Fluid Structure interaction, Cardiovascular System studies, Image and Signal Processing, Speech Signal Processing, Ultrasound and Laser instrumentation in Medicine, Biomechanics, Rehabilitation Engineering, Evoked Response and Functional Electrical Stimulation</p>	<p>Biomedical Engineering area: Master's degree in Applied Mechanics / Civil / ECE / Mechanical / Electrical / Biomedical Engineering / Computer Science / Instrumentation / Metallurgical Engineering Fluid Mechanics area: Master's degree in Applied Mechanics / Civil / Mechanical / Aerospace / Chemical / Biomedical Engineering/ Engineering/ Mechanics and Solid Mechanics areas: Master's degree in Civil/ Aerospace/ Mechanical /Naval Architecture, Production Engineering with an aptitude for research in Solid Mechanics</p>
MDBT01	Biotechnology	<p>The research foci of our Department are (a) Medical Biotechnology, especially cardiovascular aspects and (b) Bioprocesses. Our faculty who are working in various fundamental and applied aspects given below, contribute to the research foci. Cellular, Molecular and Structural Biology related to Signal Transduction, Ion Channels, Lipid Trafficking, Stem Cell Proliferation/Culture, Cell Stresses, Cancer, Cell Death, etc.; Molecular Genetics of Plant Development. Protein structure prediction, Structure-function relationship. Molecular Modeling; Protein-ligand Docking; Computational Neuroscience; Signal Processing; Neural Networks; Character Recognition; Bioinformatics. Drug design, QSAR; siRNA Delivery. Bio-catalysis; Enzymes in Organic (asymmetric) Synthesis; Biosensors. Biotransformation; Molecular Bioremediation; Biodegradation; Green Chemistry. Bioreactor Design and Analysis; Simulation and Control of Bioprocesses; Reactive Oxygen species in Bioreactors; Liquid Phase Oxygen-supply Strategy; Metabolic Engineering; Cloning of Therapeutic Proteins; Ethanol from Biomass; Plant tissue and Animal cell Culture; Enzyme Engineering; Downstream Processing; Scale-up. Biomaterials; Biomechanics; Biomedical Devices and Implants; Instrumentation; Ergonomics.</p>	<p>Same as for our regular Ph.D. programme</p>

Code	Department	Fields of specialization	Minimum Qualification
MDCH01	Chemical Engineering	Chemical reaction engineering and thermodynamics, transport processes, process design and control, environmental engineering, polymer science and technology, semiconductor materials processing, and particle technology. Fundamental studies: Mathematical modeling of physico-chemical phenomena. Applied statistical mechanics, thermodynamic property estimation, phase equilibria. Flow characterization using lasers, microwave assisted thawing. Drying, multicomponent boiling and condensation. Simultaneous heat and mass transfer processes. Modeling of processes and equipments: Hydrodynamic and kinetic studies of turbulent bed contactors, trickle beds, slurry reactors, fast and inverse bed fluidized beds. CFD analysis of process equipments. Advanced separation processes such as reactive and azeotropic distillation, membrane processes. Modeling of rotary kilns, crushing and grinding equipments, fluid energy mills of Microelectronic fabrication techniques. Development, characterization and processing of materials: Development of polymer blends and composites, polymer based nano-composites. Rheology of polymers and colloids; damping and vibration isolation using polymers. Enzyme design and engineering, protein engineering and production of recombinant proteins. Process design and control, systems engineering: Advanced control design such as adaptive control, intelligent control, non-linear control, fault diagnosis and fault tolerant control. Synthesis and optimization of process systems; statistical data processing. Simulation and optimization of crushing and grinding circuits. Environmental engineering and waste reduction: Liquid and solid waste treatment, air pollution monitoring and control, toxic and hazardous waste management, environmental risk assessment, colour removal from waste water. Recycling of mixed	Master's degree in Chemical Engineering or any other related discipline of Engineering or Technology
MDCY01	Chemistry	Analytical Chemistry, Bioinorganic Chemistry, Chemistry of Main Group Elements, Inorganic Heterocycles, Material Science, Synthetic and Structural Solid State Chemistry, Nanomaterials; Cage and Cluster Chemistry; Transition Metal Organometallics. Organic Synthesis, Natural products, Organometallics, Asymmetric Catalysis, Synthetic and Structural Carbohydrate Chemistry, Bioorganic Chemistry, Enzymes in Organic Synthesis; Homogeneous and Heterogeneous Catalysis, Surface Chemistry, Theoretical and Experimental Electrochemistry, Photochemistry, Polymer Chemistry and its Applications, Gas-phase Chemistry, Monolayers and Clusters; Green Chemistry. Chemical Physics, Quantum and Theoretical Chemistry, Chemical Reaction Dynamics, Theoretical and Experimental Spectroscopy, Magnetic Resonance Spectroscopy and Imaging (especially NMR based), Fluorescence Spectroscopy, Nuclear Spectroscopy.	Master's degree in Chemistry. (General, Applied, Analytical, Inorganic, Physical, Organic and Bio) M.Sc. in Physics or M.Tech degree holders with adequate background in Chemistry will also be considered.
MDCE01	Civil Engineering	Building Technology & Construction Management	Master's degree in Civil, Ocean or Industrial Engg., Industrial Management or MBA, or in Architecture, 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 Environmental Science & Engineering / Chemical Engineering / Biotechnology / Applied Geology.
MDCE03		Geotechnical Engineering	Master's degree in Civil or Ocean Engg. Or Engg. Mechanics, Mining Engineers. With two years experience.
MDCE04		Structural Engineering	Master's degree in Civil, Ocean, Aerospace, 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

Code	Department	Fields of specialization	Minimum Qualification
MDCS01	Computer Science & Engineering	Automata theory and Formal languages, Analysis of algorithms, Graph theory, Unconventional Methods of Computing, Cryptography, Software Engineering, Object Oriented Systems, Parallel and Distributed systems, Mobile Computing, Programming languages, Performance evaluation. Software for VLSI design, Computer architecture, Computer graphics and Visualization. Computer Communication and networks, Network Protocols and security, Real-time systems, Wireless Sensor Networks. Data bases, Knowledge based systems, Data mining, Artificial intelligence, Machine learning, Indian language systems, Speech and vision systems, Artificial neural networks.	Master's degree in Engineering / Technology. Preference will be given to those with M.Tech/M.S degree in Computer Science & Engineering.
MDEE01	Electrical Engineering	Communication Systems including Fibre Optics, Computer Networking, Image and Signal Processing, Wireless Communication, Microwave, VLSI Design, Instrumentation, Power Systems, Machines, Control, Microelectronics, MEMS, Power Electronics, Biomedical Devices.	Master's degree in Electrical or Electronics and Communication Engineering, Instrumentation Engineering or Master's degree in Physics followed by a Master's degree in Engineering in an area of relevance to the area of research.
MDER01	Engineering Design	Robotics, Dynamics and Control, Multibody dynamics, Electro hydraulic servo systems, pneumatic systems, Mechatronic systems, Micro- electro mechanical system (MEMS), Optoelectronics, remote sensing, laser based sensing, Micro Manufacturing, Modelling, Control and fault diagnosis of dynamic systems, Design Process, Non linear Finite elements, Vehicle Dynamics and Tyre Mechanics	Master's degree in Aerospace, Automobile, Biomedical, 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	British, American, Common Wealth and New Literatures in English; Applied and Theoretical Linguistics; Philosophy of Language and Continental Philosophy; English Language Teaching (ELT); German Studies; European Studies; Political Philosophy; Modern Indian History; Applied Economics and Sociology; Science and Technology Policy Studies; Environment and Natural Resources Policy; Health care Policy.	Master's degree in relevant discipline
MDMS01	Management Studies	Production and Operations Management; Supply Chain Management; Logistics Management; Financial Management; Financial Engineering; Business Policy/Strategic Management; Marketing Management; Organisational Behaviour; Personnel Management and Industrial Relations; Public Systems Management	Master's degree or equivalent in a relevant discipline
MDMA01	Mathematics	Functional Analysis, Operator Equations, Inverse problems, Fixed Point Theory, Differential Equations, Special Functions, Complex Analysis, Non-linear Analysis, Fuzzy sets –Theory and Applications, Summability Theory, Algebra, Communication and Coding Theory, Numerical Analysis, Numerical Linear Algebra, Fluid Mechanics, Computational Fluid Dynamics, Mathematical Physics, Mathematical Modeling, Applied Probability and Stochastic Processes, Queuing Theory, Inventory Control, Reliability, Computer Modeling and Simulation, Theoretical Computer Science - Algorithms, Complexity Theory, Database, Theory of Programming.	Master's Degree in Mathematics / Statistics / Physics / Computer Science or M.Tech (Industrial Mathematics & Scientific Computing).

Code	Department	Fields of specialization	Minimum Qualification
MDME01	Mechanical Engineering	<p>(i) <u>Design Engineering</u>: Machine Elements ~ design development, analysis and performance improvements, New materials and design, composites, nano composites, bio materials, 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 multiaxialloading, 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, Acoustics and Noise Control.</p> <p>(ii) <u>Manufacturing Engineering</u>: Manufacturing Processes, Technologies, CAD/CAM, Manufacturing Planning and Control, Metrology and Computer Aided Inspection, Quality Control, Fracture Mechanics, Materials behaviour in Manufacturing, Surface Treatment, Machining Process, Condition Monitoring, Flexible Manufacturing Systems, Computer Integrated Manufacturing, Non Traditional Machining; Precision Gearing, Sintered Bearings, Manufacturing Methods in Precision Engineering, Surface Technology, Active Noise Control systems, Active Suspensions, Microprocessor Based System Design, Electrohydraulic Servo and Proportional Controls, Pneumatic Systems, Robot-Kinematics, Dynamics, Design and Controls, Multibody Dynamics, System Simulation, Microhydraulics, Mechatronics, Microactuators, MEMS</p> <p>(iii) <u>Thermal Engineering</u>: Micro-miniature and small cryogenic refrigerators, Simulation and optimization of air separation cycles, Heat Transfer in Nano-fluids, Heat Transfer in Multi-Phase Flows, Flow Structure Interaction in High Speed Turbo machinery Seals, Heat Transfer Experiments in Phase Change Material Based Composite Heat Sinks, Two Phase Flow Convection Experiments and Numerical Methods in Porous Media, Solid State Hydrogen Storage, Sorption heating and cooling systems, Desiccant/evaporative cooling and air-conditioning, Conjugate heat transfer in low and high speed flows, Retrieval of geophysical parameters in the atmosphere in the microwave and infra red regions, Turbine rotor stator interaction, Performance improvement of centrifugal compressor by tip modification, subsonic cascade studies, Cavitation in hydraulic machines, Acoustics of Supersonic Jets, Active and Passive Control of High speed flows, Combustion noise, Emissions, Ruid Combustion, Propulsion, CFD high speed reacting flows, I.C Engine Combustion and Emissions, alternative fuels, CFD applications in I.C Engines and Gas turbine combustion chambers, fluid flow, heat transfer and combustion related to I.C Engines, advanced I.C Engine technologies such as homogeneous change, compression ignition, gasoline direct injection, engine management, Simulation of engine processes and modeling – Combustion diagnostics in engines Heat Transfer in Fuel Cells, Fluidized Bed Combustion, Solar Power Systems, Optimization of Solar Ics Systems.</p>	<p>Master's degree in Mechanical Engineering, Aerospace Engineering, Automobile Engineering, Automotive Engine Tech., Bio-Medical 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.</p>
MDMM01	Metallurgical and Materials Engineering	<p>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, Fatigues and Fracture Mechanics, High Temperature Behaviour of Materials and Creep.</p>	<p>Master's degree or equivalent in Metallurgical Engineering or other appropriate branch of Engineering/Technology. Science postgraduates to be considered should have exceptional merit and research or industrial experience in the appropriate field.</p>

Code	Department	Fields of specialization	Minimum Qualification
MDOE01	Ocean Engineering	Ocean Engineering	Master's degree 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 and Oceanography.
MDOE02		Petroleum Engineering	Master's degree 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, Dynamical systems, Statistical physics and field theory, Low temperature physics and superconductivity, Magnetism and Magnetic materials, Hydrogen Storage Materials, Microwaves and Dielectrics, Semiconductor Physics, Photovoltaics, Solid State Ionics and molecular electronics, Thin film phenomena, X-ray diffraction and Amorphous systems, Spintronix and Diluted Magnetic Semiconductors, Condensed Matter Physics/Magnetism in Oxides/Magnetic Materials, Electronic structure of solids/Computational material science, Nonlinear Dynamics, Quantum Chaos, Quantum Information, Metal-oxide Thin films, Nanostructured thin films and heterostructures by PLD.	M.Sc/M.Sc (Tech) in Physics, Applied Physics, Materials Science/M.Tech (Solid State Technology) / M.Tech. (Materials Science) or equivalent.

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

Minimum Qualification: Master's Degree in Engineering/Technology/Sciences/Humanities & Social Sciences & Management in respective discipline or equivalent 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 years/semesters) where marks are awarded or Applicants with B.Tech. degree or equivalent in respective discipline with excellent academic record (with a minimum CGPA of 7.00 on a 10 point scale or equivalent or 70% marks) may be considered eligible for admission. For SC/ST/PD candidates and all others holding Masters Degree (M.A. with English) Seeking admission to Ph.D English in the department of Humanities and Social Sciences the eligibility requirement of CGPA may be relaxed to 5.50 on a 10 point scale or equivalent, or 55% marks. The SC/ST/PD applicants holding B.Tech Degree or equivalent may be allowed 5% relaxation in marks or equivalent relaxation in CGPA.

Code	Department	Fields of Specialization	Minimum Qualification
RRAH01	Alternate Hydro Energy Centre	Small Hydro Energy and other Renewable Energy Development.	(i) B.Tech/M.Tech or equivalent in Civil/ Electrical Mechanical Industrial/ Chemical/ Environmental/ Agricultural/ Computer Electronics Engineering.
		Environmental management of Rivers and Lakes	(ii) M.Sc. in disciplines consistent with research areas of the centre.
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.	Master's degree in Architecture / Planning or its equivalent viz. P.G. Diploma in Planning awarded by CEPT / SPA or Diploma in TCPI awarded by ITP (India).
RRCH01	Chemical Engineering	<p>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.</p> <p>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.</p> <p>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.</p> <p>Energy Engineering: Design of energy efficient equipment and Energy conservation in chemical process industries.</p> <p>Biochemical Engineering and Down Stream Processing: Biochemical Engg., Design, Simulation and control of bioreactors, Biogasification. Bioseparation.</p>	<p>(i) B.Tech./M.Tech. or equivalent degree in Chemical Engineering.</p> <p>(ii) B.Tech./M.Tech. or equivalent degree in any branch of Engineering/Chemical Technology and interdisciplinary areas.</p> <p>(iii) M.Sc. in disciplines consistent with the research areas of the department.</p>
RRCY01	Chemistry	Protein Chemistry, Liquid Chromatography, Enantiomeric resolution of racemic pharmaceuticals, Organic Reaction Mechanisms, Molecular Electro Chemistry, Chemical Sensors, Biosensors, Wastewater Treatment, Adsorption, Environmental Chemistry, Origin of Life, Kinetics & Photochemistry, Nanomaterials Chemistry, Organometallic, Synthetic Medicinal Chemistry, Statistical Mechanics of Polymer, Macrocyclic Chemistry Synthetic Heterocyclic Chemistry, Solvent Extraction, Polymer Chemistry Coordination Chemistry, Bio-Inorganic Chemistry, Catalysis, Heme-Protein Catalysis, Theoretical Chemistry, Bioanalytical, Radiochemistry, Organic Electronics, Supra molecular Chemistry, Asymmetric Synthesis, Solid State Chemistry.	<p>(i) M.Sc. or equivalent degree in Chemistry/ Physics..</p> <p>(ii) M.Sc. in Bio-technology or M.Sc. in Biochemistry.</p>

Code	Department	Fields of Specialization	Minimum Qualification
RRCE01	Civil Engineering (Specialization code number to be indicated in the data sheet)	Environment Engineering Environmental Pollution, Optimization of Distribution Networks, Water and Waste Water Quality Assessment and Treatment Alternatives, Industrial Waste Water Treatment, Air Pollution Modeling, Abatement and Control Device, Environmental Impact Assessment & Control Water Quality Modeling, Interdisciplinary Environmental Engg. Problems.	(i) B.Tech./M.Tech. or equivalent degree in Civil Engineering. Candidate having a n M.Tech. Degree but not having a Bachelor's degree in Engineering must have studied Mathematics at the Bachelor's level. (ii) B.Tech./M.Tech. degree in any branch of Engineering may be considered for research areas consistent with the academic background and experience. (iii) MSc. Degree in any branch of Science or MCA (with mathematics at the Bachelors level for both M.Sc. and MCA) may also be considered for research areas in Geometrics Engineering.
RRCE02		Geotechnical Engineering Behaviour of shallow and deep foundations under static and dynamic loading Problems of rock mechanics and Underground Space Technology, Static and Dynamic Soil structure Interaction, Problem of partially saturated soils, Expansive soil, Reinforced earth, Ground Improvement Engg.	
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: Plan, 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: High rise buildings, Shear walled frames, Cable-stayed structures, Studies for wind effects, Finite element applications, Probabilistic design methods, girder bridges, fiber reinforced concrete, Off-shore structures, Pre-stressed concrete structures, Housing in hilly area, Composite materials (HSC/HPC, HVFAC/HVERC), Masonry Structures, Dynamic Programming for construction project management, Energy – efficient planning for buildings.	
RRCE06		Transportation Engineering Highway material characterization for flexible and rigid pavements, Reinforced flexible pavements modified binders and mix design, composite pavements, pavements management systems, low cost pavements, mixed traffic flow modeling and simulation, highway capacity, Traffic simulation of Intersection analysis, Environmental impact assessment, mass transportation system analysis; Rural, Urban and Regional Transport Planning, Road Traffic Safety, Intelligent Transport System, GIS applications.	
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.	(i) B.E./Masters degree in Earthquake, Civil, Mechanical, Electrical, Electronics, Hydrology, Geology, Geophysics, Geochemistry or equivalent. (ii) M.Sc. / M.Tech. / M.Sc. (Tech.) degree in Physics, Chemistry, Mathematics, Statistics, Life Science, Marine Science, Environmental Science, Atmospheric Sciences or equivalent.

Code	Department	Fields of Specialization	Minimum Qualification
RREQ01	Earthquake Engineering	<p>Structural Dynamics: Dynamic analysis and design of structures like building, 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.</p> <p>Geotechnical Earthquake Engineering: 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.</p> <p>Engineering Seismology and Seismotectonics: Microearthquake investigations, Estimation of earthquake source parameters, Seismotectonic modeling, Attenuation characteristics, Strong motion seismology, Broadband seismology, Characteristics of strong ground motion, Ground motion prediction, Estimation of response spectra and design spectra, Probabilistic and deterministic seismic hazard assessment, Seismic microzonation, Remote sensing/GIS/SAR based studies.</p>	<p>(i) B.Tech. / M.Tech. or equivalent degree in Civil Engineering/ Earthquake Engineering/ any branch of Engineering.</p> <p>(ii) M.Sc./ M.Tech. in Geophysics/ Physics / Mathematics / Geology for research areas in Engineering Seismology and Seismotectonics.</p>
RREE01	Electrical Engineering	<p>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 Selected area of HV engg., Automatic Generation Control, Restructured Power Systems, Measurement techniques, Smart and intelligent transducer, Industrial and 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.</p>	<p>(i) B.Tech./M.Tech. or equivalent degree in Electrical Engineering</p> <p>(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.</p> <p>(iii) M.Sc. in discipline consistent with the research areas as mentioned by the Department from time to time.</p>

Code	Department	Fields of Specialization	Minimum Qualification
RRLC01	Electronics and Computer Engineering	Communication Systems	(i) M.E. / M.Tech. in Solid State Electronics /Microwaves /Communication Systems / Control Systems / Information Technology /Instrumentation / Computer Science & Engg / Information Science / MCA or equivalent. (ii) B.E. / B.Tech. in Electronics & Communication / Computer Science & Engg. / Electrical Engg. / Information Technology or equivalent. (iii) M.Sc. in Physics / Maths/ Instrumentation / Electronics. (iv) Candidates not covered by (i), (ii), (iii) above but having B.E./M.Sc./M.Tech. in any other area may also be considered provided they have sufficient background and experience in the areas of interests to the department.
RRLC02		RF & Microwave Engineering	
RRLC03		Microelectronics and VLSI	
RRLC04		Systems Modelling and Control	
RRLC05		Computer Science and Engineering	
RRHS01	Humanities and Social Science	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 interest.
RRHY01	Hydrology	Analysis of hydrological extremes, Stochastic hydrology, Parametric hydrology, Aquifer response modeling, Aquifer parameter estimation, Subsurface drainage, Coastal aquifers, Hydrogeology, Ground water geophysics, Watershed hydrology, Reservoir operation, System analysis of water resources, Photohydrology, Conjunctive use, Rainfall-runoff modeling, Hydraulic and hydrologic routing, 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.
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. / .Com. (iii) Master of Management / M.B.A. or equivalent.

Code	Department	Fields of Specialization	Minimum Qualification
RRMA01	Mathematics	Elasticity and Vibration, Fracture Mechanics, Fluid Mechanics, Computational Fluid Dynamics, Magneto Hydro Dynamics, Bio Mathematics, Numerical Analysis, Operations Research, reliability Theory, Control Theory, Industrial Mathematics, Computer Applications, Image Processing, computer Graphics, Theory of Functions and Summability, Approximation Theory, Harmonic Analysis, Functional analysis, Theory of Relativity and Cosmology, Statistics, Computerized Tomography, Abstract Algebra, Applied Algebra, Cryptography, Complex Analysis, Mathematical Modeling, Robotics & Control, Symbolic Computation.	(i) M.A. / M.Sc. in Applied Mathematics / Statistics /Computer Science / Mathematics / Ind. Mathematics. (ii) M.Stat. (iii) M.C.A.
RRME01	Mechanical and Industrial Engineering	I.C. Engines, Combustion, Air pollution, Refrigeration and air-conditioning, Fluid Mechanics, Heat transfer, Solar energy, Turbo machinery, Slurry Transportation, Erosion Wear, Computational Fluid Dynamics, CAM/CAD & Robotics	(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		Vibration and noise, Tribology, Vehicle dynamics, Railway safety, Solid Mechanics, Composite and smart structures, Fracture Mechanic, Machine Diagnostic and Condition Monitoring CAM/CAD Robotics.	
RRME03		Machine tools and metal cutting, Non-conventional machining, Computer Aided Process Planning, CIM/FMS, Design for manufacturability, Foundry engg., Ergonomics, Industrial engg., Reliability and Maintenance Engg., Metal forming, Welding Engg. CAM/CAD Robotics.	
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 of polymers. Fatigue and fracture of materials. Electro Ceramics and Structural Ceramics. Energy materials, Surface modification and coating.	(i) B.Tech/ M.Tech. in Ceramics, Chemical, Electrical Electronics, Electrochemical, Mechanical, Metallurgical, Materials Engineering, Engineering Physics OR M.Sc. degree in Chemistry, Materials Science, Physics are eligible for admission. For those with M.Sc. degree, Mathematics as a subject at B.Sc. degree level is an essential requirement. (ii) The candidates are eligible for research areas consistent with their academic background and special interests.
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. (ii) M.Sc. in Chemistry / Mathematics / Biophysics/ Geophysics/ Computer Science, Provided Physics was a subject at B.Sc. level. (iii) B.Tech. or equivalent in Electrical / Electronics / Chemical / Metallurgical / Engineering Physics. Candidates at Category (ii) and (iii) may be considered for research area consistent with the academic background and special interests.

Code	Department	Fields of Specialization	Minimum Qualification
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.	<p>(i) Water Resources Development B.E. / B.Tech. / M.E. / M.Tech or equivalent degree in Civil, Electrical, Mechanical & Agricultural Engineering.</p> <p>(ii) Irrigation Water Management Master's Degree in Agricultural Sciences / Social Sciences / Chemical Engineering / Biological Sciences / Environmental Sciences / Engineering / Natural Sciences with at least one paper of Mathematics at the graduate level.</p>
RRBT01	Biotechnology	Molecular Biophysics, Genetics, Biofertilizers, Microbial Biotechnology, Molecular biology, Endocrinology, Environmental biotechnology, Microbiology, Plant biotechnology, Biochemical Engineering, Biochemistry Protein Crystallography & Bioinformatics, Virology.	<p>(i) Master's degree in any disciplines of Science.</p> <p>(ii) Bachelor's / Master's degree in medical sciences, engineering, pharmacy, veterinary and related disciplines.</p>
RRPP01	Paper Technology (Saharanpur Campus)	Pulp and Paper, Material science, Bio-technology, Environmental Management, Modeling and Simulation, Control Systems, Secondary Fiber Processing and deinking, Applied Mathematics, Electronics and Instrumentation, Polymer Science & Technology, Nanotechnology, Tissue Culture, Wireless Networking, Finance Accounting, English Literature and Contemporary Theory.	<p>(i) B.Tech. / M.Tech. or equivalent degree in Pulp & Paper, Chemical, Mechanical, Electrical, Electronics, Computer, Instrumentation, Metallurgical, Environmental Engineering.</p> <p>(ii) M.Sc. or equivalent degree in Physics, Chemistry, Mathematics, Applied Mathematics, Industrial Mathematics Bio-Science, Bio-Technology, Environmental Science and Material Science</p>

9. Anna University, Chennai 600025 – AU

A minimum of 55% of marks/CGPA of 5.5 on a 10 point scale in post-graduate degree examination and in case of SC/ST candidates, 50% marks or CGPA of 5.0 on a 10 point scale in the post-graduate degree.

Code	Department	Fields of specialization
A.C Tech. Campus, 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.
College of Engineering, Guindy, Chennai- 25		
AUCE01	Civil Engineering	Environmental Engineering., Structural Engg., Hydrology and Water Resources Engg., Construction Engg. and Management, Irrigation Water Management, Urban Engg., Remote Sensing, Soil Mechanics and Foundation Engg.
AUEE01	Electrical Engineering	Power Systems Engg., Control and Instrumentation, Power Electronics and Drives, High Voltage Engg., Electronics Engineering, Instrumentation Engg.
AUIC01	Information & Communication Engg.	Optical Communication, Medical Electronics, Applied Electronics, Communication Systems, Laser and Electro Optical Engg., Computer Science & Engg., Software Engg.
AUME01	Mechanical Engineering	Internal Combustion Engineering, Refrigeration and Air-conditioning, Energy Engineering, Engineering Design, CAD/CAM, Product Design and Development, Mechatronics, Automobile Engineering, CAD
Madras Institute of Technology Campus, Chennai-44		
AJAE01	Aerospace Engineering	Aircraft Structures, Aerodynamics, Propulsion
AJAU01	Automobile Engineering	Alternate fuels, IC combustion, Simulation of Engine, Vehicle Dynamics, Automotive Chassis
AJEC01	Electronics Engineering	Networking, Communication, VLSI, Embedded, Electronics, Avionics, Signal and Image Processing
AJIN01	Instrumentation Engineering	Process Modeling and Control, Fault diagnosis, VLSI, Biomedical Instrumentation, Transducers and Measurement
AJPT01	Production Technology	Manufacturing Processes, Metrology, Mechatronics, Metallurgy Manufacturing Management, Robotics, Automation, Production

10. Basaveshwar Engineering College, Bagalkot 587 102 –BB

Code	Department	Fields of specialization	Minimum Qualification
BBCE01	Civil Engineering		
BBME01	Mechanical Engineering		
BBEE01	Electrical Engineering		
BBEC01	Electronic & Communication Engineering		
BBCS01	Computer Science & Engineering		

11. Bengal Engineering and Science University, Shibpur 711103 –BE

Code	Department	Fields of specialization	Minimum Qualification
BECE01	Civil Engineering	Structural Engg. & Concrete Technology, Soil Mechanics & Foundation Engg., Water resource Engg., Environment Engg., Highway and Traffic Engg. Etc	Post Graduate Degree in the relevant field in engineering or equivalent.

12. BMS College of Engineering, Bagaluru 560 019 –BS

Code	Department	Fields of specialization	Minimum Qualification
BSCE01	Civil Engineering		
BSEE01	Electrical Engineering		
BSME01	Mechanical Engineering		
BSIE01	Industrial Engineering		
BSEC01	Electronic & Communication Engineering		

13. Coimbatore Institute of Technology, Coimbatore 641 014–CC

Code	Department	Fields of specialization	Minimum Qualification
CCCE01	Civil Engineering		
CCME01	Mechanical Engineering		
CCEE01	Electrical Engineering		
CCCH01	Chemical Engineering		

14. College of Engineering Trivandrum, Thiruvananthapuram 695 016– CT

Code	Department	Fields of specialization	Minimum Qualification
CTCE01	Civil Engineering	Transportation Engineering, Traffic Engineering, Geotechnical Engineering, Structural Engineering.	M.Tech./M.E. degree in relevant field of Engineering
CTME01	Mechanical Engineering	Heat Transfer, Refrigeration, Vibration, Machine Design, Fluid Dynamics, Computational Fluid Dynamics, Thermal Engineering, Machine Dynamics, Alternate Fuels, Optimization Techniques, Industrial Management.	
CTEE01	Electrical Engineering	Power Systems, Electrical Machines, Control Systems, Guidance & Navigational Control, Power Electronics & Drives.	
CTEC01	Electronic & Communication Engineering	Radio Frequency Engineering, Signal Processing, VLSI Circuits, Introduction Motor Drives, MEMS, Image Processing, Computer Vision, Wireless Communication, Photonics.	

15. College of Engineering, Pune 411 005 – CP

Code	Department	Fields of specialization	Minimum Qualification
CPCE01	Civil Engineering		
CPME01	Mechanical Engineering		
CPPE01	Production Engineering		
CPEE01	Electrical Engineering		
CPEC01	Electronic & Communication Engineering		

16. Delhi Technological University, Delhi –DD

Code	Department	Fields of specialization	Minimum Qualification
DDCE01	Civil Engineering		
DDME01	Mechanical Engineering		
DDEE01	Electrical Engineering		
DDPS01	Polymer Science & Chemical Technology		

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

Code	Department	Fields of specialization	Minimum Qualification
GACE01	Civil Engineering		
GAEE01	Electrical Engineering		
GAEC01	Electronic & Communication Engineering		

18. Govt. Engineering College, Kerala – GK

Code	Department	Fields of specialization	Minimum Qualification
GKCE01	Civil Engineering		
GKME01	Mechanical Engineering		
GKEE01	Electrical Engineering		

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

Master's Degree of Anna University or any other qualification recognized as equivalent thereto in the fields of study notified from **time to time by Anna University.**

Code	Department	Fields of specialization	Minimum Qualification
GCCE01	Civil Engineering	Structural Engineering	ME/M.Tech. First Class or M.S. (By Research) in the relevant branch of Engineering
		Environmental Engineering	
GCME01	Mechanical Engineering	Mobile Robotics	
		Nano Coating / Nano Fluids	
		Composite Material Characterization	
		Alternate Refrigerants	
		Engine Research with Biofuels	
		Micro Machining	
GCEE01	Electrical Engineering	Design / thermal Engineering	
		Electrical & Electronics Engineering including power Systems Engineering	
		High Voltage Engineering	
		Power Electronics & Drives	
		Embedded Control Systems	
		Control & Instrumentation	
Embedded System Technologies			

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

Code	Department	Fields of specialization
GNCE01	Civil Engineering	1. Structure Engineering, 2. Geo-Technical Engineerin, 3. Transportation Engineering. 4. Computer Aided Design.
GNME01	Mechanical Engineering	1. Thermal Engineering, 2. Industrial Engineering, 3. Production Engineering.
GNEE01	Electrical Engineering	1. Power Systems Operation and Control 2. Restructuring of Power System

21. Indian School of Mines, Dhanbad 826004 – IS

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

Code	Department	Fields of specialization	Minimum Qualification
ISMIO1	Mining Engineering	Coal Mining, Metalliferous Mining, Mine Planning & Design, Mine Systems Engg., Rock Mechanics, Rock Excavation Engg., Mine Environment, Open Cast Mining, Mine Surveying, Mine and Mineral Economics, Mine Management, Surface Environment, Marine Mining, Mine Safety Engineering.	Master's degree in Mining Engg.

22. Institute of Technology, Banaras Hindu University, Varanasi 221005 – VN

Minimum eligibility for Ph.D. Programme in Met. Engg. 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.

Code	Department	Fields of specialization
VNMT01	Metallurgical Engineering	Deformation and Fracture, Phase Stability, Phase Transformations, Rapid Solidification Processing Including Metallic Glasses Nano-materials Metallurgical Thermodynamics and Kinetics, Corrosion and Environmental Stability, Metal Casting Technology and Tribological Studies, Non-Ferrous Extractive Metallurgy, Ferrous Extractive Metallurgy, Process Simulation Studies, Agglomeration of Ore Fines and Utilization of Metallurgical Wastes.
VNMI01	Mining Engineering	Rock Mechanics & Ground Control, Mine Environment, Mine Planning & Design, Mining Machinery, Numerical Modeling of Mining Structures.

23. Jadavpur University, Kolkata 700032 – JU

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

Code	Department	Fields of specialization	Minimum Qualification
JUEE01	Electrical Engineering	Control Systems: Control and guidance, Knowledge-based systems, Artificial Intelligence, Software Engg., Stochastic Processes, Distributed Computer Control Theory, Motion Control and Power Conditioning.	Master's degree in Electrical Engg.
JUEE02		Electrical Machines: System Optimization, Optimal Design of Electrical Machines, Synchronous Machines Stability, Electrical Drives, Wind Energy.	
JUEE03		Electrical Measurements: Digital and Microprocessor-based Instrumentation, Biomedical Instrumentation, Digital Signal Processing, Process Instrumentation, Fiber Optic Instrumentation.	
JUEE04		High Voltage Engineering: High Voltage Laboratory Techniques, Field Analysis and Computation, Discharge Phenomena in Gas, Liquid and Solid and Solid Media, Dielectric Engg., Surge Analysis.	
JUEE05		Power Systems: Computer-Aided Power System Analysis Microprocessor Applications, Power Electronics, Power Systems Protection, Power System Control.	

Code	Department	Fields of specialization	Minimum Qualification
JUEC01	Electronics and Telecommunication Engineering	Communication Engineering: Digital Communication, Data Compression, Image Processing, Fiber Optic Communication, Analog and Digital Mixed Signal Circuits and Systems.	Master's degree In Electrical & Telecommunication Engg.
JUEC02		Computer Engineering: Programme Semantics, Compiler, Operating System, Computer Architecture, Artificial Intelligence, Pattern Recognition, Neural Networks	
JUEC03		Control Engineering: Digital Control, Robotics, Adaptive and Optimal Control, Fuzzy Control	
JUEC04		Electronic Devices: Photovoltaic Energy Conversion, Power Semiconductor Devices, Semiconductor Device Modeling, Electrical Conduction and Related Phenomena in Semiconductors and Superconductors, Microelectronics Technology, Nano Crystalline Materials and Devices, EDA, Sensors, MENS, VLSI Circuit Design and Implementation	
JUEC05		Microwave Engineering: Microwave and Millimeter Wave Antenna Theory and Technique, Microstrip Components, Antennas and Arrays, Electromagnetic Interference and Compatibility, Electrostatic Charging and Discharging.	
JUME01	Mechanical Engineering	Applied Mechanics	Master's degree in Mechanical Engg. With at least 60% marks (and also in the preceding degree).
JUME02		Heat Power Engineering	
JUME03		Fluid and Hydraulic Engineering (incl. Water Resources)	
JUME04		Production Engineering	
JUME05		Machine Design (including Bioengineering)	
JUPE01	Production Engineering	Production Technology: Machine tools and Metal cutting, Non-traditionmachining, Advanced material machining, CAD/CAM, Robotics, Tribology, Computer integrated manufacturing, Flexible automation, Precision engineering, Micro machining, Ergonomics, Designing for production, Manufacturing systems simulation.	Master's degree in any branch of Engg./Tech.
JUPE02		Production Management: Operations management, Quantitative management, Terotechnology, Reliability, Behavioral science, Enterprise resource planning (ERP), Supply chain management (SCM), Quality engineering, Waste management	

24. Madan Mohan Malaviya Engineering College, Gorakhpur - 273 010- 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	GIS, GPS, Remote Sensing and Engineering Survey. Geotechnical and Geo-Environmental Engineering, Water Resource and Fluvial Hydraulics. Environmental Engineering, Structural Engineering.
MMEE01	Electrical Engineering.	Power System Restructuring, Forecasting in Competitive Electricity Markets, Power System Analysis, FACTS Technology, Reactive Power Compensation, Harmonics Analysis, Load Flow Analysis, Load Frequency Control, Bio-Medical Instrumentation, Bio Medical Signal Processing, Process Control, Optimal Control, Power Electronics, Electrical Machine & Drives, CSI fed Induction Motor Drives, VSI fed Induction Motor Drives, Advance Control Application in Drives.
MMEC01	Electronics and Communication Engineering	1. Communication and Signal Processing <ul style="list-style-type: none"> • Wireless Communication • Computer Communication • Microwave • Antenna Communication Network • Optical Communication • Signal Processing & Coding Theory
		2. Integrated Electronics & Circuits <ul style="list-style-type: none"> • VLSI Design. • Analog & Digital Circuits Design & Microelectronics
		3. Electronic System <ul style="list-style-type: none"> • Embedded System Design • Electronic Instrumentation Digital Signal Processing and Audio and Speech Processing.
MMME01	Mechanical Engineering	1. Production & Industrial Engineering <ul style="list-style-type: none"> • Metal Cutting, Advanced Manufacturing Technology, Unconventional Manufacturing Processes ECM, EDM, Welding, CAD/CAM/CIM, Automation, Robotics, Quality Management, Inventory Management, Supply Chain Management Operations Research, Modelling and Simulation, System Dynamics, Material Science.
		2. Design Engineering <ul style="list-style-type: none"> • Design Engineering: Stress-strain Analysis, Mathematical Modelling, CAD, Design Optimization.
		3. Thermal Science <ul style="list-style-type: none"> • IC Engine, Heat and Mass transfer, Thermodynamics, Refrigeration and Air Conditioning. Turbo-Machines, Compressible flow, Automobile Engineering, Alternate Energy Resources, Emission Control, Hydrogen Energy.

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

Code	Department	Fields of specialization	Minimum Qualification
MGCE01	Civil Engineering		
MGEE01	Electrical Engineering		
MGCS01	Computer Science & Engineering		
MGME01	Mechanical Engineering		
MGAR01	Architecture		

26. Malnad College of Engineering, Hassan 507 201 - ML

Code	Department	Fields of specialization	Minimum Qualification
MLCE01	Civil Engineering		

27. Manipal Institute of Technology – Manipal 576 104 MI

Code	Department	Fields of specialization	Minimum Qualification
MICE01	Civil Engineering	Structural Engineering	BE/B.Tech. in Civil Engineering, PG in Structural/ Geotechnical Engineering with minimum 55% marks
MICE02		Geotechnical Engineering	
MICE03		Environmental Engineering	BE/B.Tech. in Civil/Environmental Engineering, PG in Hydraulics/ Water Resources/ Environmental Engineering with minimum 55% marks
MICE04		Water Resources Engineering	
MICE05		Earth Science	M.Sc. Geology/M.Sc. Marine Geology with minimum 55% marks

Code	Department	Fields of specialization	Minimum Qualification
MIMM01	Mechanical & Manufacturing	Tribology	PG in Machine Design/Manufacturing Engineering or related streams with minimum 55% marks.
MIMM02		Machining of Metals & Composites	PG in Manufacturing Engineering or related streams with minimum 55% marks.
MIMM03		IC Engines & Combustion	PG in Thermal Engineering or related streams with minimum 55% marks.
MIMM04		Solar Thermal Energy	
MIMM05		Turbomachinery	
MIMM06		Biomechanics	PG in Machine Design/Biomedical Engineering or related streams with minimum 55% marks.
MIMM07		Corrosion Engineering	PG in Material Science/ Metallurgy/ Manufacturing Engineering with minimum 55% marks
MIMM08		Knowledge Management & System Dynamics	PG in Management with minimum 55% marks.

28. 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 qualifying degree.

Code	Department	Fields of specialization
MNEE01	Electrical Engg.	Control Systems and Mathematical Modeling, Model Reduction Techniques, Fuzzy Logic, Neural Networks and Applications, Power Systems, EHV AC/DC Transmission Systems, Power Electronics and Electric Drives, Static VAR Systems, Instrumentation Systems Including Bio-medical Instrumentation.
MNEC01	Electronics Engg.	Data Communication and Networking, Optical Communication, Digital Signal Processing, Image Processing, Mobile and ATM Networks, Analog and Digital Circuits.
MNME01	Mechanical Engineering	Thermal Sciences (Heat Transfer, Energy Conversion, Refrigeration and Air-conditioning), Turbomachines, CAD/CAM/FMS, Fracture Mechanics, Metal Cutting./Forming, Noise, Robotics, Industrial Engg.

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

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-Masters Degree in
CLCE01	Civil Engineering	Structural Engineering;	Structural Engineering.
		Offshore Structures	Offshore Structures / Structural Engineering / Ocean Engineering / Coastal Engineering
		Traffic & Transportation Planning.	Transportation Engg./Highway Engineering/Traffic & Transportation Planning/Urban Engg.
		Geotechnical Engg.	Geotechnical Engg. / Environmental Geotechnology
		Water Resources Engg.,	Water Resources Engg./ Environmental Geotechnology
		Environmental Engineering	Environmental Engg./ Environmental Geotechnology
		Building Sciences	Building Technology/Construction Engineering/Construction and Management/Structural Engineering
		Town Planning.	Town Planning /Urban Design/Architecture
CLEE01	Electrical Engineering	Instrumentation and Control Systems	Electrical Engg./ Power Systems / Energy Systems / Energetic / Industrial Power / Industrial Power & Automation / Power Electronics / Control Systems / Instrumentation and Control Systems / Instrumentation Engg / Applied Electronics and Instrumentation / Biomedical Engineering / Computer Controlled Industrial Power
		Power and Energy Systems	
		Power Electronics & Industrial Drives	
		Biomedical Instrumentation and Signal Processing	
CLEC01	Electronics and Communication Engineering	Communication & Networking Signal Processing Micro electronics & VLSI	Electronics / Electronics Design & Technology / Electrical Communication / Microelectronics & VLSI Design / Electronics & Communication / Telecommunication / Signal Processing Computer Science & Engg. / Electronics & Instrumentation/ Electrical Engineering.
CLME01	Mechanical Engineering	Industrial Engineering and Management	Industrial Engg. and Management / Industrial Engg./ Industrial Engineering and Operations Research / Manufacturing Technology / Production Engineering
		Thermal Sciences	Thermal Sciences/Energy Engg. / Energy Engg. & Mgt.
		Manufacturing Technology	Manufacturing Technology/Production Engg.
		Energy Management	Thermal Sciences/Energy Engineering/Energy Engg & Mgmt
		Materials Science and Technology	Materials Science and Technology/ Manufacturing Technology / Production Engineering
		Mechanical Design	Mechanical Systems Design / Machine Design / Machine Dynamics

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

The relaxation is given for SC/ST candidates in the pre-qualifying degree (post graduate degree) marks/CGPA required for Ph.D. programs. They need to have a minimum of 50% marks or CGPA of 5.0 as against 55% marks and CGPA of 5.5 for general candidates.

Code	Department	Fields of specialization	Minimum Qualification
SKAM01	Applied Mechanics and Hydraulics	Marine structures/Coastal Engineering/Ocean Engineering.	Master's degree in Civil/ Marine/ Structures/ Ocean/ Offshore/ Coastal Geotechnical/ Soil Mechanics/ Structural/ Hydraulics/ Environmental/ Applied Mechanics/ Remote Sensing/GIS/ Geo-informatics.
SKAM02		Hydraulics Engineering /Water Resources Engg.	Master's degree in Civil/ Hydraulics /Water Resources/ Aerospace/ Agricultural/ Ocean/ Environmental/ Coastal Engg./ Remote Sensing/GIS.
SKAM03		Remote Sensing & GIS	Master's degree in Civil/ Hydraulics /Water Resources/ Aerospace/ Agricultural/ Ocean/ Environmental/ Coastal Engg./ Remote Sensing/GIS.
SKCE01	Civil Engineering	Mechanics of Fibre Reinforced Composite Laminates; (Structural Engg.) Mathematical Modeling: Application of Analytical and Numerical Methods for Stress, Thermal, Thermo-Mechanical, Free Vibration and Stability Analysis of Laminated Composite and Sandwich Structures; Non-linear FEM Analysis: Study of Spatial Structures, Bridges, Structural Optimization, Soil-structure Interaction, Structural Dynamics.	Master's Degree with first class or minimum 55% marks (50% for SC/ST) (or equivalent grade point average) M.E./M.Tech./M.Sc. (Engg.) in Structural Engineering or related areas of any recognized Indian Universities.
SKCE02		Soil Engineering, Soil Behaviour, Soil/Ground Improvement Techniques, Earth Pressures, Anchors, Pile Foundations, Stability of Slopes, Environmental Geotechnics, Soil Dynamics, Rock Mechanics, Blasting (using both Experimental and Analytical Approaches such as FEM).	Master's Degree with first class or minimum 55% marks (or equivalent grade point average). M.E./M.Tech./M.Sc. (Engg.) in Geotechnical Engg. (Soil Mechanics and foundation Engg.) or any other related fields such as structural Engg., Mining Engg., Environmental Engg., Transportation Engg., Construction Engg., Coastal Engg., Soil Physics and Soil Chemistry from any recognized Indian Universities.
SKCE03		Transportation Engg., Earthquake Engineering, Environmental Engg.	Master's Degree with first class or minimum 55% marks (50% for SC/ST) (or equivalent grade point average) M.E./M.Tech./M.Sc. (Engg.) in the relevant Civil Engineering disciplines or related areas of any recognized Indian Universities.
SKCH01	Chemical Engineering	Process Development, Particulate System, Biotechnology, Environmental Engg., Transfer Operations, Industrial Biotechnology	Master's Degree in Chemical Engg. / Biotechnology / Micro-biology / Biochemistry (with a CGPA of at least 5.5 in the 0-10 scale grading system or not less than 55% marks in the aggregate. In the case of SC/ST candidates these shall be a CGPA of 5.0 or 50% marks in qualifying examination – Master's Degree including Master's degree by Research from a recognized University)
SKCS01	Computer Engineering	Software Engg., Communication Network, Distributed Computing, Work flow software, Grid computing, Autonomic computing, Data Mining, Data warehouse, Security of Information, Bio-informatics, Bio-informatics	M.E. / M.Tech / M.Sc. (Engg.) in Comp / IT / E & C / Software Engg. / Networks, with B. E. / B. Tech. / B. Sc. (Engg.) in Comp./ E&C/IT/E&E (with a CGPA of at least 5.5 in the 0-10 scale grading system or not less than 55% marks in the aggregate. In the case of SC/ST candidates these shall be a CGPA of 5.0 or 50% marks in qualifying examination – Master's Degree including Master's degree by Research from a recognized University)

Code	Department	Fields of specialization	Minimum Qualification
SKEC01	Electronics and Communication Engineering	Communication/VLSI Design / Signal Processing	Master's Degree in Engineering / Technology or Masters Degree by Research in Engineering / Technology in the field of specialization (with a CGPA of at least 5.5 in the 0-10 scale grading system or not less than 55% marks in the aggregate. In the case of SC/ST candidates these shall be a CGPA of 5.0 or 50% marks in qualifying examination – Master's Degree including Master's degree by Research from a recognized University)
SKEE01	Electrical and Electronics Engineering	Energy Systems, Power Electronics & Drives, High Voltage Engg., Power Systems, Control systems, Instrumentation Engg.	Master's Degree in Electrical Engineering (with a CGPA of atleast 5.5 in the 0-10 scale grading system or not less than 55% marks in the aggregate. In the case of SC/ST candidates these shall be a CGPA of 5.0 or 50% marks in qualifying examination – Master's Degree including Master's degree by Research from a recognized University)
SKHS01	Humanities	Management, Economics, English (Comparative literature) and related disciplines	Master's Degree (with a CGPA of atleast 5.5 in the 0-10 scale grading system or not less than 55% marks in the aggregate. In the case of SC/ST candidates these shall be a CGPA of 5.0 or 50% marks in qualifying examination from recognized University)
SKME01	Mechanical Engineering	Alternative Fuels, Heat Transfer, Advanced Manufacturing , Mecha-tronics, IC Engine, Refrigeration and Air conditioning, Fluid Dynamics, Fracture Mechanics and Fatigue, Machine Dynamics and Vibration, Advance Materials, MEMS, Robotics and Control, Stress Analysis, FEM, Renewable Energy, Tribology	M.E./M.Tech./M.Sc. (Eng.) in the relevant field (with a CGPA of at least 5.5 in the 0-10 scale grading system or not less than 55% marks in the aggregate. In the case of SC/ST candidates these shall be a CGPA of 5.0 or 50% marks in qualifying examination – Master's Degree including Master's degree by Research from a recognized University)
SKMI01	Mining Engineering	Rock Mechanics and Ground Control, Drilling and Blasting, Mine Planning, Environmental Management	Master's degree in Mining Engineering or other related fields such as Geotechnical Engg., Remote Sensing/GIS, Geo-informatics, Applied Geology and Geophysics or related areas (with a CGPA of atleast 5.5 in the 0-10 scale grading system or not less than 55% marks in the aggregate. In the case of SC/ST candidates these shall be a CGPA of 5.0 or 50% marks in qualifying examination – Master's Degree including Master's degree by Research from a recognized University)
SKMT01	Metallurgical and Materials Engineering	Mechanical processes, Chemical processes and materials, Physical Metallurgy, Extractive Metallurgy, Foundry, Welding, Metal Forming, Corrosion, Powder Metallurgy and Transport Phenomena	M.E./M.Tech./M.Sc. (Engg.) in the relevant field (with a CGPA of at least 5.5 in the 0-10 scale grading system or not less than 55% marks in the aggregate. In the case of SC/ST candidates these shall be a CGPA of 5.0 or 50% marks in qualifying examination – Master's Degree including Master's degree by Research from a recognized University)

31. National Institute of Technology Rourkela, Rourkela 769008 – 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. 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.
RKCH01	Chemical Engineering	Chemical Engineering	--do--
RKEC01	Electronics and Communication Engineering	Telematics & Signal Processing	--do--
RKEC02		VLSI Design & Embedded System	
RKEE01	Electrical Engineering	Power Control & Drives	--do--
RKME01	Mechanical Engineering	Experimental Stress Analysis	M.E./M.Tech in Mechanical Engg. 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 and Materials Engineering	Metallurgy & Materials Engineering.	M.E./M.Tech. in Material Engg./ Sc or Met. Engg. or Mech. Engg. or Chem. Engg. or Ceramic Engg. 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.

32. National Institute of Technology, Tiruchirappali- 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.	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 Engg., Welding Engg., Process Modeling, and Fracture Mechanics	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.
TRPE01	Production Engineering	Metal Forming, Intelligent Manufacturing, Project Management, Modeling and Simulation, Robotics, CNC Machining, Cellular Manufacturing, Finite Element Analysis, Production Management, Tolerance Technology, Composite Material Processing and Quality Engineering.	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.

33 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	Fluidization/Modeling & Simulation/Heat Transfer and Two-Phase Flow/ Biochemical Engineering/Non-Linear Control.	Master's degree in Chemical Engg. or its equivalent.
WRCE01	Civil Engineering	Geotechnical Engineering.	Master's degree in Geo-technical Engg./ Soil Mechanics or equivalent.
		Engineering Structures.	Master degree in Structural Engg. or equivalent.
		Transportation Engineering.	Master degree in Transportation Engg./ Highway Engg. or equivalent.
		Water Resources & Environmental Engineering.	Masters degree in Water Resource Engg./ Environmental Engg. or equivalent.
WRME01	Mechanical Engineering	Thermal Engineering / Manufacturing Engg./Design Engineering.	Master's degree in Mechanical Engineering in the concerned specialization.
WRMH01	Mathematics and Humanities	Fluid Mechanics / Numerical Analysis.	M.Sc./ M.A. in Applied Mathematics/Mathematics.

34. PSG College of Technology, Coimbatore 641004 -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, <i>Casting, Welding, Injection Moulding, 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</i> , Pneumatics, Manufacturing, Instrumentation, DFMA, TPM, Tribology, <i>Ergonomics</i> & Industrial Design, Refrigeration & Air Conditioning, Nano Technology.	A Master's degree in Mechanical Engineering/ Production Engineering
PSPE01	Production Engineering	CAD/CAM, Laser Material Processing, Fluid Power Control and Automation, Industrial Engineering, Value Engineering, Systems Engineering, Total Quality Management, Agile Manufacturing, Innovative Management, Metal Forming, Concurrent Engineering, Manufacturing Systems Analysis, Virtual Manufacturing, <i>Lean Manufacturing, Precision Manufacturing, Product Data Management, Product Life Cycle Management, Product Development, Metal Casting, Injection Moulding, Tool Design (Jigs & Fixtures), Welding.</i>	A Master's degree in Mechanical Engineering/ Production Engineering.

35. Smart Ashok Technological Institute, Vidisha – SV

Code	Department	Fields of specialization	Minimum Qualification
SVCE01	Civil Engineering		
SVCS01	Computer Science & Engineering		
SVIT01	Information Technology		
SVEE01	Electrical Engineering		
SVME 01	Mechanical Engineering		

36. Shri G.S. Institute of Technology & Science, Indore 452003 -GS

Code	Department	Fields of specialization
GSCCE01	Civil Engineering	Structural Engg., Transportation Engg., Environmental Engg., Water Resource Engg., Geotechnical Engg., Remote Sensing
GSEEE01	Electrical Engineering	
GSECE01	Electronics & Communication Engineering	
GSCSE01	Computer Science & Engineering	
GSME01	Mechanical Engineering	
GSIP01	Industrial & Production Engineering	

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

Code	Department	Fields of specialization
SGECE01	Electronics & Communication Engineering	
SGICE01	Instrumentation & Control	
SGPE01	Production Engineering	
SGCE01	Civil Engineering	
SGME01	Mechanical Engineering	

38. The National Institute of Engineering, Mysore 570 008 - NM

Code	Department	Fields of specialization
NMCE01	Civil Engineering	
NMEE01	Electrical Engineering	
NMIE01	Industrial Engineering	
NMPR01	Production	
NMCS01	Computer Science & Engineering	
NMIT01	Information Technology	

39. Thiagarajar College of Engineering, Madurai 625 015 - TM

Code	Department	Fields of specialization
TMCE01	Civil Engineering	
TMEE01	Electrical Engineering	
TMME01	Mechanical Engineering	
TMEC01	Electronics & Communication Engineering	
TMCS01	Computer Science & Engineering	

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

Code	Department	Fields of specialization	Minimum Qualification
UVCE01	Civil Engineering	Structural Engg., Geotechnical Engg., Environmental Engg., Construction Technology; Highway Engineering, Water Resources Engg., Pre-stressed Concrete.	A master degree in Civil Engineering or any of the branches of Civil Engineering or equivalent fields with minimum 60% marks.

41. Veer Surendra Sai University of Technology, Burla - VB

Code	Department	Fields of specialization
VBCE01	Civil Engineering	
VBEE01	Electrical Engineering	
VBEC01	Electronics & Communication Engineering	
VBME01	Mechanical Engineering	
VBPE01	Production Engineering	

42. 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	First Class Master' degree in Electrical Engineering (Power Systems / Power Electronics / Electric Drives / Control and Instrumentation)
VRMT01	Metallurgical Engineering	<ol style="list-style-type: none"> 1. Alloy Development 2. Corrosion & High temperature oxidation 3. Development of: <ol style="list-style-type: none"> 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. Welding metallurgy 	M.Tech./ M.E. (Metallurgical Engg. OR Materials Science & Engineering OR Mechanical Engineering OR Polymer Engineering)

43. Walchand College of Engineering, Sangli 416 415 - WS

Code	Department	Fields of specialization
WSCE01	Civil Engineering	
WSME01	Mechanical Engineering	
WSEE01	Electrical Engineering	
WSEC01	Electronics & Communication Engineering	
WSCS01	Computer Science & Engineering	

QUALITY IMPROVEMENT PROGRAMME

Application for Advance Admission to Ph.D. Degree Programme 2011-2012

Copy to Principal Coordinator

Specimen Application and NOT to be used for filling application		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:
15. Physically Disabled	:	Yes/No
16. UG Degree	:	
Year	:	University :
Class/Division	:	Overall Percentage/CGPA :
17. UG Degree	:	
Year	:	University :
Class/Division	:	Overall Percentage/CGPA :
18. Teaching Experience as on September 30, 2010 (Thursday)	:	
19. Industrial / Research Experience as on September 30, 2010 (Thursday):		
20. Number of QIP/ISTE/AICTE/IMPACT Courses Attended		
a) 4 to 8 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 Specialisation	
		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	Specialisation	Class	Marks Obtained	Percentage	GPA

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

Semester/Year	University	Year	Specialisation	Class	Marks Obtained	Percentage	GPA

25. Any other Qualification

Degree	University	Year	Specialisation	Class	Marks Obtained	Percentage	GPA

26. Teaching Experience at Degree Level as on September 30, 2010 (Thursday)

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

27. Industrial/Research Experience as on September 30, 2010 (Thursday)

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

28. Short Term Courses

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 information given by me in this application form is 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 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.
- c. I shall abide by the rules and regulations of the Institutions to which I will be offered admission, if selected.
- d. 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.
- e. I understand the contents of this form and, particularly, this declaration being made here.

Place:
Date :

Signature of the Applicant

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 (Not applicable, if the candidate belongs to a National Institute of Technology (NIT) or National Institute of Technical Teacher's Training & Research (NITTTR))

- 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, 2010 (Thursday)** 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)

Date:

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.