INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

Information Brochure
M.Tech. /M.Tech.+Ph.D.(Dual Degree)
Admissions 2019-20

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I. Important Guidelines for M.Tech. Application

1 Please read the instructions given in the brochure carefully before filling up the application form.

2 **Online** Application Form & Information Brochure (including the admission schedule along with the important dates) is available on the Institute website http://www.iitb.ac.in/newacadhome/mtech.jsp You are required to submit the application **ONLINE**. No Downloadable Forms will be available. After filling the form, you are advised to take a print of your application and keep the same for the record.

3 The application fee is as follows,

Women candidates	: Rs. 150/-
SC/ST/PwD category candidates	: Rs. 150/-
All other candidates	: Rs. 300/-

The fee is to be paid by SBI Internet Banking/ Online Payment System and you do not have to submit the hard copy of the application. **Applications without online payment details will not be considered.**

APPLICATION FEE IS NON-REFUNDABLE.

4 Please refer to the Institute website http://www.iitb.ac.in/newacadhome/mtech.jsp for filling ONLINE application form.

5 Please note that you can submit only ONE application.

6 You can apply for more than one programme and can select up to 10 preferences. If a discipline has multiple specialization, each specialization is counted as one option.

7 OBC candidates may note that the limit of annual income is Rs. 8 lakhs for determining the creamy layer among Other Backward Classes (OBCs) candidates.

The OBC-NC certificate issued for the financial year 2019-20 by the Competent Authority in the prescribed format must be uploaded in the ONLINE application form and submitted at the time of admission.

The OBC reservation update Information is available in the public domain http:// www.iitb.ac.in/newacadhome/mtech.jsp under OBC Reservation Update.

8 Economically Weaker Sections(EWS) candidates may note that the limit of annual income is Rs. 8 lakhs for determining the eligibility for benefit under Economically Weaker Sections(EWS) reservation.

The EWS certificate issued by the Competent Authority in the prescribed format must be uploaded in the ONLINE application form and submitted at the time of admission.

The EWS reservation update Information is available in the public domain http:// www.iitb.ac.in/newacadhome/mtech.jsp under EWS Reservation Update.

9. PwD candidates will be given extra time, as per GOI rules on request by the candidate. Such requests need to be addressed to Head of the concerned academic units through email/hard copy well in advance.

10. Requirement of First Class/60% for PG admission at IIT Bombay :
As given under A.7.3. "ELIGIBILITY FOR M.TECH./M.TECH.+Ph.D.(DUAL DEGREE) PROGRAMMES".

11 You MUST upload the following while submitting the M.Tech. Application.

- Scanned version of photograph
- Scanned version of signature
- Marksheet of the last semester/ Consolidated marksheet of the qualifying degree. (Exam pending/result awaited candidates have to upload their latest/previous semester marksheet).
- Caste Certificate (OBC-NC/SC/ST), if applicable. An affidavit for having applied in case the certificate is not yet received.

- PwD Certificate, if applicable
- Statement of Purpose, if applicable

11 You should check the Institute website http://www.iitb.ac.in/newacadhome/mtech.jsp for results/ important announcements.

12 You should check emails sent to the email address provided in your application, for all important communications and announcements.

13 Candidates called for written test/interview should bring with them (i) Photo ID Card (ii) Hard copy of the application submitted online (iii)/Final year thesis / dissertation / report / publication / copy of certificates / Marksheets.

14 Candidates having degree from foreign universities should submit equivalence certificate from Association of Indian Universities (AIU), New Delhi for qualifying Exam and proof of having First class or 60% (55% for SC/ST) marks or equivalent in qualifying examination.

15 Seats are reserved for Economically Weaker Sections(EWS)/ Other Backward Class Non-Creamy Layer (OBC-NCL)/ Scheduled Caste (SC)/ Scheduled Tribe (ST) and Person with Benchmark Disability (PwD) Categories , as per Government of India rules.

16 Read the Frequently Asked Questions (FAQ) given on Institute website http://www.iitb.ac.in/newacadhome/toadmission.jsp for more details.

17 Contact Details for
- M.Tech./M.Tech. + Ph.D. (Dual Degree) - pgadm@iitb.ac.in
- Ph.D. - phd_unit5@iitb.ac.in

18 Students must submit self-attested copies of his/her qualifying degree certificate & final transcripts on or before **30th September, 2019**, failing which admission will stand cancelled.

Candidates need to apply ONLINE only.

SCHEDULE **II. IMPORTANT DATES : TENTATIVE** SCHEDULE FOR ADMISSION TO M.TECH. PROGRAMME 2019-20 **{AUTUMN SEMESTER}**

No	Particulars	Dates
01	Last date to convey the minimum qualifying GATE score/ Qualifying Discipline GATE score to be "eligible" for applying at IIT Bombay and Direct Admission by concerned academic units to the Academic Office.(The candidates above this GATE score will ONLY be able to apply ONLINE)	February 14, 2019
02	Last Date to convey the minimum qualifying GATE score for cut-off and No. of students to be called for Written Test/Interview to GN/EWS candidates by concerned academic units to the Academic Office.	February 14, 2019
03	Advertisement (in all leading Newspapers and on IIT website)	March 17, 2019
04	Beginning of Online application forms mode	March 20, 2019
05	Last date for submission of completed application forms	April 16, 2019
06	Direct Admission Offers	
	(AE, CH,CS,EE,MM, ME, MMM & SC on the basis of GATE score only for TA category (No Written Test and/ or Interview for GN/EWS, SC,ST, OBC-NC & PwD candidates)	**Result Announcement** / **Last date for payment of fees**
		(as per COAP schedule)
	1st offer	May 14, 2019 to May 16, 2019
	2nd offer	May 24, 2019 to May 26, 2019
	3rd offer	June 03, 2019 to June 05, 2019
	4th offer	June 13, 2019 to June 15, 2019
	5th offer	June 23, 2019 to June 25, 2019
	6th offer	July 3, 2019 to July 4, 2019
	7th offer	July 10, 2019 to July 11, 2019
07	To display the list for candidates called for TA/TAP/RA/RAP/PS/IS/SW for written test and or/interview schedule/details.	April 22, 2019

08. **Dates for the Written Test and or Interview for all categories(i.e TA/ TAP/FA/RA/RAP/PS/IS/SW)**

Programme	**Teaching Assistantship (TA)/ Teaching Assistantship Through Project (TAP)**	**Research Assistantship (RA)/ Research Assistantship Through Project (RAP)/ Fellowship Awardee (FA)**	**Project Staff (PS)/ Institute Staff (IS)/ Sponsored (SW)/ IIT B.Tech. category**
Aerospace Engineering (AE1,AE2, AE3, AE4)	Direct admission	--	May 14, 2019 (Only Interview)
Bioscience & Bioengineering (BM)	May 14 & 15, 2019 (Written Test and/ Interview)	May 14 & 15, 2019 (Written Test and/ Interview)	May 14 & 15, 2019 (Written Test and/ Interview)
Chemical Engineering (CH) (Direct admission)	Direct admission	May 16 & 17, 2019 (Written Test and/or Interview)	May 16 & 17, 2019 (Written Test and/or Interview)
Civil Engineering	May 14 & 15 , 2019 (Written Test and/or Interview)	May 14 & 15 , 2019 (Written Test and/or Interview)	May 14 & 15 , 2019 (Written Test and/or Interview)
Candidates having clash with the dates mentioned on account of qualifying degree related university			

examination may appear for written test/interview on Sunday the 19th May, 2019 at Civil Engg. Deptt.			
Computer Science & Engineering (CS)	Direct admission	May 17, 2019 (Written Test / Interview)	May 17, 2019 (Written Test/ Interview)
Earth Sciences(GS,PG)	May 16 & 17, 2019 (Interview)		May 16 & 17, 2019 (Interview)
Electrical Engineering (EE1,EE2,EE3,,EE5,EE6,EE7)	Direct admission	June 11, 2019 (Written Test) June 12 & 13, 2019 (Interview)	June 11, 2019 (Written Test) June 12 & 13, 2019 (Interview)
Energy Systems Engineering (EN)	May 13 & 14, 2019 (Written Test and/or Interview)	May 13 & 14, 2019 (Written Test and/or Interview)	May 13 & 14, 2019 (Written Test and/or Interview)
Environmental Science & Engineering (EV)	May 14 & 15, 2019 (interview only)	May 14 & 15, 2019 (interview only)	May 14 & 15, 2019 (interview only)
Geoinformatics & Natural Resources Engineering (GNR)	May 15 & 16, 2019 (Written Test and/or Interview)	--	May 15 & 16, 2019 (Written Test and/or Interview)
Industrial Engineering & Operations Research (IO)	May 14 & 15 2019 (Written Test and/or Interview)	May 14 & 15 2019 (Written Test and/or Interview)	May 14 & 15, 2019 (Written Test and/ or Interview)
Mechanical Engineering (ME1, ME2, ME3)	Direct Admission	July 16, 2019 TA/RA -(Through SPOT Admission on the basis of Gate Score) RAP-(Through SPOT Admission on the basis of Gate Score & Written Test / Interview)	April 27, 2019 (Written Test)for (SW/PS/IS/IB) ---------- May 11, 2019 (Written Test and/or Interview) (This is only for the candidates of INS Shivaji Sponsored (SW))
Metallurgical Engineering and Materials Science (MM1,MM2,MM3,MM4)	Direct admission	-	May 7, 2019 (Written Test and/or Interview
Materials,Manufacturing and Modeling (MMM)	Direct admission	--	May 7, 2019 (Written Test and/or Interview) (This includes for the candidates of Bharat Forge Ltd. (BFL) (SW/PS)
Systems & Control Engineering	Direct admission	--	May 14, 2019 (Written Test)
Technology & Development (TD)	May 14, 2019 (Written Test) May 15 & 16, 2019 (Interviews)	--	May 14, 2019 (Written Test) May 15 & 16, 2019 (Interviews)
Educational Technology (ET)	May 15, 2019 (Written and /Interview)	May 15, 2019 (Written and /Interview)	May 15, 2019 (Written and /Interview)
09 Date for receipt of recommendations from Heads of Dept/ School/ Centre/ ID groups			May 22, 2019
10 **Declaration of Result for Test/Interview ***			
A) for TA/RA category	**Offers**	**Result**	**Last date for**

		Announcement	**payment of fees**
	1st offer	May 24, 2019 to May 26, 2019	
	2nd offer	June 03, 2019 to June 05, 2019	
	3rd offer	June 13, 2019 to June 15, 2019	
	4th offer	June 23, 2019 to June 25, 2019	
	5th offer	July 3, 2019 to July 4, 2019	
	6th offer	July 10, 2019 to July 11, 2019	
B) for IS/PS/SW category	**Offers**	**Result Announcement**	**Last date for payment of fees**
	1st offer	May 28, 2019	June 3, 2019
	2nd offer (if required)	June 11, 2019	June 17, 2019
	3rd offer (if required)	June 21, 2019	June 25 , 2019
	4th offer (if required)	July 3, 2019	July 8, 2019
ONLY SPOT Admissions (If required), to be conducted in July			
11 Spot admissions (if required) for TA category only			
Mechanical Engineering (TA/RA)*** *** Please refer the ME Department & academic admission website for more details. Note : 1) No admission to specialization Nuclear Engineering (ME4) for the year 2019-20 2) The result of RA positions in ME1,ME2, ME3 will be declared after the conduct of spot admission.			July 16, 2019
Civil Engineering, Electrical Engineering, Earth Sciences.			July 17, 2019
Energy Systems Engineering, Geoinformatics & Natural Resources Engineering, Industrial Engineering & Operations Research, Metallurgical Engineering and Materials Science, MMM,Systems & Control Engineering,			July 18, 2019
Aerospace Engineering, Chemical Engineering, Computer Science & Engg., Technology & Development, Educational Technology.			July 19, 2019
12 Orientation and Registration Programme			July 22 to July 24, 2019
13 Instruction begins			July 29, 2019

AE, CH, EE, CS, ME, MM, MMM & SC - These academic units offer Direct Admissions on the basis of GATE score ONLY (No written test and/or interview) (For admission to TA/TAP category)

* The Written Test and/or Interview for M.Tech.+Ph.D. (Dual Degree) Programme will be communicated by Academic Office separately on IIT website: http://www.iitb.ac.in/newacadhome/mtech.jsp.

The results will be be uploaded/declared on the Common Offer Acceptance Portal (COAP). Candidates needs to login on COAP http://coap.iitm.ac.in to see offers and choose one of the option given.

The result of **written test and or interview for RA/RAP/ SW/IS/PS/IIT B.Tech. category** will be declared on IIT website: http://www.iitb.ac.in/newacadhome/mtech.jsp.

A) GENERAL

A.1) THE INSTITUTE

The Indian Institute of Technology Bombay (IIT Bombay) is one of the higher Institutes of Technology in the country set up with the objectives of making available facilities for higher education, research and training in various fields of Science and Technology. It was established in 1958.

The Institute is located at Powai in a campus extending over 220 hectares amidst picturesque surroundings with Vihar and Powai lakes on either side.

At present, Undergraduate (B.Tech.), Postgraduate (M.Tech.) and Doctoral (Ph.D.) programmes are offered by the Departments Aerospace Engineering, Chemical Engineering, Civil Engineering, Computer Science and Engineering, Earth Sciences, Energy Science & Engineering, Electrical Engineering, Mechanical Engineering and Metallurgical Engineering and Materials Science. Interdisciplinary groups in Industrial Engineering & Operations Research and Systems and Control Engineering offer M.Tech. and Ph.D. Programmes. A Ph.D. Programme in Climate Studies is offered by the corresponding group.

The Industrial Design Centre of the Institute offers a 2-year M.Des. Programme in Industrial Design, Visual Communication, Animation, Interaction Design, Mobility and Vehicle Design and a Ph.D. Programme in Design. M.Sc. and Ph.D. programmes in Applied Geology and Applied Geophysics, Chemistry, Mathematics, Physics, M.Sc. Programme in Applied Statistics and Informatics are offered by the respective Departments. The Department of Physics also offers a 4-year B.Tech. Programme in Engineering Physics. The Humanities and Social Sciences Department offers doctoral programmes and a 2-year M.Phil programme. The Centre of Studies in Resources Engineering (CSRE) offers a 2-year M.Tech. Programme in Geoinformatics & Natural Resources Engineering and doctoral programmes. The Departments of Physics, Energy Science and Engineering, Centre for Environmental Science and Engineering are also offering M.Sc. - Ph.D Dual degree programmes and their admissions are through JAM. The Institute offers M.Tech. in Technology and Development offered by CTARA and also offers a doctoral programme, Ph.D in Nano Technology - offered by CRNTS. The Institute offers Cross- Departmental M.Tech programme in Materials, Manufacturing & Modelling (MMM) offered by Mechanical Engineering, Met. Engineering & Mat. Sci. & Mathematics. The Shailesh J. Mehta, School of Management offers a 2-year Master of Management programme, doctoral programme and Executive Master of Business Administration (EMBA) in collaboration with Washington University in St. Louis. The Department of Biosciences and Bioengineering offers M.Sc. and Ph.D. programmes in Biotechnology, M.Tech. and Ph.D. programmes in Biomedical Engineering and M.Sc.-Ph.D. Dual Degree Programme in Biotechnology. The Centre for Urban Science & Engineering (C-USE) offers Ph.D. Programme in Urban Science & Engineering. The Institute also has PG Dual Degree Programmes (M.Tech. + Ph.D.) in several disciplines. New Ph.D. Programme in Policy Studies has been introduced from the year 2017. New M.Tech. Programme in Interdisciplinary Programme in Educational Technology (ET), Master in Urban Design Engineering offer by Centre for Urban Science & Engineering (CUSE) and Master in Public Policy (MPP) offer by Centre for Policy Studies (CPS) has been introduced from the year 2019.

The Institute on an average admits 1314 candidates for the Undergraduate programmes and 1569 candidates for different Postgraduate and Doctoral programmes every year. Students from Bangladesh, Egypt, Ethiopia, Fiji, Iran, Iraq, Pakistan, Jordan, Mauritius, Malaysia, Nepal, Palestine, Sri Lanka, Vietnam and Yemen are also undergoing training in various programmes. In addition to these academic programmes, the Continuing Education Programme (CEP) organizes short, intensive courses in specialized topics both for practicing engineers as well as for teachers from engineering colleges; and also conducts seminar and conferences on current scientific and technological developments. Further, teachers from various engineering colleges also join Institute for the postgraduate and doctoral programmes. under Quality Improvement Programme (QIP).

A.2) RESEARCH FACILITIES

All the departments, centres, schools and interdisciplinary groups of the Institute have well equipped research laboratories and workshop facilities. In addition, there are a number of central facilities, which include Computer Centre, Central Library and Central Workshop. The Central Library has a very large collection of books, back volumes of periodicals, standard specifications and other literature. The Library now has more than 3 lakhs books and volumes and subscribes to over 1500 current journals in Science,

Engineering, Humanities and Social Sciences. The Computer Centre of IIT Bombay provides high-end networked computing facilities.
The Institute has many research collaborations with leading universities in USA, Europe, Japan, and other East Asian countries. As part of these collaborations, the post graduate students get opportunities to carry out joint research projects with faculty and students from these universities.

The location of IIT Bombay, in close proximity to several leading R&D Centers and major industrial establishments, offers excellent opportunities to interact with them and plan some research programmes in collaboration with them. The Industrial Research and Consultancy Centre (IRCC) coordinates collaborative projects with industry and other research organizations such as BARC, TIFR and CSIR. The Institute is actively collaborating with several organizations of other countries on a bilateral basis.

A.3) STUDENTS AMENITIES

The Institute is fully residential and has 16 hostels for students. Each hostel is an independent entity with its own mess facilities, recreation areas, etc. However students may be permitted to have their own arrangements for accommodation outside campus. Some flatlets are available for married research scholars.

Extra-curricular activities are provided by the Students' Gymkhana. These activities include Sports, Cultural programmes and Social Service. Various clubs of the Gymkhana encourage individual talents of students in hobbies such as painting, modeling, music, photography, aeromodelling and fabrication of electronic devices. A swimming pool is an additional facility. A well-planned Student Activities Centre (SAC) routinely organizes several vibrant extra curricular events.

A.4) M.TECH. PROGRAMME

The Institute offers Master of Technology programmes in various disciplines. The aim of the programme is to train the students in deeper theoretical knowledge which will enable them to tackle practical complex problems of design and development in industrial fields, as well as pursue further academic achievements through research. For fulfilling this aim, the programme structure provides sufficient flexibility in coursework and thesis project.

The Institute offers a full-time programme of 2-year and a part-time programme of 3-year duration. Students are admitted to the full-time programme under the categories of Teaching Assistantship (TA), Teaching Assistantship through Project (TAP), Fellowship Award (FA), and Sponsored (SW). The part-time programme is available to the students admitted under the categories of Sponsored (SW), Institute Research Assistantship (RA), Research Assistantship through Project (RAP), Project Staff (PS) and Institute Staff (IS). PS and IS categories are only for persons employed at IIT Bombay. The working hours for the full-time and part-time programmes are the same. The lectures are scheduled in time slots extending from 8.30 a.m. to 8.00 p.m.

ADMISSIONS

Some of the departments and interdisciplinary groups, offer direct admission to a limited number of candidates solely based on higher GATE score. Candidates, who are offered direct admission, have to confirm the admission by paying the fees on the dates mentioned under Important Dates as per schedule of this brochure. However, such candidates have an option of not accepting the direct admission offer in given specialization, but to appear for written test / interview in a discipline of his/her higher preferences.

Seats remaining vacant after Direct Admissions may be filled through written test and/or interview/ spot admissions.

Economically Weaker Sections(EWS) /Other Backward Class Non-Creamy Layer(OBC-NCL)/Scheduled Caste (SC)/ Scheduled Tribe (ST) and Person with Benchmark Disability (PwD) Categories

Seats are reserved for Economically Weaker Sections(EWS)/ Other Backward Class Non-Creamy Layer(OBC-NCL)/Scheduled Caste (SC), Scheduled Tribe (ST) and Person with Benchmark Disability (PwD) categories as per Government of India rules.

Scheduled Caste and Scheduled Tribe candidates are offered direct admission solely based on their GATE Score and their preferences.

Admission for IIT B.Tech. degree holders

Candidate having an B.Tech. Degree from IITs and having a CGPA/CPI score of 8.00 (on 0-10 scale) and above are exempted from requirement of GATE qualification. They may be admitted to M.Tech. Programme under TA/RA positions through written test and/or interview.

A.5) APPLICATION CATEGORIES AND FINANCIAL SUPPORT

The Institute admits M.Tech. candidates under the following categories :

i. Teaching Assistantship (TA)/Teaching Assistantship through Project (TAP)/Fellowship Award (FA)
ii. Research Assistantship (RA)/ Research Assistantship through Project (RAP)
iii. Project Staff (PS), for Project staff of IIT Bombay
iv. Institute Staff (IS), for faculty/staff of IIT Bombay
v. Sponsored candidates (SW)

Admissions under TA, TAP, FA are for 2-year programme while those under RA, RAP, PS are for 3-year programme. Admission under SW category are available for full-time (2-year) as well as part-time (3-year) programmes.

Admissions to all categories are subject to availability of seats. The continuation of the financial support and the registration for the selected programme will be subject to satisfactory performance of the duties assigned by the Academic Unit as well as satisfactory academic performance and fulfillment of the other academic and non-academic requirements, as per rules.

A.5.1) TEACHING ASSISTANTSHIP (TA)

A.5.1.1) Candidates to this category are selected subject to (i) a valid GATE score and (ii) Performance in Test / Interview.

A.5.1.2) As per MHRD directives, a student holding Teaching Assistantship (TA) shall not accept or hold any appointment paid or otherwise or receive any emoluments, salary, stipend from any source during the tenure of the award.

A.5.1.3) The students joining the programme under this category will be considered for Teaching Assistantships (Rs. 12,400/- per month, at present) based on the following norms:

i. Students getting assistantship will be required to assist / work for courses, laboratory, or any other related academic / administrative work to the extent of 8 hours per week as assigned by the concerned Academic Unit.
ii. The assistantship will be available for a maximum period of 24 months and students with TA have to complete the M.Tech. programme in 2 years.
iii. Assistantship will be paid on the basis of monthly attendance.

A.5.1.4) Employees on the rolls (with or without pay) of any organization are <u>not eligible</u> for admission under this category.

A.5.2) TEACHING ASSISTANTSHIP THROUGH PROJECT (TAP)

A.5.2.1) Candidates to this category are selected subject to (i) a valid GATE score and (ii) Performance in Test / Interview.

A.5.2.2) The students joining the programme under this category will be considered for Assistantships based on the following norms:

i. The assistantship holders are required to work in a sponsored R&D project being carried out at the Institute.

ii. They will also do their M. Tech. dissertation work under same faculty group in same area as the sponsored project.
iii. They have to complete M.Tech. programme in 2 years.

A.5.2.3) Only some disciplines/specializations have TAP seats. The candidates do not have to indicate their preference for TAP separately, but as TA/TAP.

A.5.2.4) Employees on the rolls (with or without pay) of any organization are <u>not eligible</u> for admission under this category.

A.5.3) FELLOWSHIP AWARD (FA)

A.5.3.1) Candidates to this category are selected subject to (i) a valid GATE score and (ii) Performance in Test / Interview.

A.5.3.2) Fellowships are available from government agencies such as Aeronautics Research & Development Board (ARDB), Department of Science and Technology (DST), Atomic Energy Regulatory Board (AERB), Department of Atomic Energy (DAE), Maharashtra Pollution Control Board etc. and several other organizations such as Forbes Marshall, Textile Machinery Manufacturers' Association(TMMA), International Energy Initiative, Larsen & Toubro, etc.

A.5.3.3) Only some disciplines/specializations have FA seats. The candidates do not have to indicate their preference for FA separately as the seats are under TA category for admisions.

A.5.3.4) Employees on the rolls (with or without pay) of any organization are not eligible for admission under this category.

A.5.4) RESEARCH ASSISTANTSHIP (RA)

A.5.4.1) Candidates to this category are selected subject to (i) a valid GATE score and (ii) Performance in Test / Interview.

A.5.4.2) The students joining the programme under this category will be considered for Research Assistantships (RA) (Rs. 13,400/- per month, at present) based on the following norms:

i. Research Assistants have to look after the Undergraduate laboratories and also assist in Teaching or Research or other work academic / administrative work to the extent of 20 hours a week as assigned by the Academic Unit.

ii. They have to complete the programme in 3 years.

A.5.4.3) Only some disciplines/specializations have RA seats. The candidates do not have to indicate their preference for RA separately.

A.5.4.4) Employees on the rolls (with or without pay) of any organization are not eligible for admission under this category.

A.5.5) RESEARCH ASSISTANTSHIP THROUGH PROJECT (RAP)

A.5.5.1) Candidates to this category are selected subject to (i) a valid GATE score and (ii) Performance in Test / Interview.

A.5.5.2) The students joining the programme under this category will be considered for Assistantships supported under Sponsored Research Project being carried out at the Institute based on the following norms:

i. Research Assistants have to work in the assigned Sponsored R&D project. They are required to work for about 20 hours a week on the Sponsored Research Project.

ii. They will do their thesis / dissertation in same project area.

iii. They have to complete the programme in 3 years.

A.5.5.3) Only some disciplines/specializations have RAP seats. The candidates do not have to indicate their preference for RAP separately, but as RA/RAP.

A.5.5.4) Employees on the rolls (with or without pay) of any organization are not eligible for admission under this category.

A.5.6) PROJECT STAFF (PS)

This category is only for the persons employed on Sponsored Research Project at IIT Bombay.

A.5.6.1) The candidates to this category are selected subject to (i) having completed 6 months of service in project, (ii) Valid GATE score OR 2-year total experience of which 6 months in the Project of the Institute and (iii) performance in Written Test / Interview.

The option of 2-years of relevant professional experience is not applicable for applying to M.Tech. programme in Computer Science & Engineering.

A.5.6.2) i. The students under this category will continue to work on the sponsored project and carry out the tasks as assigned by the Principal Investigator of the concerned project.
ii. They will select their thesis / dissertation area in consultation with the Principal Investigator of the project.
iii. They have to complete M.Tech. programme in 3 years.

The certificate to be submitted by the selected candidates under Project Staff (PS) category is given in **Appendix-III.**

A.5.7) INSTITUTE STAFF (IS)

This category is only for the persons employed at IIT Bombay as Institute Staff.

A.5.7.1) The candidate should have completed at least ONE year of service at the Institute and should have TWO years of service remaining at the time of application.

The candidates to this category are selected subject to having (i) Valid GATE score OR 2-year total experience, and (iii) performance in Written Test / Interview.

The option of 2-years of relevant professional experience is not applicable for applying to M.Tech. programme in Computer Science & Engineering.

A.5.7.2) The candidate joining the programme are selected subject to following norms:
(i) They have to complete M.Tech. Programme in 3 years (ii) If selected, the permanency or otherwise of the candidate will not come in the way of admission process and (iii) If a candidate has an experience (1 year) of working in the Institute but is not continuing in the same position while pursuing the degree, then he/she may be considered under the 'Self-Financed' category and not under the 'Institute Staff' category.

A.5.8) SPONSORED CANDIDATES (SW)

With a view to encourage persons working in Industries, the Institute admits a limited number of sponsored candidates to the M.Tech. Programme. It is expected that such candidates after successfully completing the programme, are better equipped to work in organizations sponsoring them. The selection criteria for sponsored candidates are as follows:

i. They must be from reputed Industrial Organization /Academic Institutions.
ii. They should have a valid GATE score OR 2-year of relevant professional experience after the qualifying degree. The option of 2-years of relevant professional experience is not applicable for applying to M.Tech. programme in Computer Science & Engineering.
iii. The selection will be on the basis of performance in Written Test/Interview. The written test will be conducted to examine their knowledge in the discipline of their qualifying degree, which forms the prerequisite for admission to the corresponding specialization of the M.Tech. Programme.

Sponsored candidates who are admitted to the programme should have full financial support from the concerned sponsoring agency for the entire duration of the programme. They can complete the programme on full-time (2-year duration) or part-time (3-year duration) basis, depending on the

nature of sponsorship. Sponsored candidates are not eligible for any financial assistance from the Institute.

Sponsorship certificate (With Financial Support) is given in **Appendix-I** and Sponsorship certificate (Without Financial Support) is given in **Appendix-II**.

A.6) FEES AND DEPOSITS

Various fees, deposits and Hostel Rent are listed in **Table A.1**

A.7) ELIGIBILITY FOR M.TECH./M.TECH.+PH.D. (DUAL DEGREE) PROGRAMMES

A.7.1) General Eligibility for M.Tech. Programme in all Academic Units (Departments, Centres, Schools, Interdisciplinary Groups, Cross-Departmental Programmes)

Candidates with First class or 60% (55% marks for SC/ST) marks in B.E./ B.Tech./ B.Sc. (Engineering)/ M.Sc./ M.C.A./ MBBS/ M.Pharm./ B.Pharm.(4 yr. Degree)/ BDS (4 yr. Degree)/ Associate Membership Examinations conducted by recognized professional bodies (like Institution of Engrs. (India), Institute of Chemical Engrs., Aeronautical Society of India, Institute of Electronics & Telecommunication Engrs., Indian Institute of Metals, etc.) and recognized as equivalent to B.E. / B.Tech. Degree.

Eligibility criteria for the different disciplines and specializations, qualifying examinations, GATE (or other Postgraduate Admission Examination) and requirement for admission under different admission categories are given in **Table A.3** of this brochure.

A.7.2) Admission for IIT B.Tech. degree holders

Candidate having an B.Tech. Degree from IITs and having a CGPA/CPI score of 8.00 (on 0-10 scale) and above are exempted from requirement of GATE qualification. They may be admitted to M.Tech. Programme under TA/RA positions through written test and/or interview.

A.7.3) Eligibility Requirement for PG admission at IIT Bombay

The overall institutional requirement for admission to PhD/PG programme of the Institute is meeting ANY ONE of the following criteria :

For GN/EWS/OBC (NC) category

(1) a minimum of 60% marks in aggregate in the qualifying degree.
OR
(2) a First Class as specified by the University.
OR
(3) a minimum Cumulative Grade Point Average (CGPA)/ Cumulative Performance Index (CPI) of 6.0 on the scale of 0-10; or an equivalent to 6.0 on other corresponding proportional requirements when the scales are other than 0-10. in the qualifying degree.

For SC/ST/PwD category

(1) a minimum of 55% marks in aggregate in the qualifying degree.
OR
(2) a minimum Cumulative Grade Point Average (CGPA)/ Cumulative Performance Index CPI) of 5.5 on the scale of 0-10; an equivalent to 5.6 on other corresponding proportional requirements when the scales are other than 0-10. in the qualifying degree.

A.8) GUIDELINES FOR FILLING UP THE APPLICATION FORM

Please refer to the Institute website https://portal.iitb.ac.in/mtechapp/Help.jsp under 'Instructions' for filling ONLINE application form.

A.9) M.Tech. + Ph.D. (Dual Degree) Programme

In addition to M.Tech. Programme, IIT Bombay offers Dual Degree M.Tech.+ Ph.D. Programmes in certain disciplines.

A.9.1) Admission to M.Tech. + Ph.D. (Dual Degree) Programme with Teaching Assistantship (TA)

Some of the disciplines offer admissions to the M.Tech. + Ph.D. (Dual degree) programme. The program is designed to induct bright students who have completed their B.E./B. Tech./M.Sc. degrees directly to the doctoral programme. Key features of this programme are:

- The timelines and key milestones of this programme are aligned with the M. Tech and Ph.D. programmes currently offered.
- The student will be required to complete mandatory coursework in the first three semesters (similar to that of M. Tech programme).
- Successful completion of annual progress seminar/qualifier examination after first year may entitle the student to Assistantship as admissible for a Ph.D. student with Master's qualification after the date of successful examination of Research Proposal, for a maximum of FIVE years from the commencement of the M.Tech. degree.
- On successful completion and examination of the Doctoral Thesis, BOTH the degrees (M.Tech. and Ph.D.) are awarded to the candidate.
- Under exceptional circumstance when a student is unable to complete the requirments of the Ph.D. programme, an exit option with the M.Tech. degree is available subject to completion of required coursework and M.Tech. dissertation.

The interested candidates should apply by filling up the M.Tech. admission form and indicating their interest to be considered for this programme at the appropriate location in the form.

A.9.2) Conversion from M.Tech. Programme to M.Tech. + Ph.D. (Dual Degree) Programme

The Students who are admitted to M.Tech. Programme at IIT Bombay can convert themselves to the Dual Degree (M.Tech.+Ph.D.) Programme after the first stage of evaluation of the Masters' dissertation – with the concurrence of the proposed Doctoral Supervisor and Postgraduate Programme Committee of the concerned academic unit. Successful completion of annual progress seminar/ qualifier examination may entitle the student to enhanced scholarship at Ph.D. Level.

- A student who moves to this Dual Degree Programme is eligible for Assistantship as admissible for a Ph.D student with Master's qualification after the date of successful examination of Research Proposal, for a maximum of FIVE years from the commencement of the M.Tech. Degree.
- On successful completion and examination of the Doctoral Thesis, BOTH the degrees (M.Tech. and Ph.D.) are awarded to the candidate.
- Under exceptional circumstances, when a student is unable to complete the requirements of the Ph.D. Programme, an exit option with the M.Tech. Degree is available at any time after the end of the final semester of the normal M.Tech. Programme, subject to completion of required coursework and M.Tech. dissertation.

A.10) Termination of Studentship

Failure to meet academic performance criterion set by the Institute for the M.Tech. programme will cause termination of studentship.

Table A.1 : Fees, Deposits & Hostel Rent for M.Tech. Students

(subject to revision as per MHRD/BoG decision)

Sr. No.	Particulars	Fees payable (Rs.)			
		GN/EWS/OBC-NC		SC/ST/PD	Institute Staff
		Group I (Concessional Fee)	Group II (Non Concessional Fee)		
A) One time payment at the time of Admission					
	1. Admission fee	2200	2200	2200	2200
	2. Graduation Transcript Fees	500	500	500	500
	3. Medical Examination	400	400	400	00
	4. Provisional Certificate	500	500	500	500
	5. Student Welfare Fund	1000	1000	1000	1000
	6. Modernisation & Upgradation	2500	2500	2500	2500
	7. Identity Card	500	500	500	00
	Total (A)	**7600**	**7600**	**7600**	**6700**
B) Per Semester Fees					
	1. Tuition Fee - **Statutory fees	5000	25000	00	00
	2. Examination Fee	1000	1000	1000	1000
	3. Registration Fee	750	750	750	750
	4. Gymkhana Fee	1750	1750	1750	00
	5. Student Benevolent Fund	500	500	500	500
	6. Medical Fee	1500	1500	1500	00
	* 7. Hostel Rent	2000	2000	2000	00
	* 8. Elect. & Water Charges	3000	3000	3000	00
	* 9. Hostel Establ. Charges	3000	3000	3000	00
	$ * 10. Mess Establ. Charges	1550	1550	1550	00
	11. Student Accident Insurance Fund **(SAIF)**	200	200	200	00
	Total (B)	**20250**	**40250**	**15250**	**2250**
C) Deposits (Refundable) to be paid at the time of Admission					
	1. Institute Security Deposit	1000	1000	1000	00
	2. Library Security Deposit	1000	1000	1000	00
	*3. Mess Security Deposit	1000	1000	1000	00
	Total (C)	**3000**	**3000**	**3000**	**00**
	Total Fees (A+B+C)	**30,850**	**50,850**	**25,850**	**8,950**

** Tuition Fee Likely to be revised

* Students not staying in Hostel are exempted from the payment of Hostel fees.

$ To be increased 10% every year, rounded up in multiple of 50.

Candidates opted for Hostel Accommodation have to submit the Mess Advance of Rs.27,000/- by ONLINE payment/Net Banking as per the link provided in the online admission portal, **at the time of joining the Institute hostel.**

Table A.2 : Summary of M.Tech. Programmes

Discipline [Academic Unit : Department, Centre, Interdisciplinary Group]	Specialization	Code
1. Aerospace Engineering [Department of Aerospace Engineering]	Aerodynamics Dynamics & Control Aerospace Propulsion Aerospace Structures	AE1 AE2 AE3 AE4
2. Biomedical Engineering [Department of Biosciences and Bioengineering]	Biomedical Engineering	BM
3. Chemical Engineering [Department of Chemical Engineering]	Chemical Engineering	CH
4. Civil Engineering [Department of Civil Engineering]	Transportation Systems Engineering Geotechnical Engineering Water Resources Engineering Structural Engineering Ocean Engineering Remote Sensing Construction Technology and Management	CE1 CE2 CE3 CE4 CE5 CE6 CE7
5.Computer Science & Engineering [Department of Computer Science and Engineering]	Computer Science & Engineering	CS
6. Earth Sciences [Department of Earth Sciences]	Geoexploration Petroleum Geoscience	GS PG
7. Electrical Engineering [Department of Electrical Engineering]	Communication Engineering Control & Computing Power Electronics & Power Systems Electronic Systems Integrated Circuit & Systems Solid State Devices	EE1 EE2 EE3 EE5 EE6 EE7
8. Energy Systems Engineering [Department of Energy Science and Engineering]	Energy Systems Engineering	EN
9. Environmental Science & Engineering [Environmental Science and Engineering Department]	Environmental Science & Engineering	EV
10. Geoinformatics and Natural Resources Engineering [Centre of Studies in Resources in Engineering]	Geoinformatics and Natural Resources Engineering	GNR
11. Industrial Engineering & Operations Research [Interdisciplinary Group in Industrial Engineering & Operations Research]	Industrial Engineering & Operations Research	IO
12. Mechanical Engineering [Department of Mechanical Engineering] * **No admission to specialisation Nuclear Engineering (ME4) for the year 2019-20.**	Thermal & Fluids Engineering. Design Engineering Manufacturing Engineering Nuclear Engineering *	ME1 ME2 ME3 ME4
13. Metallurgical Engineering & Materials Science [Department of Metallurgical Engineering & Materials Science]	Materials Science Process Engineering Steel Technology Corrosion Science & Engineering	MM1 MM2 MM3 MM4
14. Materials, Manufacturing and Modeling [Cross-Departmental Programme of Mechanical Engineering, Metallurgical Engineering & Materials Science and Mathematics]	Materials, Manufacturing and Modeling	MMM
15. Systems and Control Engineering	Systems and Control Engineering	SC
16. Technology and Development [Centre for Technology Alternatives for Rural Areas]	Technology and Development	TD
17. Educational Technology (Interdisciplinary Programme in Educational Technology)	Educational Technology	ET

TABLE-A.3 : ELIGIBILITY FOR ADMISSION TO DIFFERENT DISCIPLINES

Discipline [Academic Unit : Department, Centre, Interdisciplinary Group]/Specialization	Degree/Qualifying Discipline First class or 60% marks (55% marks for SC/ST) as specified in the clause A.7.3.	GATE Requirement
Aerospace Engineering (AE) [Department of Aerospace Engineering] Aerodynamics (AE1)	B.E./B.Tech./AeSI/AMIE or equivalent in Aeronautical/Aerospace Engineering (AE) Civil Engineering (CE) Mechanical Engineering (ME)	AE,CE,ME
Aerospace Engineering (AE) [Department of Aerospace Engineering] Dynamics and Control (AE2)	B.E./B.Tech./AeSI/AMIE or equivalent in Aeronautical/Aerospace Engineering (AE) Electronics/Telecommunications Engineering (EC) Electrical Engineering (EE) Instrumentation Engineering (IN) Mechanical Engineering (ME)	AE, EC,EE,IN,ME
Aerospace Engineering (AE) [Department of Aerospace Engineering] Aerospace Propulsion (AE3)	B.E./B.Tech. /AeSI/AMIE or equivalent in Aeronautical/Aerospace Engineering (AE) Mechanical Engineering (ME)	AE,ME
Aerospace Engineering (AE) [Department of Aerospace Engineering] Aerospace Structure (AE4)	B.E./B.Tech./AeSI/AMIE or equivalent in Aeronautical/Aerospace Engineering (AE) Civil Engineering (CE) Mechanical Engineering (ME)	AE,CE,ME
Candidates having two years of relevant work experience are exempted from requirement of GATE score, provided their candidature is sponsored by the employer. They are not eligible for award of Teaching/Research Assistantship.		

Biomedical Engineering (BM) (Department of Biosciences & Bioengineering)	(i) B.E./B.Tech. /AMIE or equivalent in Biomedical Engineering (BM) Biotechnology (BT) Chemical Engineering (CH) Computer Science and Engineering/ Information Technology (CS) Electrical Engineering (EE) Electronics/Telecommunications Engineering (EC) Engineering Physics (EP) Instrumentation Engineering (IN) Mechanical Engineering (ME) Metallurgy & Materials Science (MT) Pharmaceutical Technology (PY) Other Engineering (ZE)	Any discipline
	(ii) M.Sc. or equivalent in Biochemistry (BY) Biophysics (BP) Biotechnology (BT) Ceramics (CG) Chemistry (CY) Electronics / Electronic Sciences (EC) Ergonomics (ER) Materials Science (MS) Mathematics (MA) Molecular Biology (MG) Physics (PH) Physiology (PS) Other Science (ZS)	Any discipline
	(iii) ** MBBS (Medicine) / BDS (Dental) OR *	AIIMS/ All India MCI/ JIPMER/ PGI Chandigarh/ AFMC-Pune/ DNB Part I/ Pre-M.D.S. national level medical and dental postgraduate entrance examinations or GATE (Life Sciences) examination for medical and biological sciences.
	(iv) **B.Pharm / M.Pharm OR *	GPAT/ All India level selection examination for B.Pharm.
	(v) ** B.V.Sc., B.P.Th. and B.O.Th. degree (Duration 4 years or more)	All India level post graduate entrance examination for M.V.Sc., M.P.Th. and M.O.Th. Eligibility/ rank certificates for all such All India level entrance examinations are required (for iii, iv and v above).

** Candidate with qualifications mentioned against (iii), (iv) & (v) must submit a certificate for their having First class or 60% marks (55% for SC/ST) * in qualifying degrees, failing which, they will not be eligible for admission to M.Tech. in Biomedical Engineering.

The admission will be based on written test and interview. There will be only one exam paper for all the candidates. A written examination will be conducted in Physics, Chemistry, Mathematics, Biology and Physiology, which will be in accordance with the 12th standard syllabi of CBSE.

Chemical Engineering (CH) [Department of Chemical Engineering]	B.E./B.Tech./AMIE or equivalent in Chemical Engineering (CH) or equivalent	CH
Candidates having two years of relevant work experience are exempted from requirement of GATE score, provided their candidature is sponsored by the employer. They are not eligible for award of Teaching/Research Assistantship.		
Civil Engineering (CE) [Department of Civil Engineering] Transportation Systems Engineering(CE1)	B.E./B.Tech./AMIE or equivalent in Civil Engineering (CE)	CE
Civil Engineering (CE) [Department of Civil Engineering] Geotechnical Engineering CE2)	B.E./B.Tech./AMIE or equivalent in Civil Engineering (CE)	CE
Civil Engineering (CE) [Department of Civil Engineering] Water Resources Engineering (CE3)	B.E./B.Tech./AMIE or equivalent in Civil Engineering (CE)	CE
Civil Engineering (CE) [Department of Civil Engineering] Structural Engineering(CE4)	B.E./B.Tech./AMIE or equivalent in Civil Engineering (CE)	CE
Civil Engineering (CE) [Department of Civil Engineering] Ocean Engineering(CE5)	B.E./B.Tech./AMIE or equivalent in Civil Engineering (CE) Mechanical Engineering (ME) Ocean Engineering (OE) Naval Architecture and Marine Engineering (NA) and allied degrees	CE , ME, XE
Civil Engineering (CE) [Department of Civil Engineering] Remote Sensing(CE6)	B.E./B.Tech./AMIE or equivalent in Civil Engineering (CE)	CE
Civil Engineering (CE) [Department of Civil Engineering] Construction Technology and Management (CE7)	B.E./B.Tech./AMIE or equivalent in Civil Engineering (CE)	CE
(i) Out of SEVEN specialisation choices (CE1,CE2,CE3,CE4, CE5, CE6, CE7) in Civil Engineering, the candidates has to choose only two in the order of their preference. Written Test/Interview will be conducted only for the FIRST two choices given by an applicant pertaining to Civil Engineering. (ii) Candidates having two years of relevant work experience are exempted from requirement of GATE score, provided their candidature is sponsored by the employer. They are not eligible for award of Teaching/Research Assistantship. (iii). Written test for "CE2 and CE4" followed by Interview.		
Computer Science & Engineering(CS) [Department of Computer Science & Engineering]	(i). B.E./B.Tech./AMIE or equivalent in any engineering discipline. (ii). M.Sc. or equivalent in any science discipline. (iii). MCA (with Physics & Mathematics at B.Sc. level) or equivalent	CS
Valid GATE score (CS) is required for all applicants (including Project Staff (PS)/Institute Staff(IS) and Sponsored (SW) candidates), except commissioned officers of the armed forces and those having B.Tech. Degree in CS/CSE from IITs with CGPA/CPI of 8.00 (on 0-10 scale) and above.		
Earth Sciences (ES) [Department of Earth Sciences] Geoexploration (GS)	M.Sc./ M.Sc. Tech in Geology/Applied Geology (GL) Geophysics/Applied Geophysics (GP)	GG
Earth Sciences (ES) [Department of Earth Sciences] Petroleum Geoscience (PG)	M.Sc./ M.Sc. Tech in Geology / Applied Geology (GL) Geophysics / Applied Geophysics (GP)	GG

Candidates having two years of relevant work experience are exempted from requirement of GATE score, provided their candidature is sponsored by the employer. They are not eligible for award of Teaching/Research Assistantship.		
Electrical Engineering (EE) [Department of Electrical Engineering] Communication Engineering (EE1)	(i). B.E./B.Tech./AMIE or equivalent in Computer Science and Engineering / Information Technology (CS) Electronics/Telecommunication Engineering (EC) Electrical Engineering (EE) Engineering Physics (EP) (ii). M.Sc. or equivalent in Electronics / Electronic Sciences (EL) Physics (PH)	CS, EC, EE
Electrical Engineering (EE) [Department of Electrical Engineering] Control & Computing (EE2)	(i). B.E./B.Tech./AMIE or equivalent in Aeronautical / Aerospace Engineering (AE) Computer Science and Engineering / Information Technology (CS) Electronics/ Telecommunication Engineering (EC) Electrical Engineering (EE) Engineering Physics (EP) Energy Engineering (EN) Instrumentation Engineering (IN) ii). M.Sc. or equivalent in Electronics/Electronic Sciences ((EL) Mathematics (MA) Physics (PH)	CS, EC, EE, IN,
Electrical Engineering (EE) [Department of Electrical Engineering] Power Electronics & Power Systems (EE3)	(i). B.E./B.Tech./AMIE or equivalent in Computer Science & Engineering Information Technology (CS) Electronics/ Telecommunication Engineering (EC) Electrical Engineering (EE) Energy Engineering (EN) Instrumentation Engineering (IN)	EC, EE, IN
Electrical Engineering (EE) [Department of Electrical Engineering] Electronic Systems (EE5)	(i). B.E./B.Tech./AMIE or equivalent in Biomedical Engineering (BM) Computer Science and Engineering/ Information Technology (CS) Electrical Engineering (EE) Electronics/Telecommunication Engineering (EC) Engineering Physics (EP) Energy Engineering (EN) Instrumentation Engineering (IN) (ii). M.Sc. or equivalent in Electronics/ Electronic Sciences (EL)	CS,EC, EE, IN,
Electrical Engineering (EE) [Department of Electrical Engineering] Integrated Circuit & System (EE6**)** **(New Specialisation started from the year 2019).**	(i). B.E./B.Tech./AMIE or equivalent in Biomedical Engineering (BM) Computer Science and Engineering/ Information Technology (CS) Electrical Engineering (EE) Electronics/Telecommunication Engineering (EC)	CS,EC, EE, IN,

	Engineering Physics (EP) Energy Engineering (EN) Instrumentation Engineering (IN) (ii). M.Sc. or equivalent in Electronics / Electronic Sciences (EL)	
Electrical Engineering (EE) [Department of Electrical Engineering] Solid State Devices (EE 7) **(New Specialisation started from the year 2019).**	(i). B.E./B.Tech./AMIE or equivalent in Computer Science & Engineering / Information Technology (CS) Electronics/ Telecommunication Engineering (EC) Electrical Engineering (EE) Engineering Physics (EP) Energy Engineering (EN) Metallurgical Engineering / Materials Science & Engineering (MT) Instrumentation Engineering (IN) (ii). M.Sc. or equivalent in Electronics / Electronic Sciences (EL) Physics (PH)	CS, EC, EE, IN, PH, MT
(i) Out of the six specialization choices (EE1, EE2, EE3, EE5, EE6, EE7) in Electrical Engineering, each candidate is permitted up to THREE choices in the order of his/her preference. All admission procedures will be conducted only for the FIRST three choices pertaining to the Electrical Engineering. (ii) Candidates having two years of relevant work experience are exempted from requirement of GATE score, provided their candidature is sponsored by the employer. They are not eligible for award of Teaching/Research Assistantship.		
Energy Systems Engineering (EN) [Department of Energy Science & Engineering]	B.E./B.Tech./AMIE or equivalent in Automobile Engineering (AU) Aeronautical / Aerospace Engineering (AE) Chemical Engineering (CH) Civil Engineering (CE) Electrical Engineering (EE) Energy Systems Engineering (EN) Mechanical Engineering (ME) Metallurgical Engineering / Materials Science & Engineering (MT) Thermal Power Engineering (TP)	Any discipline
Candidates having two years of relevant work experience are exempted from requirement of GATE score, provided their candidature is sponsored by the employer. They are not eligible for award of Teaching/Research Assistantship.		
Environmental Science & Engineering (EV) [Environmental Science and Engineering Department (CESE)]	(i). B.E./B.Tech./AMIE or equivalent in Aeronautical / Aerospace Engineering (AE) Agricultural Engineering (AG) Biotechnology (BT) Chemical Engineering (CH) Civil Engineering (CE) Energy Engineering (EN) Environmental Engineering (EV) Mechanical Engineering (ME) Mining Engineering (MN) Metallurgical Engineering / Materials Science & Engineering (MT) ---------- - (ii). M.Sc. or equivalent in Atmospheric Science (AT) Biotechnology (BT)	AE, AG, BT, CH, CE, ME, MN, MT, XE, XL ---------- BT, CY, GG, PH, XE, XL

	Biochemistry (BY) Chemistry (CY) Earth Sciences (ES) Environmental Toxicology (ET) Environmental Science (EM) Meteorology (MO) Microbiology (MB) Physics (PH)	
(i) For candidates with M.Sc., Mathematics is essential at Higher Secondary/ Intermediate (10+2) level. (ii) Candidates having two years of relevant work experience are exempted from requirement of GATE score, provided their candidature is sponsored by the employer. They are not eligible for award of Teaching/Research Assistantship		
Geoinformatics & Natural Resources Engineering (GNR) [Centre of Studies in Resources Engineering (CSRE)]	(i). B.E./B.Tech./AMIE or equivalent in Agricultural Engg (AG) Architecture & Planning (AR) Civil Engineering(CE) Computer Science and Engineering / Information Technology (CS) Electronics/Telecommunication Engineering (EC) Electrical Engineering (EE) Environmental Engineering (EV) Mining Engineering (MN) Geoinformatics /Geomatics (GI) (ii).M.Sc. or equivalent in Geology / Applied Geology (GL) Geophysics / Applied Geophysics (GP) Mathematics (MA) Physics (PH) Geoinformatics /Geomatics (GI) Atmospheric and Oceanic Sciences (XE-H)	AG, AR, CE, CS, EC, EE, GG, MA, MN, PH, XE-H
(i) For candidates with M.Sc. Mathematics is essential at Higher Secondary/ Intermediate(10+2) level. (ii) Candidates having two years of relevant work experience are exempted from requirement of GATE score, provided their candidature is sponsored by the employer. They are not eligible for award of Teaching/Research Assistantship.		
Industrial Engineering & Operations Research (IO) [Interdisciplinary Group in Industrial Engineering & Operations Research (IE&OR)]	B.E./B.Tech./AMIE or equivalent in any Engineering discipline	Any discipline
Candidates having two years of relevant work experience are exempted from requirement of GATE score, provided their candidature is sponsored by the employer. They are not eligible for award of Teaching/Research Assistantship.		
Mechanical Engineering (ME) [Department of Mechanical Engineering] Thermal & Fluids Engineering (ME1)	B.E./B.Tech./AMIE or equivalent in Aeronautical / Aerospace Engineering (AE) Automobile Engineering (AU) Chemical Engineering (CH) Mechanical Engineering (ME)	Any discipline
Mechanical Engineering (ME) [Department of Mechanical Engineering] Design Engineering(ME2)	B.E./B.Tech./AMIE or equivalent in Aeronautical / Aerospace Engineering (AE) Automobile Engineering (AU) Mechanical Engineering (ME) Machine Tool Engineering (MC) Production / Industrial Engineering	Any discipline

	(PI)	
Mechanical Engineering (ME) [Department of Mechanical Engineering] Manufacturing Engineering (ME3)	B.E./B.Tech./AMIE or equivalent in Mechanical Engineering (ME) Machine Tool Engineering (MC) Production / Industrial Engineering (PI)	Any discipline
Mechanical Engineering (ME) [Department of Mechanical Engineering] Nuclear Engineering (ME4) * ***No admission to specialisation Nuclear Engineering (ME4) for the year 2019-20.***	B.E./B.Tech./AMIE or equivalent in Chemical Engineering (CH) Electrical Engineering (EE) Mechanical Engineering (ME)	CH, EE, ME
Candidates having two years of relevant work experience are exempted from requirement of GATE score, provided their candidature is sponsored by the employer. They are not eligible for award of Teaching/Research Assistantship.		
Metallurgical Engineering and Materials Science (MM) [Department of Metallurgical Engineering and Materials Science] Materials Science (MM1)	(i). B.E./B.Tech./AMIE or equivalent in a recognised branch of engineering or technology (ii). M.Sc. or equivalent in a recognised branch of science.	CH,CY, EE,ME, MT,PH, XE
Metallurgical Engineering and Materials Science (MM) [Department of Metallurgical Engineering and Materials Science] Process Engineering (MM2)	i). B.E./B.Tech./AMIE or equivalent in a recognised branch of engineering or technology (ii). M.Sc. or equivalent in a recognised branch of science.	CH, ME,MT,XE
Metallurgical Engineering and Materials Science (MM) [Department of Metallurgical Engineering and Materials Science] Steel Technology (MM3)	i). B.E./B.Tech./AMIE or equivalent in a recognised branch of engineering.	CH,ME,MT
Metallurgical Engineering and Materials Science (MM) [Department of Metallurgical Engineering and Materials Science] Corrosion Science & Engineering (MM4)	i). B.E./B.Tech./AMIE or equivalent in a recognised branch of engineering or technology (ii). M.Sc. or equivalent in a recognised branch of science.	AE,CE,CH,CY,EE,ME,MT, XE
(i) For candidates with M.Sc., Mathematics as a subject at B.Sc. degree level is essential. (ii) Out of the four specialization choices (MM1, MM2,MM3, MM4), each candidate is permitted up to THREE choices in the order of his/her preference. All admission procedures will be conducted only for the FIRST three choices pertaining to the Metallurgical Engineering & Materials Science. (iii) Candidates having two years of relevant work experience are exempted from requirement of GATE score, provided their candidature is sponsored by the employer. They are not eligible for award of Teaching/Research Assistantship. (iv) The general eligibility criteria prescribed by IIT Bombay are bare minimum and mere possessions of same will not entitle the applicants to be allowed for written test/interview during spot admission. Where number of applicants during spot admission is large, it may not be convenient or possible for the Department to interview/conduct written/trade tests for all applicants. The Department may restrict the number of applicants for written test/interview to a reasonable limit depending on seats available, with eligibility criteria higher than that of the minimum prescribed in the advertisement.		
Materials, Manufacturing and Modeling (MMM) [Cross-Departmental Programme of Mechanical Engineering, Metallurgical Engineering & Materials Science, and Mathematics]	B.E./B.Tech./AMIE or equivalent in in a recognised branch of engineering or technology	MT,PI,ME
Candidates having two years of relevant work experience are exempted from requirement of GATE score, provided their candidature is sponsored by the employer. They are not eligible for award of Teaching/Research Assistantship.		

Systems & Control Engineering (SC) [Interdisciplinary Group Systems & Control Engineering]	B.E./B.Tech./AMIE or equivalent in any engineering discipline	AE, ME, EE, EC, IN, CH
Candidates having two years of relevant work experience are exempted from requirement of GATE score, provided their candidature is sponsored by the employer. They are not eligible for award of Teaching/Research Assistantship.		
Technology & Development (TD) [Centre for Technology Alternatives for Rural Areas](CTARA)	(i). BE/B.Tech/B.Arch/AMIE or equivalent in any engineering discipline. (ii). M.Sc. or equivalent in any science discipline	Any discipline
Candidates with a qualifying degree (BE/ B.Tech./ B.Arch./M.Sc.) without a GATE score can apply under "Sponsored" category if they have minimum two years experience in development related work.		
Educational Technology (ET) [Interdisciplinary Programme in Educational Technology]	(i) B.Tech / B.E / B.Pharm / B.Arch / AMIE in any engineering discipline OR 4-year B.S. in any science discipline OR M.Sc / M.A / MCA *OR* Int. M.Tech / Int. M.E / Int. M.Sc / Int. B.S-M.S or Dual Degree in engineering/technology	Any discipline

B) M.TECH. PROGRAMMES

The Master's degree programme in Aerospace Engineering provides education in, multi-disciplinary areas involving Aerodynamics, Dynamics & control, Aerospace Propulsion and Aerospace structures.

B.1) Aerospace Engineering AE (AE1, AE2, AE3, AE4)
[Department of Aerospace Engineering]

The Master's degree programme in Aerospace Engineering provides education in multi-disciplinary areas involving Aerodynamics, Dynamics & Control, Aerospace Propulsion and Aerospace Structures.

ELIGIBILITY FOR ADMISSION- as given in Table A.3 - Eligibility for Admission to Different Disciplines.

AREAS OF RESEARCH

I. Aerodynamics (AE1)

Experimental Aerodynamics, Experimental Hypersonic Aerothermodynamics, Shock Waves and their applications, computational Hypersonic Aerothermodynamics, Computational Fluid Dynamics, computational Electromagnetics , Vortex and particle methods, vortex flows, Aero-acoustics, Aircraft Design, Air Transportation, Turbulence modeling and applications, Computational studies of scramjet intakes, Supersonic mixing, Computation of high enthalpy flows, plasma assisted flow control, Thermoacoustics , Morphing Aircraft, Unmanned Aerial Vehicles, and Lighter-Than- Air Systems.

II. Dynamics and Control (AE2)

Flight mechanics , guidance, trajectory optimization, navigation, state and parameter estimation, tracking and control of launch vehicles, missiles, aircraft, manned and unmanned aerial vehicles, mini aerial vehicles(MAVs), satellites, multi-agent systems, nonlinear adaptive and robust flight control, integrated navigation systems, air-breathing and gas turbine engine control, swarm, path planning and formation flying of aerial vehicles, hardware –in -loop-simulation, co-operative missions for MAVs.

III. Aerospace Propulsion (AE3)

Aircraft and spacecraft Propulsion, Experimental and numerical studies on detonations, Combustion instabilities , Development of new techniques for emission reduction from combustion systems, Heat Transfer, Infrared Signatures of Aerospace Vehicles, Micro-Channel cooling of Gas Turbine Blades.CFD of propulsive systems, Aerodynamic design and performance analysis of axial flow turbomachines, Flow control of turbomachines and internal duct flows, Computational Hypersonic aerothermodynamics, Turbulence modeling and applications, Computational studies of scramjet engines, Supersonic mixing and combustion, Computation of high enthalpy flows, Plasma assisted combustion and flow control, Thermoacoustics, Non- Equilibrium , Thermodynamics of Dissipative Structures , Entropy Generation Studies in Micro-Flows , Fuel atomization and sprays, Optical diagnostics of combustion systems.

IV. Aerospace Structures (AE4)

Structural Health Monitoring, wave Propagation, Aeroelasticity, Aeroservoelasticity, Structural Dynamics & Stability, Multidisciplinary Optimization, Mechanics of Materials (Metals, Metallic Alloys and Composites), Fracture and Fatigue in materials.

B.2) Biomedical Engineering (BM)
[Department of Biosciences and Bioengineering]

Introduction

The Biomedical Engineering Group (BME) at IIT Bombay was set up in 1988. It is now a part of Department of Biosciences and Bioengineering (BSBE). Biomedical Engineering is one of the youngest disciplines in engineering and has made tremendous progress in the last 4 decades. This has been aided by rapid advancements in Semiconductor Technology, Information Technology, and Biotechnology. In the field of Biomedical Engineering, researchers with expertise in diverse areas work towards the unified goal of creating products and techniques for better health care. The backgrounds of faculty in BME at IIT Bombay reflect the wide spectrum of expertise required to make better and more affordable health care a reality. Further, the students admitted to the program have backgrounds in Engineering, Physical

Sciences, Life Sciences and Medicine, making it the only program in the country to offer M.Tech. admission to such a unique mix of candidates. The creation of a heterogeneous class composition promotes interaction between students and faculty of different backgrounds and provides opportunities for research in exciting interdisciplinary areas.

Course work & Project

Over the first two semesters, M.Tech. students are required to do substantial amount of course work to complement their undergraduate or masters level education. The third semester is devoted mostly to the M.Tech. project although some courses may be taken during that period. The fourth semester is fully devoted to completion of the project. The curriculum has been designed to provide all students with a general background in Biomedical Engineering followed by more specific knowledge in the area of their choice. The former is achieved through core (for everyone) and compulsory (for students with a particular background) courses in the first semester. Electives taken during the second and third semester provide specialized knowledge in the area of the individual interest.

In the first semester, students with backgrounds in life sciences and medicine are required to take compulsory courses in mathematics, electronic circuits and instrumentation. Students with backgrounds in physical sciences and engineering take courses in physiology. There are other elective courses to be taken as well.

In the second semester, all students have to go through a core course on Biostatistics. Further, everyone is required to present a seminar on a topic related to Biomedical Engineering under the guidance of a faculty. The rest of the courses are electives, which the students choose after consultation with the faculty adviser.

Electives are offered in biopotentials, bioelectricity, ergonomics, medical sensors, biosensors, bioMEMS, medical imaging physics, biomaterials, drug delivery, cellular & tissue engineering, microfluidics, computational modeling, biomechanics, etc. All students are required to take a course designated as an Institute Elective offered by departments other than BSBE. In special cases, electives other than the institute elective may be taken from other departments in IIT after obtaining necessary permissions from the Department Post Graduate Committee.

ELIGIBILITY FOR ADMISSION - as given in Table A.3 -Eligibility for Admission to Different Disciplines.

AREAS OF RESEARCH

Currently fundamental and applied research is being conducted in the following broad areas, which the students can choose to do projects in:

- Biomedical transducers and sensors including biosensors and bioMEMS devices
- Biomaterials and tissue engineering
- Bionanotechnology
- Biophysics, cellular mechanics and computational biology
- Controlled drug delivery systems
- Computational neurophysiology
- Microfabrication and microfluidics
- Telemedicine and knowledge based systems
- Biophotonics, Tomography, Inverse Problems
- Movement neurophysiology, neural plasticity, non-invasive brain stimulation, rehabilitation technology

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B.3) Chemical Engineering (CH)
[Department of Chemical Engineering]

A wide variety of courses are offered to enable a student to obtain proficiency in various facets of the Chemical Engineering Profession–Design, Production, Research and Development, and academics. The programme provides strong core courses together with a set of elective courses in the following areas : Biotechnology and Bio-Systems Engineering; Energy and Environment; Transport, Colloids and Interface Science; Catalysis and Reaction Engineering; Materials Engineering; Process Systems Engineering and Control.

ELIGIBILITY FOR ADMISSION - as given in Table A.3 -Eligibility for Admission to Different Disciplines.

AREAS OF RESEARCH

- **Biotechnology & Bio-Systems Engineering**

Metabolic & Genetic Engineering, Bio-separations, Bioinformatics, Systems Biology, Drug Discovery, Enzymology, Bioprocess Development, Vermiculture for Waste Management, Dehydration of Food Systems, Controlled Atmosphere Storage, and Process Development of Food Systems.

- **Energy and Environment**

Climate change, Coal Gasification, Energy Integration, Green Engineering, Renewable Resources, Waste Management, Pollution Control, Air Pollution Prediction & Control and Vermiculture.

- **Transport, Colloids and interface Science**

Fluidization, Granular flows, Powder Mixing, Membrane Separations, Rheology of Complex Fluids, Colloids, Sol-gels, Emulsions & Foams, Paints and Coatings, Microstructural Engineering, Aerosols, Electro-hydrodynamics, Fluid Mechanics & Stability, Computational Fluid Dynamics, Heat & Mass transfer, Porous media, and Surfactants.

- **Catalysis and Reaction Engineering**

Catalysis, Multiphase Reaction, Bio-reaction Engineering and Reactor Modelling, Process intensification & reactive distillation.

- **Materials Engineering**

Polymer materials, Polymer Reaction Engineering, Polymer Processing, Polymer Physics, Polyurethane, Rubber, Polymer Rheology, Ceramics, Polymers, Biomaterials, Drug Delivery, Food Engineering, Microscopy, Nano-composites, Statistical Thermodynamics, and Supercritical Fluids.

- **Process Systems Engineering and Control**

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.

B.4) Civil Engineering CE (CE1, CE2, CE3, CE4, CE5, CE6, CE7)
[Department of Civil Engineering]

The programme is geared to meet the growing demand for designers, consultants, development engineers, research-scientists and faculty.

A student entering the M.Tech. programme in Civil Engineering can pursue one of the following streams :
(i) Transportation Systems Engineering(CE1)
(ii) Geotechnical Engineering (CE2)
(iii) Water Resources Engineering (CE3)
(iv) Structural Engineering (CE4)
(v) Ocean Engineering (CE5)
(vi) Remote Sensing (CE6)
(vii) Construction Technology and Management (CE7)

ELIGIBILITY FOR ADMISSION - as given in Table A.3- Eligibility for Admission to Different Disciplines.

AREAS OF RESEARCH

i. Transportation Systems Engineering: Transportation Planning: Sustainable urban transportation planning, Travel survey design and analysis, Travel demand modelling, Travel behaviour and choice modelling, Transport system analysis and economic evaluation, Land use and transport planning models, Air travel demand modelling, Freight transport modelling, public transport planning and design, and Transport network modelling. Traffic Engineering: Traffic flow theory and capacity analysis, Traffic management, operations and control, Pedestrian flow modelling, Intelligent Transportation Systems, and traffic impact assessment and externalities. Highway Planning and Design: Optimal alignment design, Performance based geometric design, Road safety. Pavement Engineering: Characterization and performance tests of pavement materials, Recycled and warm mix asphalt mixes, Asphalt rheology, Constitutive modelling of pavement materials, Pavement maintenance, rehabilitation and management systems, and design and performance evaluation of concrete pavements.

ii. Geotechnical Engineering: Geotechnical earthquake engineering; Geoenvironmental engineering; Energy geotechnics; Computational geomechanics; Foundation engineering; Seismic hazard study; Liquefaction; Constitutive modelling of soil; Soil-structure interaction; Offshore geotechnical engineering; Pipeline geotechnics; Soil Characterization, Foundation for offshore structures, Bio-geo interface study; Earth dam problems; Rock Mechanics and tunnelling; Soil dynamics; Soil stabilization; Expansive soils; Earth retention structures; Slope stabilization; Ground improvement; Reinforced soil structures and geosynthetics; Physical modelling in geotechnics; Centrifuge modelling of geotechnical problems; Optimization techniques and environmental geotechnics; Landslides; GIS applications for geotechnical problems; Earthquake resistant design of geotechnical structures; Reliability analysis; Dynamic soil characterization; Landfills and waste containment engineering; Seawalls; Railway Geotechnics.

iii.Water Resources Engineering : a) *Experimental Fluid Mechanics and Computational Fluid Dynamics* - Fluid flow investigation by experimental and numerical studies, Turbulent flows, Sedimentation and erosion problems, Fluid transients in closed conduits, Pipe network analysis; b) *Groundwater Flow, Transport Process and Remediation*- Groundwater movement and recharge, Seawater intrusion in coastal aquifers, Transport of pollutant in aquifers and aquifer remediation; *c) Surface water Hydrology:* River and lake hydrodynamics, Contaminant transport process, River basin and watershed scale modelling of hydrologic processes, Hydraulic structures; Conceptual IUH; hydrologic time series analysis and forecasting Reservoir sedimentation modelling; Chaos and Singular Spectrum analysis d) *Floods and Droughts studies*; e) *Water Resource System and Optimization* - Reservoir operation and management; *f) Urban water management* - Urban water supply, Storm water and wastewater management, Water quality modelling; g) *Hydroinformatics* - GIS and remote sensing applications in water resources, Use of Artificial Intelligence Techniques; h) Simulation - optimization for water resources environmental engineering problems; i) *Climate change and Impact Studies* - Detection and attribution of hydrologic change; Modelling of hydroclimatic extremes, Hydrologic statistics;

iv. Structural Engineering: Computational Mechanics; Finite element techniques; Composite materials and mechanics; Reinforced and prestressed concrete structures; Steel structures; Strength, stability and dynamics of thin membranes; Plates and shells; Structural optimization; Structural resilience, Structural response to blast, impact and shock loading; Pressure vessels; Reliability analysis; Seismic vulnerability and fragility assessment of structures; Bridge engineering; Machine learning; Probabilistic design methods; Curved grid; Cable networks; Plastic analysis techniques; Structural dynamics; Earthquake engineering; Earthquake disaster management; Vibration control of structures; Wind effects on structures; Inverse problems and artificial intelligence applications; Offshore structures; Shell foundation; Structural health monitoring; Uncertainty quantification; Shell and membrane structures; Risk analysis

v. Ocean Engineering: (a) Physical modelling – wave-structure interactions, floating body dynamics, offshore and maritime infrastructures design, nearshore dynamics, nonlinear waves and sediment transport; (b) Numerical modelling – coastal processes, tidal hydrodynamics, pollutant dispersion in coastal waters, wave-current interactions, tsunami, storms, surges and extreme events, sea level rise, climate change impacts on met-ocean parameters, oil spill dispersions, coastal erosion, shoreline changes; (c) Soft computing techniques – Application of statistical, stochastic and neural networks analysis on ocean parameters; (d) Remote Sensing and GIS – Application of RS and GIS for assessment of coastal vulnerability and nearshore processes.

vi. Remote Sensing: Development of methods and algorithms for digital analysis of Remotely Sensed Data (RSD); Remote sensing and GIS Applications for Hydrology and Water Resources, Ocean Sensing, Decision Support Systems in Watershed Development; Remote sensing for snow and glacier Studies, Remote sensing data assimilation, Thermal Remote Sensing; Microwave remote sensing; Uncertainty modelling in Geospatial datasets; Unmanned Aerial Systems (UAS) based applications in Civil Engineering.

vii. Construction Technology and Management: Building materials, Concrete technology; Construction management; Infrastructure project management.

B.5) Computer Science and Engineering (CS)

[Department of Computer Science and Engineering

The M.Tech. programme in Computer Science is a flexible, second level programme offering students wide choice of electives from areas such as algorithms, programming languages, databases, machine intelligence, computer graphics and vision, networks, architecture, distributed computing and formal methods. The programme is aimed at generation of high quality technical manpower for Research, Design and Development in Computer Science and Computer Applications by exposing students to courses in theory as well as application areas. The department has strong ties with the computer industry and many M.Tech. students work on sponsored projects.

ELIGIBILITY FOR ADMISSION- as given in Table A.3 - Eligibility for Admission to Different Disciplines.

AREAS OF RESEARCH

i. Theoretical Computer Science: Algorithms, Combinatorial Optimization, Combinatorics, Complexity Theory, Cryptography and Graph Theory.

ii. Natural Language Processing: Natural language understanding; Machine translation, Semantics Extraction; Document understanding; Cross lingual information Retrieval; Intelligent interfaces.

iii. Visual Computing: Computer graphics, Geometry processing, Image and signal processing, Computer vision and medical image computing.. Rendering (photorealistic, non-photorealistic, real-time, immersive); animation (character, physics-based); sketch-based systems; augmented and virtual reality; camera and imaging systems. Image and geometry reconstruction; restoration; compressed sensing; compression; pattern recognition; localization; segmentation; tracking; registration; quantization; shape analysis; group analysis; retrieval; affective computing. Machine learning methods; deep learning; matrix analysis; statistical methods.

iv. Computer Security and Applied Cryptography: Information flow-based security modeling, language and OS security, web and browser security, security analytics, secure multi-party communication, verification of cryptographic protocols, side channel attacks and hardware security, computation on encrypted data.

v. Computer Networks: Performance modeling, analysis and design of wired and wireless networks, Implementation and verification of network security protocols. Deployment, data management, communication and energy-efficiency issues in Sensor Networks, Design of content distribution networks for data dissemination, Architectures and protocols for metro optical networks, Network algorithms, Utility and Pricing models, Quality of service protocols, Mobile Computing, Voice Routing, Voice over IP, RFID networks, Enterprise networks, Access and Broadband networks.

vi. Database and Information Systems: Query Optimization, with a focus on parallel and distributed databases (aka Big Data systems), Holistic optimization of database applications, data generation for testing and grading SQL queries, Real time databases, Database support for Embedded and IoT systems, Spatial databases.

vii. Machine Learning and Information Retrieval: Data integration models and algorithms, Graphical models, Information extraction and retrieval, Forecasting and smart e-business, Text and Web data mining. Integrated mining with relational DBMS, Temporal mining, Integrating mining with OLAP

viii. Distributed Systems: Performance Evaluation, fault tolerance and scalability issues in distributed systems; Distributed object-based systems, Programming models and runtimes for generic agents, Parallel Computing, High performance cluster computing, Distributed operating systems, Self-configuration using abstract performance and capacity models of distributed component based applications, Topology based problem detection and root cause isolation in enterprise environments.

ix. Formal Methods: Formal specification, design and verification of hardware and software systems including distributed systems; Logic, automata theory and their applications in reasoning about systems; Automated theorem proving; Model checking; Reachability analysis of large and infinite state spaces: exact and approximate techniques.

x. Programming languages and Compilers: Theory of code optimization; Optimizing and parallelizing compilers; Analysis and implementation of functional and logic programming languages; Theory of programming languages.

xi. Real-Time, Embedded, Cyber Physical Systems: Functional Programming Applications, Reconfigurable computing, Automobile Telematics, Embedded control units, Design and development of robots and sensor platforms, temporal constraints, time critical applications

xii. Software Engineering and Paradigms: Software Architecture, Program Synthesis and Analysis, Design, Evolution and Re-engineering of Programs, Conceptual Models of Programs, Abstractions and Paradigms, Design Quality of Program Structure.

Refer to the department web page (www.cse.iitb.ac.in) for more information about various RESEARCH AREAS. Candidates are also encouraged to visit individual faculty member's home page to learn about his/her research interest.

B.6) Earth Sciences (GS, PG)

[Department of Earth Sciences]

The M.Tech programme of the department lays special emphasis on developing skills for exploration of mineral, petroleum and groundwater. The students of this programme have good placement opportunities in leading national and international mineral & oil exploration companies, Geological Survey of India, National Mineral Development Corporation, Atomic Mineral Division, Mineral Exploration Corporation and software companies.

a. Geoexploration : GS

The programme is structured such that the students can learn various aspects of mineral, petroleum and groundwater explorations. It offers wide ranging courses in exploration Well Logging, Basin Analysis, Marine
Mineral Resources, Groundwater Hydrology, Environmental Geology and Hydrogeochemistry.

b. Petroleum Geoscience : PG

This Specialization is introduced from July 2007. It prepares graduates for a career in petroleum exploration and development. The course provides advanced skills in seismic interpretation, basin analysis and applied micropaleontology, sequence stratigraphy, reservoir sedimentology, petrophysics, wireline logging tools and data interpretation using workstations and software as used in the industry.

ELIGIBILITY FOR ADMISSION - as given in Table A.3 -Eligibility for Admission to Different Disciplines.

AREAS OF RESEARCH

- Active Tectonics and Tectonics
- Electromagnetism
- Engineering Geology
- Geochemistry
- Geothermics
- Geostatistics

- Geomagnetism
- GPS and Geodesy
- Gravity and Magnetic
- Hydrogeology
- Isotope Geology
- Igneous Petrology
- Mineralogy
- Micropalaeontology
- Metamorphic Petrology
- Ore Petrology and Ore deposit modeling
- Organic Geochemistry
- Petroleum Geology
- Remote Sensing and GIS
- Sedimentology
- Structural Geology
- Stratigraphy
- Seismology
- Volcanology
- Numerical modelling in Geophysics

B.7) Electrical Engineering EE (EE1, EE2, EE3,-EE5,EE6,EE7)
[Department of Electrical Engineering]

AREAS OF SPECIALIZATION

Communication Engineering	EE1
Control and Computing	EE2
Power Electronics and Power Systems	EE3
Electronic Systems	EE5
Integrated Circuits & Systems	EE6
Solid State Devices	EE7

ELIGIBILITY FOR ADMISSION - as given in Table A.3- Eligibility for Admission to Different Disciplines.

AREAS OF RESEARCH

Communication Engineering (EE1)
- Communication Systems
- Communication Networks and Internet
- Computational Electromagnetics
- Image Processing and Computer Vision
- Microwaves, RF and Antennas
- Multimedia Systems
- Optical Communication and Photonics
- Signal Processing
- Speech Processing
- Wireless and Mobile Communication
- Information Theory and Coding
- Magnetic Resonance Imaging

Control and Computing (EE2)
- Linear Systems Theory
- Optimal Control and Optimization
- Modeling and Identification of Dynamical Systems
- Control of Distributed Parameter Systems
- Nonlinear Systems

- Modern Filter and Network Theory
- Behavioral Systems Theory
- Computational Methods in Electrical Engineering
- Software and System Reliability
- Cryptography and Security
- GPU-based Computing

Power Electronics and Power Systems (EE3)
- FACTS, HVDC and Power Quality
- Distributed Generation
- Power System Restructuring
- Wide Area Measurements and System Protection
- EMI / EMC
- Coupled Field Computations
- Electrical Machines: Modeling, Analysis, Design and Control
- Special Machines
- Power Electronic Converters, Electric Drives
- Power Electronics for Non-conventional Energy Sources
- Reliability in Power Systems and Power Electronic Systems
- Smart Grids for Energy Harvesting

Electronic Systems (EE5)
- Electronic Instrumentation
- Signal Processing Applications
- Speech and Audio Processing
- Biomedical Electronics
- Embedded System Design

Integrated Circuits & System (EE 6)
- Digital System Design
- Analog/Mixed-signal/RF Integrated Circuits and Systems
- Sensing Device Design and Fabrication
- Miniature Sensor Systems
- Energy Harvesting and Power Management
- Data Converters, Phase Locked Loops
- High-Speed Serial Links/Interfaces

Solid State Devices (EE 7)
- Non-volatile memory technologies (Flash, RRAM, FERAM, MRAM, etc.)
- Device Fabrication (CMOS, Solar cells, Detectors, etc.)
- Theory, modeling, and simulation of Electronic devices
- Novel materials and devices (III-V, Graphene, 2D, etc.)
- Spintronics, Quantum Computing, Quantum sensing, and related technologies
- Photonics, MEMS, Neuromorphic Engineering
- Photovoltaics - c-Si, Organics, Perovskite, quantum dots, etc.
- Reliability of semiconductor devices and systems (e.g., Solar panels, PV systems)
- Nanoscale energy conversion
- Flexible devices and sensors (bio, chemical, and quantum)
- Light emitting diodes (III-Nitride UV) and photodetectors (quantum dot, etc)
- Wide Bandgap Power Devices

B.8) Energy Systems Engineering (EN)
[Department of Energy Science & Engineering]

Energy is a critical input required for development. Fossil fuel reserves in the country are limited and there is a need to develop viable cost effective alternatives. Renewable and Nuclear Energy can provide possible

longterm solutions for the energy problems. There are problems in the large scale development and deployment of these alternatives that need to be addressed. In the short run, India has to aggressively pursue energy efficiency and Demand Side Management to improve the efficiency of supply and utilization devices and systems. The development of new energy technologies provides technological challenges as well as significant business opportunity. In order to help meet these challenge, the Department of Energy Science and Engineering (DESE) has been established with a mission to develop sustainable energy systems and solutions for the future. There is a requirement for high quality trained manpower in the energy sector. It also provides scope for engineering innovators/entrepreneurs. The M.Tech. programme offers a mix of compulsory courses and elective courses that can be chosen according to the specialization and interest of the students.

The programme has two laboratories (Solar Energy and Energy Systems Laboratory) and a computational facility. In addition to this, the students are actively involved in the research and development activities of the Thermal Hydraulics facility, Gasification Laboratory, Heat Pump Laboratory (Mechanical Engineering), Power Electronics and Power Systems Laboratory (Electrical Engineering). DESE faculty have been organizing several Continuing Education Programmes on a continuous basis on Renewable Energy, Energy Management, Process Integration, Solar Passive Architecture and have initiated a series of programmes for the Nuclear Power Corporation. The department has established linkages with industries like Thermax, Forbes Marshall, BSES, Mahindra & Mahindra, BHEL and organization like Atomic Energy Regulatory Board, Ministry of New and Renewable Energy, International Energy Initiative and The Energy and Resource Institute which have sponsored M.Tech/Ph.D Projects, ensuring the relevance of the research output.

ELIGIBILITY FOR ADMISSION - as given in Table A.3- Eligibility for Admission to Different Disciplines.

AREAS OF RESEARCH

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 Fludised Bed Combustion, Exhaust Heat Recovery, Cogeneration, Building Energy Management, Efficient Air Conditioning Systems, Hydrogen Generation and Storage, Fuel Cells.

Renewables

Coal Gasification, Biomass Gasifier Design, Development and Testing, Liquid fuels from Biomass through the thermochemical and algal route, Microbial Hydrogen, Pyrolysis for liquid fuels and chemical, CNG Kit development, Testing of Solar Collectors and systems, Passive Solar Architecture, Development of Carbon PV cell, Decentralized 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 of SVO, Biodiesel, Dual fuelling etc., Biodiesel manufacturing process. Complex Fluid Dynamics, Flow of Granular Materials, Multiphase flows, Computational Fluid Dynamics, Molecular Dynamic Simulation of Particulate Flows.

Nuclear

Nuclear Safety, Nuclear Waste management, Thermal Hydraulics Research, Computer Simulation Models for Analysis of Transients in Pressurized Heavy Water Reactor. Nuclear thermal hydraulics and safety, Analytical solution of multilayer heat conduction problems.

Fellowships

Several fellowships are normally available to DESE students ranging from 8000 to Rs.15000/- per month. Most of the fellowships also include tuition fee waiver. Fellowship will be offered on the basis of separate interviews.

B.9) Environmental Science & Engineering (EV)
[Environmental Science and Engineering Department]

The interdisciplinary programme in Environmental Science and Engineering aims to offer a balanced training in scientific, engineering and social aspects of this field. The course has been designed to meet the requirements of industry, consultancy services, academic and R & D organizations related to Environmental Management, treatment of emission and effluents and remediation of contaminated environment. The programme provides ample choice of electives to enable students to delve deeper in to various aspects related to this discipline, i.e. Environmental Monitoring and Modeling, Environmental Impact Analysis, Environment Biotechnology, Industrial Air & Water Pollution Control, Industrial Ecology, Clean Technology and Hazardous Waste Management and Aerosol Science and Technology. Maharashtra Pollution Control Board under their MoU with IIT Bombay has provided financial assistance for fellowship for Two year M.Tech. Programme in Environmental Science and Engineering.

ELIGIBILITY FOR ADMISSION - as given in Table A.3- Eligibility for Admission to Different Disciplines.

AREAS OF RESEARCH

The research and development activities of the CESE encompass a wide spectrum of areas in Environmental Science and Engineering with special emphasis on the solution of real life environmental problems such as environmental monitoring, industrial air and water pollution control, solid and hazardous waste management, air and water quality modelling, environmental systems optimization, environmental microbiology and biotechnology, bioremediation, indoor air quality, aerosol science and technology, environmental impact assessment and global issues. For further details visit www.cese.iitb.ac.in

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B.10) Geoinformatics & Natural Resources Engineering)(GNR)
[Centre of Studies in Resources Engineering (CSRE)]

Centre of Studies in Resources Engineering offers an M.Tech programme in Geoinformatics & Natural Resources Engineering which is multidisciplinary in nature. The emphasis of the programme is on the use of modern technological tools such as Satellite Remote Sensing, Geographic Information Systems, Global Positioning Systems, etc. for natural resources studies. The course provides a balanced coverage on natural resources exploration and management as well as on the application areas of interest such as Agriculture, Atmospheric Studies including Ozone Depletion, Coastal and Marine Environment, Digital Image Processing, Digital Photogrammetry, Natural Hazard Assessment and Disaster Mitigation, Snow, Avalanche and Glacial Studies, Terrain Evaluation, Water Resources (Surface and Ground water), High Performing Computing, etc.

Due to multidisciplinary nature of the subject of Geoinformatics and Natural Resources Engineering, emphasis is laid on training the students with an integrated approach to various issues pertaining to natural resources exploration and scientific management using the most modern tools and techniques. The courses offered cover fundamentals to advanced topics in the use of Remote Sensing, GIS and GPS to natural resources of Land, Earth and Atmosphere as well as natural hazards and disasters.

ELIGIBILITY FOR ADMISSION - as given in Table A.3- Eligibility for Admission to Different Disciplines.

AREAS OF RESEARCH

Remote Sensing and GIS applications, Surface and ground water resources, Terrain evaluation, Landuse Planning, Agro-Informatics, Sensor Networks and UAVs in Precision Agriculture, Mineral and hydrocarbon exploration, Snow and avalanche studies, Hazards of landslide, Drought and desertification, Marine and coastal environmental studies, Atmospheric remote sensing, Development of tools and techniques of spatial data processing, Digital Image processing, Stereo image analysis and digital cartography, Microwave remote sensing, Geo-computational systems, Climate change aspects, etc.

B.11) Industrial Engineering and Operations Research (IO)
[Interdisciplinary Group in Industrial Engineering and Operations Research (IE&OR)]

The M.Tech. program in Industrial Engineering and Operations Research (IEOR) is interdisciplinary and accepts students from all branches of engineering and mathematics. Besides the core areas of IEOR the programme also offers new courses in Financial Engineering, Data Analytics, Knowledge Based Systems, Neural Networks, Machine Learning and others.

ELIGIBILITY FOR ADMISSION- as given in Table A.3-Eligibility for Admission to Different Disciplines.

AREAS OF RESEARCH
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 manufacturing systems, supply chains, logistics, transport including railways, e-commerce, finance, services, health care, 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.

Specific applications include optimal control in stochastic systems; applications of game theory, modeling and simulation of supply chains, manufacturing and service systems; theory and applications of distributed simulation, 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; 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.

The IEOR programme is unique in its contemporary flavour, with new courses on Financial Engineering, Machine Learning for Operations Research, Optimization for Data Science, Longitudinal Data Analysis, Computer Vision and Multimedia Analytics for IE, and Neural Networks to name a few. The programme is equally strong in background building, with updated courses in Optimization Techniques, Stochastic Models and Simulation.

B.12) Mechanical Engineering ME (ME1, ME2, ME3,ME4)
[Department of Mechanical Engineering]

Areas of Specialization

1. Thermal and Fluids Engineering (ME1)
2. Design Engineering (ME2)
3. Manufacturing Engineering (ME3)
4. Nuclear Engineering (ME4)*

** **No admission to specialisation Nuclear Engineering (ME4) for the year 2019-20.***

ELIGIBILITY FOR ADMISSION - as given in Table A.3- Eligibility for Admission to Different Disciplines.

AREAS OF RESEARCH

Thermal and Fluids Engineering (ME1)
Fluid Mechanics, Fluid Machinery, Fluid Power Control and Fluidics, Analysis of Thermal Systems, Numerical prediction of convective and radiative heat transfer, Combustion, Fluidised bed combustion, Refrigeration and Airconditioning, Cryogenics, Miniature Cryorefrigerators, Food preservation, Performance Studies on IC Engines, Alternate Fuels, Nuclear Energy and Reactor Physics, Fuel Cells, Nuclear Reactor Thermal Hydraulics, Electronics Cooling, Microfluidics and Microscale Heat Transfer, Transport in porous media, Computational Fluid Flow and Heat Transfer, Analysis of Turbulent Flows, Low Temperature Plasma Modelling, Molecular Gas Dynamics, Enhanced Oil Recovery.

Design Engineering (ME2)
Stress and Vibration Analysis – Analytical, numerical (Finite Element and Boundary Element Methods) and experimental methods, Fatigue and Fracture-Linear elastic and elastic-plastic fracture mechanics, Fracture of composite materials, Fatigue-creep-corrosion interaction, Tribology and Machinery Maintenance, Pressure Vessel Design, Computer Aided Simulation and Design Optimization, Linear and non-linear vibrations, Chaos, Vehicle Dynamics, Rotor Dynamics, Acoustics and Noise, Active Vibration and Noise Control, Smart Structure, Robotics, Kinematics and control of Rigid and Flexible Manipulators, Microprocessor based control and automation, Mechatronics, Mobile Robots, Textile Machinery, MEMS.

Manufacturing Engineering (ME3)
CAD / CAM / CIM, CNC, Computer Assisted Process Planning, Design for Manufacturing and Assembly, Manufacturing Automation & Control, Intelligent Manufacturing Systems, Rapid Prototyping and Tooling.

Design, Optimization and Modelling of Manufacturing Processes (Casting, Forming, Machining, and Welding), Precision and Micro-Manufacturing Processes, Computer Aided Tool Design.

Applications of IE & OR in Manufacturing, Logistics, Quality and Maintenance Systems.

Nuclear Engineering (ME4) -- ***No admission to specialisation Nuclear Engineering (ME4) for the year 2019-20***
Nuclear Reactor Theory, Nuclear Reactor Dynamics and Control, Nuclear Reactor Thermal Hydraulics, Nuclear Reactor Safety, Reliability and Probabilistic Risk Assessment.

Fellowships
There will be about four fellowships from Atomic Energy Regulatory Board (AERB) given to deserving M.Tech. Students. Those selected (based on an interview) will be offered and enhanced stipend of Rs. 20,000/-, along with fee wavier. These students will be absorbed as Scientific Officer (C) in AERB and would be required to execute a bond to serve the organisation for atleast three years. A similar Fellowship program is also likely to be available from Nuclear Power Corporation of India Ltd. (NPCIL).

B.13) Metallurgical Engineering and Materials Science MM (MM1, MM2, MM3, MM4)
[Department of Metallurgical Engineering and Materials Science]

Areas of Specialization	
Materials Science	MM1
Process Engineering	MM2
Steel Technology	MM3
Corrosion Science & Engineering	MM4

ELIGIBILITY FOR ADMISSION - as given in Table A.3- Eligibility for Admission to Different Disciplines.

AREAS OF RESEARCH
Faculty in the Metallurgical Engineering and Materials Science Dept. carry out research on a range of materials:

i. **Metals:** Process analysis, instrumentation and control, Iron and Steel making, deformation behavior and microstructure evolution during creep and superplasticity, mineral processing and extractive metallurgy, metal forming, mechanical behavior, welding, physical metallurgy, phase transformation,

structure property relationship, thermomechanical processing and texture analysis.

ii. **Ceramics:** Electronic ceramics, bioceramics, glasses and glass-ceramics – electrical and optical properties, magnetic materials, dielectric and piezoelectric ceramics and devices, ceramic foams, industrial ceramics, high temperature ceramics, near net shape forming, gel casting, rheology of suspensions.

iii. Semiconductors and magnetic materials: Devices of thin film elemental semiconductors and alloy systems, surface treatment and surface engineering, chemical vapor deposition, structure property correlation in nanocrystalline magnetic materials, magnetoresistor materials In addition, research into materials for sensors and batteries, superconductors, thermoelectric materials, organic semiconductors, solar cells, nanophotonics, synthesis and processing of ion conductors, materials for energy generation and storage materials for quantum computing and ultrahigh vaccuum systems for thin film systems is going on in the Dept.

iv. Polymers and Composites: Polymer blends, Polymercarbon nanotube composites, polymer thin films, polymer nanocomposites, thermodynamic, mechanorheological, mechanical properties of polymers, responsive, functional and conjugated polymers, metal-matrix composites, structure property relations.

v. Wear and Corrosion: Fracture and failure, nondestructive evaluation, aqueous corrosion, metallurgy of corrosion, oil and gas corrosion, and protective coatings (paints, high temperature coatings etc.).

vi. Modeling and Simulations: Modeling of metallurgical processes, heat and mass transport, modeling of metal forming, Optimization, Monte Carlo simulations, Dislocation dynamics simulations, molecular dynamics simulations, phase field modelling, first principle calculations, crystal plasticity.

FACILITIES AVAILABLE

- Basic XRD with Xcelerator and thin film attachment
- 1600 Degree Horizontal Single Sample Dilatometer with Accessories
- Image Intensifier System and ExRay Source
- High Temp. Attachment and Texture and Stress Attachment Unit
- Air Vacuum Induction Melting System
- Hitachi Scanning Electron Microscope
- Simultaneous Thermal Analysis System
- R/S SST Plus with Coaxial Cylinder Rheometer
- Atomic Absorption Unit AVANTAP
- Carbon Sulphur Analyser
- High Temp. Furnaces 1700 Deg.C.
- UV Visible Spectrophotometer
- Thin film processing units
- MTS machines
- Vibrating sample magnetometer
- National facility on OIM and stress determination by XRD
- Electrochemical Measurement Systems - The State of the art Model PAR 338.
- Potentiostat model Wenking PSG 581
- Automated 10 Ton/SCC systems.
- Thermogravimetry analysers.
- Computer Facilities.
- Optical & Stereo microscopes
- Acoustic Emission Systems.
- Wear and Corrosion Machines.
- Facilities for testing Paint and Other Coatings.
- Dynamic loop system.
- High temperature high pressure autoclaves

B.14) Materials, Manufacturing and Modeling (MMM)

[Cross-Departmental Programme of Mechanical Engineering, Metallurgical Engineering & Materials Science and Mathematics]

ELIGIBILITY FOR ADMISSION -as given in Table A.3 - Eligibility for Admission to Different Disciplines.

B.15) Systems & Control Engineering (SC)

[Interdisciplinary Group in Systems & Control Engineering (SC)]

The programme provides a balanced choice of courses in theory and application of Systems and Control Engineering with the possibility of concentration in either theory or application. It provides an interdisciplinary background to all the students by exposing them to other areas. The exercises, examples and projects are based on real world systems, so as to impart a deep understanding of the subjects and their applications. The programme also aims to develop deeper mathematical fundamentals of systems and control engineering for future academics/researchers.

ELIGIBILITY FOR ADMISSION - as given in Table A.3- Eligibility for Admission to Different Disciplines.

AREAS OF RESEARCH

Large scale systems, system reduction, nuclear reactor control, sliding mode control (continuous & discrete), power systems – stability & control, modeling, control & implementation of smart structures, space launch vehicles – stability & control, flexible manipulators, stability & control of multirate output feedback based control (POF/FOS). •

NMR spectroscopy, quantum information and control. •

Nonlinear system analysis and control, adaptive control, geometric mechanics, Lagrangian and Hamiltonian mechanics. •

Optimal control, constrained and optimization based control, in particular, stochastic model-predictive/receding-horizon control. •

Stochastic control, learning theory, information theory. •

Cooperative control of multi-agent systems, resource allocation, team theory and its application, decentralized control, cooperative and network control. •

Reconfigurable hardware, embedded control systems, robotic path planning algorithms, hardware/software codesign. •

Switched and hybrid systems, control under communication and computation constraints. • Game theory, optimization, economics, combinatorics and systems biology. •

Control of distributed parameter systems, parameter estimation for PDEs, motion planning for PDEs.

All applicants are advised to look at the faculty webpage (www.sc.iitb.ac.in/coreFaculty.html) and the corresponding research areas before applying.

B.16) Technology and Development (TD)

[Centre for Technology Alternatives for Rural Areas (CTARA)]

The two-year trans-disciplinary course is designed to prepare professionals in the area of “Technology and Development” to work in diverse fields and in different roles for managing / influencing / consulting/ innovating / choosing in different public, private and civil society organizations. The core courses will deal with important rural resource assessment (land, water, energy), techniques for choice of technology, development theory and policy, social science research methods and system dynamics models, and project management. Students will be able to choose electives based on their background and interest.

ELIGIBILITY FOR ADMISSION- as given in Table A.3 - Eligibility for Admission to Different Disciplines.

FACILITIES AVAILABLE

Metal and wood working workshop, Food Processing laboratory, contacts with active organization in the region for practical training and field-based project work.

AREAS OF RESEARCH

- Technology and Development
- Rural/Agro-based Industries
- Natural Resources (Energy, water, Land use)
- Environment, Climate Change and Development
- Public Policy and Governance
- Agriculture and Biodiversity
- Rural and regional planning

B.17) EDUCATIONAL TECHNOLOGY (ET)
[Interdisciplinary Programme in Educational Technology]

The Interdisciplinary Programme in Educational Technology (IDP-ET) at IIT Bombay is actively involved in research and education in the area of technologies to improve the teaching-learning process. IDP-ET focuses on designing learning environments leveraging effective pedagogy and innovative technology scaffolds for supporting individual and collaborative learning in formal and informal contexts. IDP-ET is composed of core faculty members with additional associate members from various disciplines across IIT Bombay covering engineering, sciences, humanities and social sciences, design, and management.

The 2 year M.Tech program in Educational Technology focuses on training students on applying theories of learning and principles of Human-Computer Interaction (HCI) for creating teaching-learning content and designing learning environments. In addition, the program focuses on teaching students how to evaluate online and offline training programs and learning environments using data analytics and other forms of evaluation.

Core courses in the program focus on Learning Sciences, effective pedagogy, cognitive processes, human-computer interaction for educational technology, educational data mining, instructional systems design, and research methods in education. In addition, students will complete project work and elective courses based on their interest.

ELIGIBILITY FOR ADMISSION- as given in Table A.3 - Eligibility for Admission to Different Disciplines.

The admissions process will be similar to M.Tech in other departments and centres at IIT Bombay. This will include a written test and interview, with a minimum GATE score requirement.

- For other admission-related details, please visit the Admissions page of the IDP in Educational Technology: **www.et.iitb.ac.in/Admissions.html**

Please visit **http://www.et.iitb.ac.in** for details regarding the research group and recent activities.

STATEMENT OF PURPOSE(SoP)/Additional information

1. Candidates applying to M.Tech. in (i) Aerospace Engineering (AE), (ii) Technology & Development (TD) of IIT Bombay

Statement of Purpose (SoP) is your opportunity to share with the admission committee your thoughts and feeling about Postgraduate studies at IIT Bombay including your preparation for the same. Include a brief description of past project/ research work done by you. Restrict yourself to 500-600 words. The personal SOP will aid the admission committee in evaluating your application.

1. **Name**:

_____

2. **Programme of study:** M.Tech. Discipline **:** _____
(AE /TD)

Appendix-I

a) Sponsorship Certificate – for full-time- (2 years)/part-time –(3years) candidates
(On the letterhead of the Sponsoring Organization).

SPONSORSHIP CERTIFICATE
(With Financial Support)

To,

The Director,
Indian Institute of Technology,
Mumbai - 400 076.

Subject : Sponsoring of an employee for M.Tech. Programme (full-time) /(part-time)

(With Financial Support) at IIT Bombay

Dear Sir,

We hereby sponsor the candidature of Shri / Smt. / Kum_____, employed in our organization as _____(designation), for joining M.Tech. Programme in _____ at your Institute as a (**full-time/part-time)** candidate.

He / She is employee of our organization since_____. We shall fully relieve him / her from duties during the entire period of the M.Tech. programme, to enable him / her to devote full time to his / her studies in the Institute. We understand that the duration for full-time/part-time M.Tech. Programme is _____ years. We shall bear the total expenses of his / her studies.

Date: Signature and seal of the Sponsoring Authority

b) Sponsorship Certificate – for full-time- (2 years)/part-time – (3years) candidates
(On the letterhead of the Sponsoring Organization).

SPONSORSHIP CERTIFICATE
(Without Financial Support)

To,

The Director,
Indian Institute of Technology,
Mumbai - 400 076.

Subject : Sponsoring of an employee for M.Tech. Programme (full-time) /(part-time)
(Without Financial Support) at IIT Bombay

Dear Sir,

We hereby sponsor the candidature of Shri / Smt. / Kum_____, employed in our organization as _____(designation), for joining M.Tech. Programme in _____ at your Institute as a **full-time/part-time** candidate.

He / She is employee of our organization since_____. We shall fully relieve him / her from duties during the entire period of the M.Tech. programme, to enable him / her to devote full time to his / her studies in the Institute. We understand that the duration for full-time/part-time M.Tech. Programme is _____ years and he/she will bear the total expenses.

Date: Signature and seal of the Sponsoring Authority

Appendix-III

c) CERTIFICATE FOR PROJECT STAFF

This is to certify that Shri / Smt / Kum. _____ has been working in Project _____ from dt. _____.

The duration of the project is _____ years. Appointment of Shri / Smt / Kum_____ _____ is for the period of _____ years. His / Her appointment is likely to be extended for the further period.

I have no objection if he / she register for M.Tech. Programme in _____Department under _____ category.

Signature _____

Prof. _____

Project Investigator: _____

Project Code : _____

Project Title : _____

Undertaking

I, Shri / Smt / Kum_____hereby declare that in the event of termination of my appointment in the project, I shall continue my studies as Self-financed student for the remaining period.

Signature:

Date: Name of Student: