



M.Tech. 2014



Admission

Brochure

I I T Madras

VISION & MISSION

VISION

To be an academic institution in dynamic equilibrium with its social, ecological and economic environment, striving continuously for excellence in education, research and technological service to the nation.

MISSION

- To create and sustain a community of learning in which students acquire knowledge and learn to apply it professionally with due consideration for ethical, ecological and economic issues
- To pursue research and disseminate research findings
- To provide knowledge-based technological services to satisfy the needs of society and the industry
- To help in building national capabilities in science, technology, humanities, management, education and research

QUALITY POLICY

To pursue global standards of excellence in all our endeavors namely, teaching, research, consultancy and continuing education and to remain accountable in our core and support functions through processes of self-evaluation and continuous improvement.

CORE VALUES

In pursuit of its mission, IIT Madras will

- develop human resources to serve the nation
- recognize teaching as a unifying activity
- nurture integrity, creativity and academic freedom
- retain a willingness to experiment with new paradigms

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1. THE INSTITUTE

The Indian Institute of Technology Madras (IIT Madras) was established as an autonomous institute of national importance in 1959 by the Government of India with initial technical and financial support from the Government of Germany. IIT Madras, with a number of well-equipped laboratories, advanced research facilities, sophisticated services and computing and networking capabilities, is recognized to have done exceedingly well in the fields of higher technical education, research and industrial consultancy.



IIT Madras conducts academic Programmes of B.Tech., Dual Degree (B.Tech. and M.Tech.) Dual Degree (B.S. & M.S.), M.B.A., M.Tech., M.Sc., Integrated M.A., M.S., and Ph.D. in various disciplines. Located in about 250 hectares of natural flora and fauna, with 17 students' hostels and about 1076 faculty/staff/married research scholars' quarters, IIT Madras is one of the greenest residential campuses in the country. Faculty of international repute, a brilliant student community, excellent technical and supporting staff and an effective administration have all contributed to the pre-eminent status of IIT Madras.

2. M.TECH. ADMISSIONS

2.1 About M.Tech. Programmes

The four-semester M.Tech. Programmes (except CL1Y, which is a five-semester Programme) offered in various Disciplines and Programmes by different departments of the institute are based on the credit system and provide a student with a wide choice of courses. Each Programme comprises several core and elective courses and project work. These Programmes, along with the number of seats available, are indicated in Table 1.



Further details of the Disciplines/Programmes offered in the respective departments are given in Section 3 - Programme Highlights. Apart from these, User Oriented M.Tech. Programmes (UOP) are also offered by certain departments to meet specific requirement of industries. Details of these Programmes are available in Section 4 of this brochure.

Each Discipline/Programme in a department has a faculty advisor to help the students in the choice of academic options for elective courses. Students may be permitted to do their project work in industries and other approved organizations. Students are also encouraged to participate in the research and development projects undertaken by the faculty through the Industrial Consultancy and Sponsored Research (IC & SR; see also Section 6).

Opportunities exist for a limited number of students to carry out M.Tech. Projects in Germany.

Almost all students desirous of placement are placed in reputed organizations and industries after completing their courses of study.

M.Tech. students will be eligible for conversion to M.S./Ph.D. if they satisfy the following criteria:

- a) **The candidate should have successfully completed a minimum of 2 semesters in the M.Tech. Programme.**
- b) **The candidate should have a minimum CGPA of 8.0 in the prescribed courses.**

A committee duly constituted by the Head of the Department will consider applications for conversion to M.S./Ph.D. and make its recommendation.

2.2 Financial Assistance

- (i) Financial assistance in the form of Half-Time Teaching Assistantship (HTTA) at the rate of **Rs.8,000/- p.m.** (tenable for a maximum period of 24 months) will be awarded to Indian nationals doing the M.Tech. Programmes, subject to Institute rules. HTTA students are required to assist the department for 8 hours of work per week related to academic activities of the department such as laboratory demonstration, tutorials, evaluation of assignments, test papers, seminars, research projects, etc. The number of seats available under HTTA is indicated in Table 1.
- (ii) A few assistantships may also be offered by some government organizations such as Atomic Energy Regulatory Board, Aeronautical Research and Development Board, and so on.
- (iii) A few seats are available without HTTA (N-HTTA, i.e., without any financial assistance) in some M.Tech. Programmes as indicated in Table 1. Candidates can opt for either HTTA (code ending with Y), or N-HTTA (Code ending with N), or both, in a particular M.Tech. Programme. The eligibility criteria for HTTA and N-HTTA categories are the same.
- (iv) Provision exists for the candidates who have joined M.Tech. Programmes under N-HTTA category to convert to HTTA at the end of one semester depending on the vacancies in HTTA category and on the basis of their performance in the first semester examinations.

2.3 Fellowship Schemes

(i) DAE-GF Scheme

DAE-Graduate Fellowship (DAE-GF) Scheme in various engineering disciplines is offered by Department of Atomic Energy. GATE qualified candidates selected under this scheme will get a fellowship of Rs.20,000/- per month. After successful completion of M.Tech. Programme, the DAE-GF scheme fellows will be placed in one of the DAE units.

(ii) AERB-GF Scheme

Under Atomic Energy Regulatory Board Graduate Fellowship (AERB-GF) Scheme, up to three candidates will be selected either from Mechanical Engineering (only in Design/ Nuclear/ Thermal Engineering) or Chemical Engineering discipline or from both and they will be offered a monthly stipend of Rs.20,000/- for two years with a one-time educational material allowance of Rs.5,000/-. More details about AERB-GF scheme may be seen in the website www.aerb.gov.in.

2.4 Reservation of Seats

Seats are reserved for SC/ST/OBC (Non-creamy layer) and PwD (Persons with Disability) candidates according to the Government of India rules.

2.5 Who can Apply?

- A) GATE qualified candidates
- B) IIT Graduates with B.Tech. Degree

- C) Candidates sponsored by various organizations recognized by DST as Research and Development units, candidates sponsored by NIOT or from educational institutions approved by AICTE/UGC/ Government or from Government/Public Sector Undertakings
- D) QIP candidates
- E) UOP candidates of various organizations/industries as per the MoU (Memorandum of Understanding) with the Institute
- F) Defence sponsored candidates
- G) Foreign Nationals

The minimum requirement and admission procedure are different for different categories (A to G) and are given in Section 2.7. Candidates should contact the appropriate office for details as per the addresses listed in Section 2.6. Candidates belonging to categories C to G cannot apply through the Online Application Portal.

2.6 Whom to Contact?

The candidates may write to the following offices for details about specific Programmes.

<u>For Categories A & B:</u> The Chairman M.Tech. Admission Committee GATE Office IIT Madras Chennai 600036	<u>For Category D:</u> The Chairman Centre for Continuing Education IIT Madras Chennai 600036
<u>For Categories C, E & G:</u> Deputy Registrar (Academic Courses) IIT Madras Chennai 600036	<u>For Category F:</u> Director General of Military Training General Staff Branch Army Headquarters DHQ PO, New Delhi 110011

2.7 Minimum Requirements

A. FOR GATE QUALIFIED CANDIDATES

Candidates qualified in GATE 2013 or GATE 2014 and satisfying any one of the following:

- (i) Bachelor's degree in Engineering/Technology/Architecture from educational Institutions approved by AICTE/Government
- (ii) Master's degree in Chemistry/Life Sciences/Mathematics/Physics related subjects from educational Institutions approved by UGC/ Government
- (iii) Degrees obtained through Distance Education/Correspondence Mode for the qualifying degree specified in [(i) or (ii)]. The Departments will follow test/interview procedure for screening in such cases.
- (iv) Candidates yet to appear or have appeared in the final examination for the qualifying degree specified in [(i) or (ii)] and whose results are likely to be declared by July 15, 2014.
- (v) Associate Membership holders of the professional bodies for admission into their **parent disciplines from the following:**
 - The Institution of Engineers (India) (AMIE)
 - The Aeronautical Society of India (AMAEI) (eligible only for aerodynamics, structures and propulsions streams)
 - The Indian Institute of Metals (AMIIM)
 - The Indian Institute of Chemical Engineers, including Polymer and Environmental Group (AMICHEM)
 - The Institution of Electronics and Telecommunication Engineers (AMIEETE)

B. FOR IIT GRADUATES

Candidates graduating/graduated from IITs with B.Tech. degree and having CGPA of 7.5 and above for SC/ST and 8.0 and above for others can apply without GATE Score. These applications will be reviewed by the respective Department(s).

C. FOR SPONSORED CANDIDATES

Candidates employed and sponsored (with full pay and allowances for 24 months) by industry/ government organizations/ private and public enterprises, engaged in R&D work recognized by DST/ engineering colleges recognized by AICTE, possessing at least two years of professional experience as on the last date of receipt of applications at IIT Madras can apply, provided they hold:

- (i) B.E./B.Tech. degree from AICTE recognized Engineering Colleges/University with first class or 60% aggregate marks in all the four years (no need for having GATE Score); or
- (ii) AMIE or any other Associate memberships listed above (no need for having GATE Score)

D. FOR QUALITY IMPROVEMENT PROGRAMME (QIP) CANDIDATES

M.Tech. under Quality Improvement Programme (sponsored by AICTE) is advertised separately and the selection of QIP candidates is made through a test/interview.

E. FOR USER ORIENTED PROGRAMMES (UOP)

Please refer to Section 4 for details of these Programmes.

F. FOR DEFENCE SPONSORED CANDIDATES

M.Tech. Programme sponsored by Defence Authority (Research & Training and Post Graduate Training) is through a separate selection procedure.

G. FOR FOREIGN NATIONALS

Foreign Nationals should contact "The Deputy Registrar (Academic Courses), IIT Madras, Chennai – 600036, India".

2.8 How to Apply?

2.8.1 FOR GATE QUALIFIED CANDIDATES AND IIT GRADUATES WITH B.TECH. DEGREE (Refer Sections 2.7 A & B):

Apply ONLINE at <http://mtechadm.iitm.ac.in>

(Instructions and further links available on the Website)

Website Opens on 29th March, 2014 Website Closes on 12th April, 2014

Application fee: Rs.100 /- for SC/ST/PwD Candidates and Rs.200/- for others

In case of difficulty in applying ONLINE, please contact

The Chairman
M.Tech. Admission Committee
GATE Office
Indian Institute of Technology Madras
Chennai 600036

Phone: 044 - 22578200
Fax: 044 -22578204
E-mail: mtechadm@iitm.ac.in

The application fee should be paid online at the online Application website.

Last dates:

- i) For applying Online : 12.04.2014, 23:59 hrs.
ii) For receipt of signed applications at GATE Office : 15.04.2014

Before you start filling the ONLINE application form, please pay attention to the following:

- (a) Carefully read all the instructions given herein.
- (b) Study Tables 1, 2 and 3 carefully, along with details of Programmes in Section 3.
- (c) If you satisfy the minimum requirement (Section 2.7 A/B), choose your options from Table 1 (also refer Tables 2 and 3) and decide your choices of Programmes. Note that Programme codes ending with Y indicate HTTA and N indicate N-HTTA.
- (d) Note the following additional Suitability Test/ Interview (refer Table 3) requirements for:
- (i) Associate membership holders of various recognized professional societies applying for MA1 Programme.
 - (ii) Candidates with XE Gate Paper, applying to AM1, AM2, CE2 and CE4 Programmes.
 - (iii) ZE/ZS candidates must upload a complete list of courses studied during their degree Programme with syllabi. They may be considered for admission to the Programmes relevant to the discipline of their qualifying degree as decided by the concerned Departments. If they are considered, they may have to take suitability test/interview.
 - (iv) Candidates having degrees obtained through Distance Education/Correspondence Mode, who apply to AM1, AM2, CS1, MA1, MM1, OE1, OE2, PE1 and PH1

If you are called for the Suitability Test/ Interview, you need to be present to be considered for that particular Programme. Even if you do not attend the Suitability Test/ Interview for a particular Programme, you will still be considered for the other Programmes that you have chosen in your application and that do not require Suitability Test/ Interview.

- (e) Keep ready the soft copy of the following documents (if applicable) for uploading at the website:
- Persons with Disability (PwD) are required to upload a certificate of disability from the AUTHORIZED MEDICAL BOARD ATTACHED TO one of the following - Vocational Rehabilitation Centre (VRC) for Physically Handicapped persons/ Special Employment Exchange for Physically Handicapped/ Government Hospital (District and State level).
 - SC/ST Certificate
 - OBC (Non-Creamy Layer) Certificate: To consider under OBC category, candidates should upload the OBC (Non-Creamy Layer) certificate in the format prescribed by Government of India issued by competent authorities available in the website <http://mtechadm.iitm.ac.in>. Submission of only BC or MBC certificate will not be treated as OBC category. If no valid OBC (Non-Creamy Layer) certificate copy is enclosed, the candidate will be treated under General category.
 - Complete list of courses with syllabi in case of ZE/ZS candidates
 - Complete Grade Card(s) till date in case of IIT B.Tech. candidates

The upload instructions will be available on the online application website.

- (f) Exercise utmost care in choosing the order of choices as the process of selection is computerized. An error in the list of choices may even lead to rejection of your application.
- (g) Complete the application in all respects. No changes in the application are permitted afterwards.
- (h) Do not submit more than one application form.
- (i) Application Fee should be paid online at the online application website.
- (j) After completing the online application form, take a print out of your online application, affix your recent passport size photograph and sign.
- (k) Your signed application form (downloaded copy) should reach The Chairman, M.Tech. Admission Committee, GATE Office, IIT Madras, Chennai 600036, on or before 15th April, 2014.

2.8.2 FOR SPONSORED CANDIDATES [Refer Sections 2.5 (C) and 2.7 (C)]

The application form can be downloaded from IIT Madras website (<http://www.iitm.ac.in>) under Notices.

- a) Before filling the application form, ensure that you satisfy the minimum requirements stipulated in Section 2.7 C.
- b) While filling the choices, follow column (3) (Discipline Code) of Table 1. The Programme codes should not end with Y or N as HTTA is not applicable to the sponsored candidates.
- c) Along with the application form, the candidate should enclose (not stapled) the Sponsorship Certificate, SC/ST/OBC (Non-Creamy Layer) certificate (if applicable) and certificate by competent Medical Board for Persons with Disability (PWD) candidates (if applicable).
- d) Your filled-in application form with relevant enclosures should reach The Deputy Registrar (Academic Courses), IV Floor, Administrative Block, IIT Madras, Chennai 600036, before April 21, 2014 by post.

Table 1 – M.Tech. Programmes in Various Departments / Programmes

No.	Department / Degree / Programme	Discipline Code	Code (for Choices)	No. of Seats
Department of Aerospace Engineering – M.Tech. in Aerospace Engineering				
1.	Aerospace Engineering	AE1	AE1Y	12
			AE1N	3
Department of Applied Mechanics – M.Tech. in Engineering Mechanics and M.Tech. in Biomedical Engg.				
2.	Engineering Mechanics (Fluid Mechanics/Solid Mechanics)	AM1	AM1Y	10
			AM1N	2
	Biomedical Engineering	AM2	AM2Y	6
			AM2N	1
Department of Chemical Engineering – M.Tech. in Chemical Engineering				
3.	Chemical Engineering	CH1	CH1Y	27
			CH1N	5
Department of Civil Engineering – M.Tech. in Civil Engineering				
4.	Building Technology and Construction Management	CE1	CE1Y	7
			CE1N	1
	Environmental Engineering	CE2	CE2Y	6
			CE2N	1
	Geotechnical Engineering	CE3	CE3Y	7
			CE3N	1
	Hydraulic and Water Resources Engineering	CE4	CE4Y	6
			CE4N	1
	Structural Engineering	CE5	CE5Y	13
			CE5N	3
Transportation Engineering	CE6	CE6Y	8	
		CE6N	1	
Department of Computer Science and Engineering – M.Tech. in Computer Science and Engg.				
5.	Computer Science and Engineering	CS1	CS1Y	54
Department of Electrical Engineering - M. Tech. in Electrical Engineering				
6.	Communication Systems	EE1	EE1Y	17
	Power Systems and Power Electronics	EE2	EE2Y	11
	Micro Electronics and VLSI Design	EE3	EE3Y	14
	Control and Instrumentation	EE4	EE4Y	11
	Photonics	EE5	EE5Y	10
Department of Mathematics - M.Tech. in Industrial Mathematics and Scientific Computing				
7.	Industrial Mathematics and Scientific Computing	MA1	MA1Y	10
			MA1N	3
Department of Mechanical Engineering - M. Tech. in Mechanical Engineering				
8.	Thermal Engineering	ME1	ME1Y	36
			ME1N	4
	Design	ME2	ME2Y	20
			ME2N	4
	Manufacturing Engineering	ME3	ME3Y	18
			ME3N	3
Department of Metallurgical and Materials Engineering - M. Tech. in Metallurgical and Materials Engg.				
9.	Metallurgical and Materials Engineering	MM1	MM1Y	20
			MM1N	4
Department of Ocean Engineering - M. Tech. in Ocean Engineering				
10.	Ocean Engineering	OE1	OE1Y	14
			OE1N	1
	Ocean Technology*	OE2*	OE2Y	10
Department of Physics - M. Tech. in Solid State Technology				
11.	Solid State Technology	PH1	PH1Y	11
			PH1N	1
Interdisciplinary M.Tech. Programmes				
12.	M.Tech. in Catalysis Technology (Co-ordinating Dept. – Chemical Engg.)	CA1	CA1Y	6
13.	M.Tech. in Clinical Engineering (Co-ordinating Dept. - Biotechnology)	CL1	CL1Y	16
14.	M.Tech. in Nuclear Engineering (Co-ordinating Dept. - Chemical Engg.)	NE1	NE1Y	12
15.	M.Tech. in Petroleum Engineering (Co-ordinating Dept. – Ocean Engg.)	PE1	PE1Y	12
TOTAL			Y	404
			N	39
TOTAL				443

Y – With Half-Time Teaching Assistantship (HTTA)

N – Without Half-Time Teaching Assistantship (N-HTTA)

* – Assistantship sponsored by NIOT

Table 2: M.Tech. Programmes: Eligibility for Admission

Discipline of Qualifying Degree	Qualifying Discipline Code	Eligible <u>M.Tech. 2014 Programme Codes</u> (to which applications can be submitted) For details on additional requirements for each Programme, refer <u>Table 3</u>
Qualifying Disciplines in Engineering / Technology		
Aeronautical/Aerospace Engg.	AE	AE1, AM1, AM2, CL1, CS1, MA1, ME1, ME2, ME3, OE1, OE2
Agricultural Engineering	AG	CE2, CE4, CL1, CS1
Architecture (B.Arch.)	AR	CE1, CE6, CL1, CS1
Automobile Engineering	AU	AE1, AM1, CL1, CS1, ME1, ME2, ME3
Biochemical Engineering	BI	CH1, CL1, CS1
Biomedical Engineering	BM	AM2, CL1, CS1, EE4
Biotechnology	BT	CE2, CL1, CS1, MM1
Ceramics	CR	CL1, CS1, MM1
Chemical Engineering	CH	AE1, AM1, AM2, CA1, CE2, CH1, CL1, CS1, MA1, ME1, MM1, NE1, PE1
Civil Engineering	CE	AE1, AM1, AM2, CE1, CE2, CE3, CE4, CE5, CE6, CL1, CS1, MA1, OE1, OE2
Computer Science	CS	AE1, AM2, CL1, CS1, MA1, ME3
Electronics and Communications Engg.	EC	AE1, AM2, CL1, CS1, EE1, EE2, EE3, EE4, EE5, MA1, ME3, PH1
Electrical and Electronics Engg.	EE	AE1, AM2, CL1, CS1, EE1, EE2, EE3, EE4, EE5, MA1, ME3, PH1
Energy Engineering	EN	AE1, CL1, CS1, EE2, ME1
Engineering Physics	EP	CL1, CS1, EE1, EE2, EE3, EE4, EE5, PH1
Environmental / Environmental and Civil Engg.	EV	CE2, CE4, CH1, CL1, CS1
Industrial Engineering	IE	CS1, CL1, ME3
Instrumentation	IN	AE1, AM2, CL1, CS1, EE1, EE2, EE3, EE4, EE5, ME3
Information Technology	IT	CL1, CS1
Mechanical Engineering	ME	AE1, AM1, AM2, CE2, CE4, CL1, CS1, MA1, ME1, ME2, ME3, MM1, NE1, OE1, OE2, PE1
Manufacturing Engineering	MF	AE1, CL1, CS1, ME3, MM1
Machine Tool Engineering	ML	CL1, CS1, ME3
Metallurgical and Materials Engg.	MM	AE1, AM1, AM2, CL1, CS1, MA1, MM1, NE1, PH1
Marine Engineering	MR	CL1, CS1, ME1, OE1, OE2
Naval Architecture	NA	AE1, AM1, CL1, CS1, MA1, ME3, OE1, OE2
Petroleum Engineering	PE	CL1, CS1, ME1, PE1
Production and Industrial Engg.	PI	CL1, CS1, ME3
Production Engineering	PR	AE1, CL1, CS1, ME3, MM1
Other Disciplines in Engineering/Technology	ZE	AE1, AM1, AM2, CA1, CE1, CE2, CE3, CE4, CE5, CE6, CH1, CL1, CS1, EE1, EE2, EE3, EE4, EE5, ME1, ME2, ME3, MM1, NE1, OE1, OE2, PH1
Qualifying Disciplines in Science		
Chemistry	CY	CA1, CS1, MM1
Geology and Geophysics	GG	CS1, PE1
Maths/Applied Maths	MA	CS1, MA1
M.Sc. Computer Science	MC	CS1
Master of Computer Applications	MP	CS1
Materials Science	MS	CS1, MM1, PH1
Nanotechnology	NT	CS1, MM1
Operations Research	OR	CS1
Physics/Applied Physics	PH	CS1, EE5, MA1, MM1, NE1, PH1
Statistics	ST	CS1
Master's Degree in Life Sciences	ZL	CS1
Other Disciplines in Science	ZS	AE1, CA1, CH1, CS1, ME1, ME2, MM1, NE1

Table 3: M.Tech. Programmes: Eligible Disciplines, Seats available and Additional Requirements

No.	Programme Code	Eligible Discipline Codes	HTTA	Non-HTTA	Additional Requirements
1.	AE1	AE	3	0	GATE Paper must be AE, CE, ME or XE
		ME	6*	2*	
		AU, CE, CH, EN, MF, MM, NA, PR	2*	1*	
		CS, EC, EE, IN, ZE, ZS	1*	0	
2.	AM1	AE, AU, CE, CH, ME, MM, NA, ZE	10	2	GATE Paper must be AE, CE, CH, ME, MT or XE (Test/Interview for XE GATE Paper)
	AM2	BM	2	1	GATE Paper must be AE, CE, CH, CS, EC, EE, IN, ME, MT or XE (Test/Interview for XE GATE Paper)
		IN	2*	0	
		AE, CE, CH, CS, EC, EE, ME, MM, ZE	2*	0	
3.	CA1	CH, ZE	3	0	GATE Paper must be CH or CY
		CY, ZS	3*	0	
4.	CE1	CE	4	1	GATE Paper must be AR or CE
		AR	2	0	
		ZE	1	0	
	CE2	CE	4	1	GATE Paper must be AG, BT, CE, CH, ME or XE (Test/Interview for XE GATE Paper)
		AG, BT, CH, EV, ME, ZE	2*	0	
	CE3	CE	6	1	GATE Paper must be CE
		ZE	1*	0	
	CE4	CE	3	1	GATE Paper must be AG, CE, ME or XE (Test/Interview for XE GATE Paper)
		AG	2	0	
		EV, ME, ZE	1*	0	
	CE5	CE	12	3	GATE Paper must be CE
		ZE	1*	0	
	CE6	CE	6	1	GATE Paper must be AR or CE
		AR, ZE	2*	0	
5.	CH1	BI, CH, EV, ZE, ZS	27	5	GATE Paper must be CH
6.	CL1	AE, AG, AR, AU, BI, BM, BT, CE, CH, CR, CS, EC, EE, EN, EP, EV, IE, IN, IT, ME, MF, ML, MM, MR, NA, PE, PI, PR, ZE	16	0	GATE Paper must be AE, BT, CE, CH, CS, EC, EE, IN, ME, MN, MT, PI, TF or XE
7.	CS1	All Disciplines of Qualifying Degree	54	0	GATE Paper must be CS
8.	EE1	EC, EE, EP, IN, ZE	17	0	GATE Paper must be EC
	EE2	EC, EE, EN, EP, IN, ZE	11	0	GATE Paper must be EE
	EE3	EC, EE, EP, IN, ZE	14	0	GATE Paper must be EC
	EE4	IN	7	0	GATE Paper must be IN
		BM, EC, EE, EP, ZE	4	0	GATE Paper must be EC or EE
	EE5	PH, EP	5	0	GATE Paper must be PH
EC, EE, IN, ZE		5	0	GATE Paper must be EC, EE or IN	
9.	MA1	MA	6	3	Screening process and suitability test for Associate membership holders of various recognized professional societies
		PH	2*	0	
		AE, CE, CH, CS, EC, EE, ME, MM, NA	2*	0	

No.	Programme Code	Eligible Discipline Codes	HTTA	Non-HTTA	Additional Requirements
10.	ME1	ME	34	3	Nil
		AE, AU, CH, EN, MR, PE, ZE, ZS	2*	1*	
	ME2	ME	18	3	Nil
		AE, AU, ZE, ZS	2*	1*	
	ME3	ME	16	2	Nil
		AE, AU, CS, EC, EE, IE, IN, MF, ML, NA, PI, PR, ZE	2*	1*	
11.	MM1	MM	15	3	Nil
		BT, CH, CR, CY, ME, MF, MS, NT, PH, PR, ZE, ZS	5*	1	
12.	NE1	CH	3	0	GATE Paper must be CH, ME, MT, PH or XE
		ME	3	0	
		MM	3	0	
		PH	3	0	
13.	OE1	AE, CE, ME, MR, NA, ZE	14	1	GATE Paper must be other than XL
	OE2	AE, CE, ME, MR, NA, ZE	10**	0	GATE Paper must be other than XL
14.	PE1	ME	3	0	GATE Paper must be CH, GG (with Part B Geophysics), ME or XE
		GG	3	0	
		CH	3	0	
		PE	3	0	
15.	PH1	PH	9	1	Nil
		EC, EE, EP, MM, MS, ZE	2*	0	

* The indicated number will be considered as the maximum number of available seats for that group of eligible disciplines and the seats will be allotted from the combined merit list (along with discipline mentioned in the first row)

** Assistantship sponsored by NIOT

- **ZE/ZS candidates must upload a complete list of courses studied during their degree Programme with syllabi. They may be considered for admission to the Programmes relevant to the discipline of their qualifying degree as decided by the concerned Departments. If they are considered, they may have to take suitability test/interview.**
- **Candidates with degrees obtained through Distance Education/Correspondence Mode must take test/interview for the following Programmes: AM1, AM2, CS1, MA1, MM1, OE1, OE2, PE1 and PH1.**
- **Applications of candidates with B.Tech. from IITs, applying for admission without GATE Score will be reviewed by the respective Department(s). They must upload the all Grade Card(s) pertaining to the B.Tech. Programme at the website.**

2.9 Admission procedure for GATE qualified candidates

- Admission to candidates (who are not required to take test/interview/suitability test) will be finalized strictly in the order of merit as per the GATE Score (CGPA & Department Review for IIT Graduates) and on the basis of choices given by them in the application.
- Candidates requiring Suitability Test/Interview shall report at the office of the Head of the respective Department as per the following schedule:

Date of Suitability Test/Interview **3rd May, 2014**

Time: 8:30 a.m.

Persons with Disability (PwD): For PwD candidates with any category of disability (viz., blindness or low vision, hearing impairment, locomotor disability or cerebral palsy), benefit will be given to only those who have at least 40% permanent physical impairment in relation to a body part/system/extremity/whole body, etc. Such candidates must upload, along with the Application Form, the certificate of disability from the authorized medical board attached to one of the following: Vocational Rehabilitation Centre (VRC) for Physically Handicapped persons /Special Employment Exchange for Physically Handicapped/ Government Hospital (District and State level).

First set of offers for HTTA and N-HTTA seats are likely to be sent by 15th May 2014. The candidates have to make online payment of Advance Fees and send their **ORIGINAL GATE SCORECARD** (refer to Section 2.10 for details) within the stipulated date to The Chairman, M.Tech. Admission Committee, GATE Office, IIT Madras, Chennai - 600036. Second and subsequent offers may be made depending on the availability. In the final round, seats unfilled, if any, within a department offering multiple Programmes will be re-distributed to other Programmes within the department.

- Updating

There is a possibility of updating the Programme for the candidates who have already accepted the offer of admission, depending upon the availability of vacancies subsequently. Please note that during the updating, depending on the indicated order of preference, it is possible for a candidate to switch from a HTTA seat to an N-HTTA seat if N-HTTA is higher in order of preference given by the candidate.

- Spot Admission

(Only for applicants who are called for spot admission)

If all the seats are filled during the first, second and subsequent offers, spot admission may not be operated.

Depending upon the final number of vacancies and availability of seats in different Programmes before the closure of admissions, some of the candidates, who have already applied but could not secure admission in the first, second and subsequent offers will be informed to appear before the Admission Committee at GATE Office of the Institute with relevant documents and fees. The list of candidates called for spot admission will also be displayed on the website.

Seats unfilled after the final round of offers may be re-distributed to Programmes across the departments. Admission will be offered for HTTA and N-HTTA unfilled seats on the spot to suitable candidates. They should join immediately by paying the fees. This is an additional opportunity provided and hence candidates should be prepared to take the risk of not getting a seat. Candidates appearing for Spot Admission will have to travel at their own expense.

Reporting for Admission

GATE qualified candidates and IIT B.Tech. graduates who accept the offer of admission must produce completion certificate of their qualifying degree examination and join the Institute on 21st July, 2014 (Monday) forenoon. Failure to do so will result in cancellation of the offer of admission. Sponsored candidates also should report for admission on 21st July, 2014 (Monday) afternoon. Selected candidates will have to pay various fees and deposit amounts as applicable. The candidate must produce a medical fitness certificate from a Registered Medical Practitioner in the format which will be enclosed along with the letter of offer of admission.

In all matters relating to admission, the decision of the M.Tech. Admission Committee is final.

2.10 Details of Fees and Deposits

The break-up of various fees and deposits for all the four semesters are given in Table 4.

Table 4: Fees and Deposits

A. One Time Payment

No.	Details of Fees	July-Dec 2014 (Rs.)
1.	Admission fee	150
2.	Grade Card	150
3.	Provisional Certificate	100
4.	Medical Examination Fee	100
5.	Student Welfare Fund	500
6.	Modernisation Fee	500
7.	Alumni Life Membership	500
8.	Publication	250
Total – A		2250

B. Semester Fees

No.	Details of Fees	July- Dec 2014 (Rs.)	Jan-May 2015 (Rs.)	July-Dec 2015 (Rs.)	Jan- May 2016 (Rs.)
1.	Tuition Fee**	5000	5000	5000	5000
2.	Examination Fee	300	300	300	300
3.	Registration & Enrolment	300	300	300	300
4.	Gymkhana	1000	1000	1000	1000
5.	Medical Fee and Student Wellness Fee	400	400	400	400
6.	Hostel Seat Rent*	3000	3000	4000	4000
7.	Fan, Electricity & Water Charges*	750	750	750	750
8.	Medical Insurance Premium (per annum) [@]	927	-	927	-
Total - B		11677	10750	12677	11750

C. Deposits (Refundable)

1.	Institute Deposit (Rs.)	1000
2.	Library Deposit (Rs.)	1000
Total – C		2000

D. Payable to the Chairman, Council of Wardens

No.	Details of Fees	July- Dec 2014 (Rs.)	Jan-May 2015 (Rs.)	July-Dec 2015 (Rs.)	Jan- May 2016 (Rs.)
1.	Hostel Admission Fee	100	100	100	100
2.	Hostel Deposit (Refundable)*	2000	-	-	-
3.	Advance Dining Charges	12000	12000	12000	12000
4.	Hostel Establishment 'A' Charges***	5000	5000	5000	5000
5.	Hostel Establishment 'B' Charges***	1000	1000	1000	1000
6.	Solid Waste Disposal***	50	50	50	50
Total - D		20150	18150	18150	18150

Notes/ Exceptions

@ Subject to revision

* Only for students who opt for hostel accommodation in the campus.

**SC/ST Students are exempted from payment of Tuition Fee.

Sponsored candidates have to pay tuition fee of Rs. 25,000/- per semester.

***Day Scholars also have to pay this amount.

Fees are subject to revision from time to time as decided by the Institute

Initial Payment during Offer of Admission

When Admission is offered and accepted by candidates, an amount of **Rs.1000** shall be paid as Advance towards Institute Fee/Processing Fee. Online Payment facility will be available on the website. The remaining amount of Institute Fee shall be paid online before the date of reporting for Admission at the Institute (21st July 2014). The link for payment of the remaining amount will be made available to the concerned candidates. In case a candidate withdraws his/her offer of Admission, the initial payment of Rs. 1000 shall be treated as Processing Fee and will not be refunded.

3. M.TECH. PROGRAMME HIGHLIGHTS

I. DEPARTMENT OF AEROSPACE ENGINEERING

M.Tech. in Aerospace Engineering (AE1)

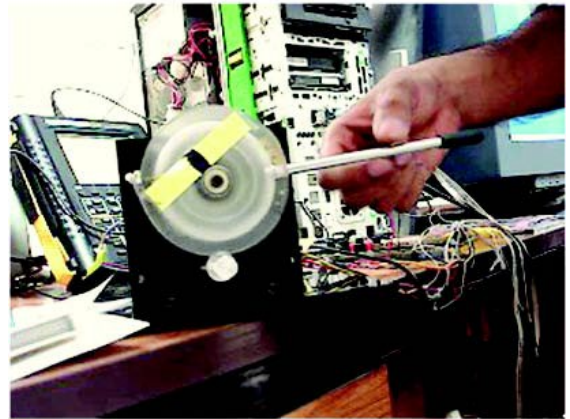
This Programme is based on a common core in the areas of aerodynamics, space technology, design, propulsion and structures. A number of elective courses are available for specialisation in areas related to aerospace engineering. Candidates with specialisations other than aeronautical / aerospace engineering have to undergo certain basic core courses during the first semester. There is provision for aeronautical / aerospace graduates to opt for other courses in lieu of basic core courses. Students also can choose elective courses offered by other departments which are of interest and have a direct bearing on the Programme of studies. Computational facilities with appropriate software support as well as experimental facilities in aerodynamics, propulsion, guidance/control and structures are available for project work.



II. DEPARTMENT OF APPLIED MECHANICS

M.Tech. in Engineering Mechanics (AM1) and M.Tech. in Biomedical Engineering (AM2)

Applied Mechanics is the only department in IIT Madras dedicated to Post Graduate programs in Engineering completely. In view of its unique interdisciplinary academic activities candidates from wide range of Engineering disciplines (see Tables 2 and 3) are eligible to apply.



Engineering Mechanics (Fluid Mechanics and Solid Mechanics) (AM1):

First Semester is common for all the students of this specialization. Based on the performance in the first semester and their preference, students will be allotted to either of these two groups.

Fluid Mechanics covers turbulence, hydrodynamic instability, convection, fluid-structure interaction, bio-fluid mechanics, waves, micro scale flows and environmental flows. Solid Mechanics covers continuum theory, plates and shells, plasticity, fracture mechanics, modeling of materials, dynamics of structures, finite and boundary element methods, experimental stress analysis, digital photo mechanics. The students can choose analytical and experimental approaches for their project works.

Biomedical Engineering (AM2):

Closing the gap between the engineering and medicine, this specialization covers science and technology to understand the complexity of human physiology and pathology and to design and develop new diagnostic and rehabilitation techniques. A number of courses have been designed towards this objective and the students can undertake projects in medical instrumentations, imaging, signal processing, biomechanics, rehabilitation, haptics, etc.

III. DEPARTMENT OF BIOTECHNOLOGY

M.Tech. in Clinical Engineering (CL1)

The use of advanced technology is an essential requirement of the modern medical practice. Thus, presence of well-trained Clinical Engineers within the healthcare system is also needed to ensure effective and safe use of this technology. Clinical Engineers are an integral part of the clinical and management team, and work closely with the medical practitioners to achieve optimal use of technology in healthcare. Clinical Engineers, being directly exposed to clinical set-up, can identify the un-met clinical need and apply their design and development skills to provide innovative solutions, which can fundamentally change the medical practice in the future.

The Joint M. Tech. Clinical Engineering Programme is the FIRST Programme in the country to formally train Graduate Engineers as Clinical Engineers. It was launched in 2008 with the support of Department of Science and Technology, Government of India.



Indian Institute of Technology Madras (One of the country's premier Institutes in technology education and research), Sree Chitra Tirunal Institute of Medical Sciences and Technology (SCTIMST), Trivandrum (A leading National Institute involved in technology development for

medical devices and a tertiary care hospital) and Christian Medical College (CMC), Vellore (One of the finest medical colleges and research institutes, and a 2500 bedded multi-speciality hospital) jointly run the M.Tech. (Clinical Engineering) Programme. It brings together three of the best Institutions in the country that combine engineering, medicine and management. It has been designed to enable students to develop comprehensive knowledge in the field and acquire multiple skills to become highly proficient Clinical Engineers.

The selection will be done on an All-India basis, through a screening test and a personal interview of eligible candidates. The M.Tech. Programme will be of two-and-a-half years duration. The students will study and work at all the three participating Institutes. Fellowship is awarded to all the selected students for the complete duration (2.5 years) of the Programme. An aptitude for engineering and an interest in working in a hospital environment is desirable for the Programme.

Highlights of the Programme:

- A minimum of one semester in each institution, where engineering, medical and management courses are taught formally.
- Clinical Attachment (1 year in CMC, Vellore and SCTIMST, Trivandrum) gives a direct exposure to different departments of these hospitals to give an insight into the realities of a typical healthcare system.
- Internship (6 Months in SCTIMST, Trivandrum) - To work as a Clinical Engineer in the tertiary care hospital of the Institute.
- One week training in peripheral/ rural hospitals around the country.
- Short training in a medical device / medical instrumentation industry.
- Guest lectures and short courses by eminent professionals from leading hospitals and institutions of the country.
- Thorough exposure to medical device design and development processes.

For further details about the Clinical Engineering Programme, please visit <http://www.biotech.iitm.ac.in/mcephd/>. You can also contact Professor Mukesh Doble, Institute Co-ordinator, Joint Programmes with SCTIMST and CMC, Department of Biotechnology, IIT Madras, Chennai – 600036.

IV. DEPARTMENT OF CHEMICAL ENGINEERING

M.Tech. in Chemical Engineering (CH1)

The M.Tech. Programme in Chemical Engineering is spread over four semesters. The main emphasis in the first two semesters is on course work. Courses are classified as core or compulsory courses and electives. The former includes Chemical Reactor Theory, Transport Phenomena, Thermodynamics and Mathematical Methods in Chemical Engineering. In core courses advanced topics are covered and presented in a holistic framework. The elective courses are decided by the student in consultation with his/her thesis supervisor. These are intended to



provide expertise in the research area of interest for the student and also equip the student with the necessary tools and concepts for carrying out research. The Programme is designed so that the students are evaluated on a continual basis. Emphasis is also placed on developing the written and oral communication skills of students.

The research project constitutes a major part of the work in the second year. The student under the supervision of a faculty member carries out state of the art research in the frontier areas of chemical engineering such as computational fluid dynamics, materials science, biochemical

engineering, environmental engineering, process control, reaction engineering, transport phenomena, particle technology, semi-conductor processing, etc. The research involves solving problems of industrial relevance as well as of fundamental significance.

The M.Tech. Programme equips students with skills which enable them to contribute to the development of chemical industry in India. The scope of each research area in the Chemical Engineering Department of IIT Madras is given below:

Fundamental studies

Mathematical modeling of physico-chemical phenomena. Applied statistical mechanics, thermodynamic property estimation, phase equilibria. Flow visualization using lasers, microwave assisted thawing. Drying, multi-component boiling and condensation, simultaneous heat and mass transfer processes.

Modeling of processes and equipment

Hydrodynamic and kinetic studies of turbulent bed contactors, trickle beds, slurry reactors, fast and inverse bed fluidized beds. CFD analysis of process equipment. Advanced separation processes such as reactive and azeotropic distillation, membrane processes. Modeling of rotary kilns, crushing and grinding equipment, fluid energy mills. Bio-process engineering and optimization; analysis of bio-reactors. Microelectronic fabrication techniques.

Development, characterization and processing of materials

Development of polymer blends and composites, polymer based nano-composites. Rheology of polymers and colloids; damping and vibration isolation using polymers.

Process design and control, systems engineering

Advanced control design such as adaptive control, intelligent control, non-linear control, fault diagnosis and fault tolerant control. Synthesis and optimization of process systems; statistical data processing. Simulation and optimization of crushing and grinding circuits.

Environmental engineering and waste reduction

Liquid and solid waste treatment, air pollution monitoring and control, toxic and hazardous waste management, environmental risk assessment, colour removal from waste water. Recycling of mixed plastic waste.

V. DEPARTMENT OF CIVIL ENGINEERING

M.Tech. in Civil Engineering

The following six Programmes are offered in M.Tech. Civil Engineering Discipline:

Building Technology and Construction Management (CE1)

This unique specialization offers courses covering a range of subjects in Building Sciences, Construction Materials, and Construction Engineering and Management areas, which include:

Building Science: Functional design of buildings, Buildings acoustics & noise control, Building services, and Energy management in buildings.

Construction Materials: Modern construction materials, Characterisation of Construction Materials, Advanced concrete technology, Maintenance & rehabilitation of constructed facilities, and Structural systems & design.



Construction Engineering and Management: Construction methods and equipment, Sustainable Construction, Construction planning and control, Construction project management, Construction economics and finance, Quality and safety management, Lean construction, Construction contracts & specifications, and Computer applications in construction.

Environmental Engineering (CE2)

This interdisciplinary Programme is designed to meet the needs of both government departments/ public sector and industry, with emphasis on various aspects like protected water supply and sanitation for public health, pollution control and sustainable development. The topics to be covered include protected water supply, waste water management, air pollution control, solid waste management, ground water pollution-fate, transport and remediation, environmental planning and impact assessment, modelling of air and water quality environmental chemistry, environmental microbiology biotechnology and environmental systems analysis.

Geotechnical Engineering (CE3)

This Programme provides specialized knowledge in various geotechnical engineering topics such as foundation engineering, ground improvement techniques, design of retaining walls, underground excavations, etc. A wide range of subjects such as advanced soil mechanics, rock mechanics, soil exploration and testing, applied soil mechanics, advanced foundation engineering, soil dynamics and machine foundations, earthquake geotechnical engineering, geoenvironmental engineering, geosynthetics and reinforced soil structures, ground improvement, finite element analysis and constitutive modelling of soils, geotechnics for infrastructures, and seismic site characterization are included in the curriculum.

Hydraulic and Water Resources Engineering (CE4)

This Programme provides a strong conceptual background in areas such as irrigation, hydrology, hydropower, water supply, flood control, through a wide range of courses including applied fluid mechanics, free surface flows, surface water, hydrology, water resources planning and management, hydraulic modeling, irrigation technology, ground water engineering, contaminant transport, finite element methods in water resources, unsteady open channel flows, stochastic methods in water resources technology, economics of water resources planning, hydraulic transients, environmental hydraulics, simulation of water resources system, urban hydrology and storm drainage design and management, coastal zone management, expert system and evolutionary algorithm applications to water resources problems, water quality modeling, computing techniques, computer aided analysis and design.

Structural Engineering (CE5)

This Programme deals with the following major areas: advanced structural mechanics, finite element analysis, structural dynamics, structural stability, structural reliability, structural optimization, reinforced and pre-stressed concrete, steel structures, design for wind and earthquake, plates and shells, bridges, tall buildings, towers, computer applications in structural engineering, fracture mechanics, masonry structures, power plant structures, composite structures.

Transportation Engineering (CE6)

This Programme covers a wide range of topics which includes urban transportation systems planning, transportation economics, traffic engineering and management, traffic flow theory, computer aided modeling of traffic and transportation systems, Intelligent transportation systems, travel demand modeling, transportation system analysis focusing on energy and environment, network optimisation, urban public transportation, geometric design of highways, pavement material characterization; flexible and rigid pavement analysis and design; constitutive modeling of bitumen, modified bitumen and bituminous mixtures; stress analysis of

layered structures; aging of binders, pavement design, pavement management, pavement evaluation, rural roads construction, use of alternate materials for flexible pavement construction, transportation terminals, railway engineering and waterway transportation.

VI. DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

M.Tech. in Computer Science and Engineering (CS1)

The objective of this discipline is to train the manpower required (a) to meet the industry needs of the country, (b) to pursue research in specialized areas, and (c) to meet the growing needs of engineering colleges for trained faculty in Computer Science and Engineering. The Programme includes courses covering the core of Computer Science and Engineering discipline and several electives in areas of Intelligent Systems and Knowledge Engineering, Human Computer Interaction, Theoretical Computer Science, Networks and Distributed Systems and Hardware Systems.



VII. DEPARTMENT OF ELECTRICAL ENGINEERING

The following five Programmes are offered in M.Tech. Electrical Engineering Discipline:

Communication Systems (EE1)

This Programme leads to specialization in modern communication system (with emphasis on broad band wireless communication), signal processing, optical and computer networks. Foundational graduate-level courses include probability and random processes, communication systems and digital signal processing. A number of advanced electives are available in the areas of digital communication, information theory, coding theory, wireless communications, speech & image signal processing, optical and data networks. Comprehensive laboratory training covers implementation on DSP processors & advanced wireline and wireless communications. The students opting for this Programme are expected to have good basic knowledge in the areas of analog & digital communications, signal processing. The mathematical backgrounds needed are (i) signals and systems (LTI systems and basic transform theory) and (ii) basic probability & random-processes.



Power Systems and Power Electronics (EE2)

This Programme leads to specialization in one or more of the following areas: electrical machines and drives, power electronics, power systems and high voltage engineering. Application of digital control methods in these areas could also be studied through an appropriate selection of the project work. In the first semester students have to undergo courses in the areas of power electronics, power systems, control engineering and instrumentation systems.

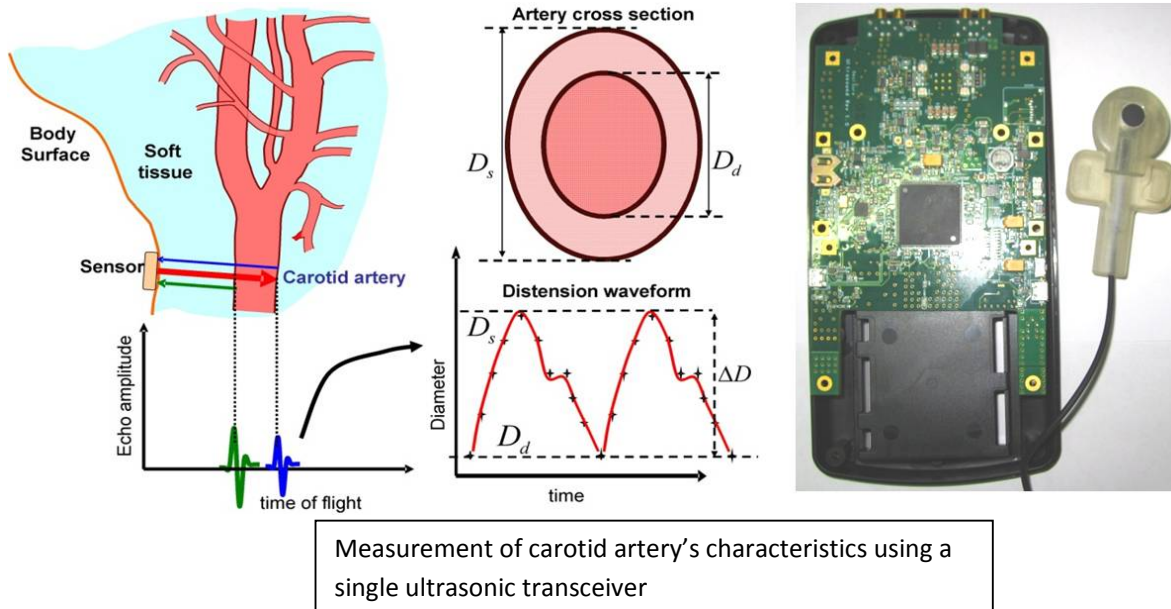
In the second semester, students get an opportunity to learn high voltage engineering and can further choose electives to further their knowledge in their specialization areas. Opportunity exists to take further advanced electives in the third semester besides starting on their project work. The fourth semester of the Programme is fully dedicated to a project work in the chosen area of specialization.

Micro Electronics and VLSI Design (EE3)

This Programme leads to specialization in the areas of semiconductor devices, VLSI technology, Micro Electro Mechanical Systems (MEMS), analog and digital IC design and architectures. A number of electives in the areas of VLSI design, mixed signal ICs, semiconductor device modeling, technology and characterization, photonic devices as well as MEMS are offered. The students have access to state of the art laboratory facilities and design tools.

It is desirable that students opting for this Programme have adequate background in semiconductor devices and analog and digital integrated circuits.

Control and Instrumentation (EE4)



This Programme leads to specialization in the areas of control theory and systems, robotics, electronics and instrumentation for biomedical, power and measurement applications. In addition to core subjects and laboratory courses that focus on control systems, electronics and instrumentation, a number of electives are offered in the areas of transducers, analysis and synthesis of control systems, biomedical instrumentation. The program has strong linkage with the Healthcare Technology Innovation Centre (www.htic.iitm.ac.in) operating out of IIT Madras Research Park. Students will have opportunities to work along with medical professionals and industry in developing technology solutions for unmet healthcare needs of India.

It is desirable that students opting for this Programme have strong fundamentals in control theory, instrumentation, analog and digital electronics.

Photonics (EE5)

Photonics deals with all aspects of light such as its generation, transmission, modulation, processing, switching, amplification, detection and sensing. Expertise in the area of Photonics in the EE department fall under the categories of

1. Devices and Components - Integrated optoelectronics, Fibre Bragg Gratings (FBGs), Plasmonics, Optical MEMS, All optical logic.
2. Subsystems - a combination of optoelectronic devices and mixed signal electronics for metrology and instrumentation.
3. Networks - Optical communication networks, both at a physical layer and the implementation of algorithms and protocols at the service layer, and advanced



encryption schemes using quantum key distribution. The program is supported by faculty from Departments of Physics, Applied Mechanics, and Engineering Design.

The curriculum for the Photonics Programme can be found in <http://www.ee.iitm.ac.in/optics/node/13>

The curriculum of all the five Programmes of M.Tech. includes a comprehensive twelve-month individual project. Students are exposed to cutting edge technology in these projects, and work on research problems that often serve as spring-boards to Research and Development careers.

VIII. DEPARTMENT OF MATHEMATICS

M.Tech. in Industrial Mathematics and Scientific Computing (MA1)

The primary objective of this Programme is to train the manpower required to deal with the problems faced by industry through knowledge of mathematical modeling and scientific computational techniques so as to achieve reduced costs, flexibility and high quality.



The curriculum is interdisciplinary in nature and the course contents provide a broad understanding of the different aspects of applied mathematics and computer applications. The lecture-based courses cover a wide spectrum of topics including mathematical modeling, applied statistics and probability, operations research, numerical methods, discrete mathematics, data structures and simulation. The laboratory courses provide necessary training in advanced techniques of software and simulation. Students are also required to take suitable courses from engineering and science departments. Modeling workshops, spread over two semesters, are an integral part of the Programme, during which the students gain proficiency in the modeling of real world problems, experience in team work and effective technical communication.

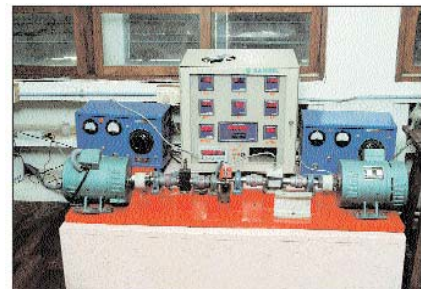
An important component of the Programme is the project work that will be done by the student in collaboration with industry and engineering / science departments. The aim of the projects is to impart in-depth training in the analysis of problems relevant to industry.

IX. DEPARTMENT OF MECHANICAL ENGINEERING

The following three Programmes are offered in M.Tech. Mechanical Engineering Discipline:

Thermal Engineering (ME1)

The Programme 'Thermal Engineering' offers courses related to theory and applications of thermal engineering. Core and Elective courses are offered by the Thermal Engineering faculty from the six laboratories comprising of (a) Thermodynamics and Combustion Engineering laboratory (b) Heat Transfer and Thermal Power laboratory (c) Hydroturbomachines laboratory (d) Internal Combustion Engines and Gas Turbines laboratory (e) Refrigeration and Airconditioning laboratory (f) Thermal Turbomachines laboratory. All students have to take 9 stream courses in the first two semesters.



The courses are as follows:

Semester I - Advanced Heat and Mass Transfer, I.C. Engines Combustion and Pollution, Refrigeration and Cryogenics, Incompressible Fluid Flow, Principles of Turbomachinery and Applied Thermodynamics.

Semester II - Numerical Methods in Thermal Engineering, Measurements in Thermal Engineering, Advanced Energy Conversion.

The students also have an opportunity to study 4 elective courses from the department (out of a total of 66 possible electives) and 1 free elective from any department. The students will undertake a two semester project in their second year.

Core courses are designed to provide the students the required base for undertaking specialized electives and the project. The student will pursue a project of his/her choice in any area in which the thermal engineering faculty are engaged.

Design (ME2)

Mechanical Design Programme offers courses related to the mechanical aspects of design and their application. All the students take six core (theory) courses and one laboratory in the first semester - computational methods in engineering, theory of mechanisms, theory of vibrations, principles of product design, design with advanced materials and advanced mechanics of solids.

Additional core subjects such as failure analysis, finite element analysis and a laboratory course on CAE are offered in the second semester. The students are offered a basket of electives such as design synthesis, design of transmission elements, gear design, CAD/CAM for product design, mechatronics, product reliability, design of transmission systems, fracture mechanics, tribo-design, tribo-instrumentation, nonlinear solid mechanics, optimization methods, rotor dynamics, random vibration, acoustics and noise control, vehicular vibration, chaotic vibration, advanced theory of vibration, modal analysis of mechanical systems, design for manufacture and assembly, theory of mixtures, mechanics of human movement.

The concepts learned through course work are useful for the project work done in the third and final semesters. The project work can be taken up in the following broad areas of expertise: Finite Element Analysis; CAE; Vibration; Acoustics and Noise Control; Fluid-structure interactions; Constitutive Material Modeling; Fatigue and Fracture; Machine Elements; Mechanisms; Kinematics; Non-Destructive Evaluation & Condition Monitoring; Structural Health and Condition Monitoring; Tribology; Fretting; Rotor Dynamics; Product Design; Bio-Mechanics, Human Body Kinematics, Prosthetics; Design Optimization and Reliability Engineering as well as in new and Emerging areas of mechanical engineering relating to design.

Manufacturing and Precision Engineering (ME3)

The courses offered in the first semester are computational methods in engineering, microprocessors in automation, robotics and robot applications, metrology and computer aided inspection, computer-aided design in manufacturing and computer numerical control. The core courses offered after the first semester in this Programme are advanced materials and processing, sensors for intelligent manufacturing & condition monitoring, mechatronics and oil hydraulics & pneumatic systems.

A good number of electives permit one to choose his/her area of interest within the broad spectrum of courses related to advanced manufacturing engineering, computer integrated manufacturing and precision engineering.

The list of electives include the courses such as production system design and control, handling system design, tooling for automated manufacturing & assembly, and management of finance, marketing & personnel, with a special emphasis on impact of computers in advanced manufacturing. Further, a wide variety of electives for in-depth study in specific areas of CIM

such as artificial intelligence in manufacturing, flexible manufacturing systems, machine vision & its applications are included. This also includes courses to give a clear understanding of the organizational aspects and total quality management of CIM environment. A number of electives are offered to cover precision engineering elements and instruments, manufacturing methods in precision engineering, precision drives & controls, applied optics, instrumentation and controls, and other important aspects of precision engineering which have assumed a great significance in the recent past for realizing a host of products ranging from IT to Aerospace.

The project work can be taken up in the areas such as computer applications in design and manufacturing, materials, heat treatment and manufacturing processes, process equipment and tools, process control and optimization, inspection, testing and quality assurance, manufacturing automation; sensors and handling devices. their selection, integration and control, simulation and management aspects. Project work can also be undertaken in the broad areas of instrumentation, robotics, precision manufacture, metrology, microprocessor system based development. CAD, adaptive and digital control system, active noise control, active suspension, embedded controllers for automotive application, sensor technology, micro actuators, dynamic balancing, magnetic suspension, gyroscopic systems, hydraulic and pneumatic systems, simulation and dynamic analysis, sintered bearings, mechatronic devices, computer aided surgery and Micro Electro Mechanical Systems (MEMS).

X. DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING

M.Tech. in Metallurgical and Materials Engineering (MM1)

This Programme is designed to strengthen understanding of the students in the core areas of metallurgical and materials engineering, and to meet the needs of Indian industry as well as R&D organizations. A blend of theoretical knowledge and modern laboratory and industrial practices is accomplished through a few core courses and sets of elective courses. These courses span the areas of materials technology and manufacturing processes such as metal forming and materials joining. In addition, courses pertaining to areas such as characterization techniques improve the ability of the student to adapt to emerging areas of research. There are certain core courses such as mechanical behaviour of materials, materials characterization, etc. to be taken up by all M.Tech. students. A set of elective courses apart from the core courses will give a firm foundation to the students in an area of their choice.



The department offers electives in the areas of advanced ceramics, advanced metallurgical thermodynamics, advanced powder processing, bio materials, ceramic science and technology, corrosion engineering, metal casting processes, metallurgical failure analysis, metallurgical process modeling, nano materials, solidification phenomena, surface degradation processes, and surface engineering.

Courses in the areas of manufacturing processes expose the students to metal forming equipment, metal forming processes, metal forming tools, plasticity and plastic deformation, press tools for metal forming, and special topics in metal forming. The students can get an understanding of topics related to joining of materials through courses on advanced topics in metal joining, stress analysis in weld design, welding application technology, welding metallurgy, and welding processes.

In addition, courses in the areas of X-ray diffraction techniques, electron diffraction and microscopy, surface phenomena, non-destructive evaluation and residual stress analysis will prepare the students to understand and use various characterization tools.

Apart from the departmental core and elective courses, some of the courses offered by other departments/specializations may also be taken. Seminars and summer industrial training are integral parts of the Programme. Projects work constitutes a significant part of the M.Tech. Programme.

For further information visit web site: <http://www.mme.iitm.ac.in>

XI. DEPARTMENT OF OCEAN ENGINEERING

M.Tech. in Ocean Engineering (OE1)

The M.Tech. Programme in Ocean Engineering relates to all forms of engineering activity in the oceans and includes deep-ocean, offshore and coastal waters. It is an interdisciplinary field which provides background to the students in a wide variety of areas such as offshore hydrodynamics, structural and foundation engineering, design and analysis of marine vehicles and floating systems, coastal engineering, design and analysis of offshore structures, ocean energy, instrumentation, experimental methods, and ocean engineering materials. A large number of electives provide opportunity to specialize in one or more areas of ocean engineering and equip students with skills in design, experiments and numerical modeling. This program prepares students to take up careers in offshore engineering pertaining to oil and gas, marine transportation, ports, coastal engineering etc.



M.Tech. in Ocean Technology (OE2)

M.Tech. in Ocean Technology is a full-time four semester program sponsored by the National Institute of Ocean Technology (NIOT), Ministry of Earth Sciences, to meet the needs of trained manpower in various ocean technology related projects in India.

Students opting for this program should have background either in engineering or in science and they should be interested in a career in technology, engineering systems which include marine transport, environment, ocean mining, underwater systems, ports and harbours, maritime security and marine scientific research. Ocean Engineering activities require a multi-disciplinary approach involving technical aspects of complex marine systems in coastal as well as deep ocean waters. The curriculum is specially tailored to encompass these aspects. Another important component of this program is shipboard training designed to give the students a feel for the sea and an opportunity to conduct scientific research in sea.

Eligibility: Candidates should have first class or 60% (55% in case of SC/ST) in Bachelor's degree in any branch of Engineering or Technology or Master's degree in Oceanography, Marine Sciences, Ocean Science and Technology, Applied Mathematics, Applied Geology, Geophysics, and Physics or any other equivalent degree approved by the Advisory Committee with minimum 2 years experience in NIOT or in an organization approved by NIOT. Fresh candidates with GATE score may also apply for a few seats approved by NIOT.

XII. DEPARTMENT OF PHYSICS

M.Tech. in Solid State Technology (PH1)

This discipline aims at teaching students the basic concepts of solid state technology and its recent applications. The lecture-based courses deal with the subject at the state-of-the art level, and cover a wide spectrum of topics, in order to provide a broad understanding of the different aspects of solid state technology. The topics include synthesis



and characterisation of materials, semiconductors, magnetic materials, optical and optoelectronic materials, superconductors, solid state ionics and semiconductor devices. Since this subject is interdisciplinary in nature, students are required to take courses from among related departments. The laboratory courses are formulated so as to provide necessary training in advanced topics of solid state technology.

An important component of the Programme is the project work. The aim of the project work is not only to impart training in research methodology and analysis but also to help the student gain an in depth understanding of a problem of relevance to industry.

XIII. M.Tech. PROGRAMMES (INTERDISCIPLINARY)

M.Tech. in Catalysis Technology (CA1)

This Programme will be coordinated by the Department of Chemical Engineering in association with the National Centre for Catalysis Research (NCCR). NCCR is a national centre established by the Department of Science and Technology, Government of India to promote human resource development in this vital area and also to be useful to the Indian industry.

Considering the needs of Indian Chemical industry, this Programme has been developed strictly adhering to the academic standards stipulated by our institute. Elective courses cover topics such as catalysis in green chemistry and environment, photo-catalysis, catalysis in petroleum technology, catalysis in the production of chemicals, nano-materials in catalysis, bio-catalysis and computational methods in catalysis. All these electives have been designed to reflect the frontiers of research and development that are going on in these areas. In addition the candidates have been given the option to choose the electives offered by the Chemical Engineering Department and also by the Department of Chemistry on surface chemistry and chemical and electro chemical energy systems. The blend of science and technology in this course has come out naturally and hence the course can be interesting to students of both streams.

M.Tech. in Nuclear Engineering (NE1)

M.Tech. in Nuclear Engineering is offered from July 2009 session. It is an interdisciplinary program with participation of the Departments of Mechanical, Metallurgical and Materials, Chemical Engineering and the Department of Physics with active cooperation of Indira Gandhi Center for Atomic Research (IGCAR), Kalpakkam. M.Tech. in Nuclear Engineering will provide opportunity for the students to learn thermal hydraulics, chemical processing, materials and physics aspects of nuclear power production. In plant training at IGCAR will provide experience with reactor control and operation.

M.Tech. in Petroleum Engineering (PE1)

The M.Tech. Programme in Petroleum Engineering is an interdisciplinary Programme designed to meet the need of highly qualified manpower in the petroleum industry.

The curriculum covers the entire gamut of engineering activities in the petroleum industry, from petroleum prospecting, exploration and production to petroleum refining. Both onshore and offshore petroleum reserves and their exploitation are emphasized. The Programme will provide the students with a broad knowledge of the principles and practical aspects of petroleum engineering through key courses on petroleum geology, reservoir engineering, petroleum prospecting technologies, drilling technology, oil and gas production systems, risk analysis and safety issues, subsea engineering for oil and gas fields, petroleum refining methods etc. The students will also undergo summer training in ONGC facilities. The design and thesis projects will equip students to take up careers in challenging problems in both onshore and offshore oil

and gas industry.

4. USER ORIENTED PROGRAMMES (UOP)

User Oriented Programmes are designed to meet the specific requirements of the user industries.

(i) M.Tech. in Construction Technology and Management (CE7)

This user-oriented Programme tailored to meet the requirements of the construction Industry and is open only to sponsored candidates from Larsen & Toubro Ltd. and other organizations involved in construction operations - both government and private. The Programme is designed for training construction engineers and managers with undergraduate degree in Civil, Architecture, Mechanical and Electrical Engineering. The contents of the core courses incorporate topics in the areas of construction engineering and management.

Based on the background of the students, elective courses may be taken from courses offered by several Departments including: Civil Engineering, Electrical Engineering, Humanities & Social Sciences, Management Studies, Mechanical Engineering, Metallurgical and Materials Engineering and Ocean Engineering. Two semesters are devoted to project work, which can be done at the institute and/or the sponsoring agency.

(ii) M.Tech. in Automotive Technology (ME4)

The User Oriented Programme in Automotive Technology, started in 2006, is designed based on the requirements of automotive industries. The curriculum and course contents have been prepared in consultation with various user industries. The novelty of this Programme is that some electives are designed to suit the requirements of automotive industries and R&D laboratories so that the participants will benefit from the expertise of faculty members. Industrial visits, expert lectures by eminent people in this field and project work on problems of relevance to industry are expected to make this Programme user-friendly.

(iii) M.Tech. in Ocean Technology (OE2)

This Programme is sponsored by NIOT (vide page 23 for details)

(iv) M.Tech. in Offshore Structural Engineering (OE3)

This Programme is for Larsen & Toubro. Details of curriculum for this Programme are available at http://www.oec.iitm.ac.in/Curriculum_M.tech_Offshore.pdf

(v) Post Graduate Diploma in Metro Rail Technology and Management

Details of curriculum for this one year Programme are available at http://www.civil.iitm.ac.in/PG_Diploma_Curriculum.pdf

5. STUDENT AMENITIES

5.1 Accommodation

IIT Madras is a residential Institute and provides on-campus accommodation to all students, faculty and staff. For the students, there are 17 Hostels, named after rivers of India (Brahmaputra, Cauvery, Ganga, Krishna, Sarayu, Sharavati, etc.). Accommodation in the Hostels is provided by The Chairman, Council of Wardens. The hostel rooms are furnished with a cot, a chair, and a writing table. Students are expected to bring their own bedding. Establishment fees cover the rent for hostel accommodation (vide section 2.10 for fees and deposits).



Students residing in the hostels are provided with exclusive dining facility. This covers breakfast, lunch, evening coffee/tea and dinner. The menus for these are decided by an elected student body.

Each hostel has

- (i) a small library for the exclusive use of the students of that hostel. The hostel library is normally stacked with books for general reading and story books. The hostel library is maintained by the student body of the hostel.
- (ii) a common room for recreation. The common room is provided with a Television, Newspapers and selected magazines (decided by the student body).
- (iii) limited sports facility such as table tennis, volley ball, ball-badminton courts.

Taramani Guest House provides accommodation for visitors to the Institute faculty, staff and students. Campus wide transport is provided by buses.

5.2 Shopping

The campus has two shopping centres catering to the needs of the students, faculty and staff. The shopping centre in the hostel zone hosts a photocopying shop, a stationery shop, patisserie shop, gift articles shop and a fruit shop. The shopping centre in the residential zone hosts grocery shops and vegetable/fruit shops.

5.3 Sports Facilities

The Institute has play fields for football, hockey, cricket, volleyball and tennis, and a skating ring. A modern gymnasium, indoor courts for shuttle and volley ball, and a beautiful swimming pool are the pride of Institute sports facility.

5.4 Medical Facility

A full-fledged hospital with 18 beds takes care of the medical needs of the students, faculty and staff. All students of Institute are registered with the hospital and are also covered by a Medical Insurance scheme. Apart from general practitioners, services of leading specialists (on part-time basis) are provided by the hospital.

5.5 Other Amenities

Two banks, namely State Bank of India (SBI) and Canara Bank operate branches within the campus. ATMs of SBI and ICICI are housed near the hostels. A post office with Railway Booking Centre is also available on campus.

There are four restaurants, two in the Institute zone and two in the hostel zone.

6. RESEARCH FACILITIES

Ample opportunities exist for research-minded students to hone their research skills and participate actively in pioneering research studies. The faculty of departments of Engineering, Sciences, Management and Humanities & Social Sciences, along with their students, are involved in academic research, which often results in highly acclaimed publications in International and National Journals. Some of the research work is also presented in International and National conferences. A large number of sponsored research projects are funded by agencies such as the Department of Science and Technology, Aeronautical Research and Development Board, Indian Space Research Organisation, for tackling the challenging research issues of national interest. Several application-oriented industrial consultancy projects and collaborative research projects with foreign universities are also undertaken by our faculty.

Opportunities are available for interested students to participate in such sponsored research, industrial consultancy or collaborative research projects. The Industrial Consultancy & Sponsored Research (IC & SR) wing of the Institute coordinates the sponsored research and

consultancy activities, while the Office of the Dean, Academic Research, administers the academic research activities.

The Engineering and Science Departments of our Institute are equipped with excellent laboratories, with state-of-the-art equipment. Research is being carried out on many areas of topical interest. For example, research is carried out in areas such as Laser Diagnostic Applications, Non-destructive Techniques, NMR Spectroscopy, Solid State Physics and Micro-electronic devices. Nano-materials technology, Bio-technology, Bio-medical research, Bio-chemistry, Wireless Local Loop Technology, Alternative Energy Sources and Emission Control, Composite Materials, Finite Element Modeling, Photo Elasticity, Structural Analysis, Computational Fluid Dynamics, Ocean Engineering, Vibration & Acoustics, Rarefied Gas Dynamics, to name a few. A more detailed description of the research work undertaken in each department is available in the Institute website. Strong expertise exists among the faculty on both theoretical and experimental methods of research.

M.Tech. students are required to complete a one year research project, in their third and fourth semesters, under research guide(s), selected in consultation with the respective Head of the Department and Faculty Advisor.

IMPORTANT DATES

GATE QUALIFIED CANDIDATES & IIT GRADUATES

Opening of Website for ONLINE applications	29.03.2014 (Saturday)
Closing of Website for ONLINE applications	12.04.2014 (Saturday) 23:59 hrs.
Last date for receiving signed application form (downloaded copy with signature) by post at the GATE Office	15.04.2014 (Tuesday)
Suitability Test/ Interview for relevant candidates (Refer Table 3)	03.05.2014 (Saturday)
Date of reporting for admission	21.07.2014 (Monday)
Date for Spot Admission (only if there are any unfilled seats)	22.07.2014 (Tuesday)
Orientation Programme	23.07.2014 (Wednesday)
Photo session and Workflow enrolment	24.07.2014 (Thursday)
Commencement of Classes	30.07.2014 (Wednesday)

FOR SPONSORED & OTHER CATEGORY CANDIDATES

Application form & Brochure available (to download)	29.03.2014 (Saturday)
Last date for receipt of completed application forms from Sponsored Candidates by Post or in person at the Academic Section	21.04.2014 (Monday)
Written Test and/or Interview for sponsored candidates	Academic Section/ Departments will notify
Date of reporting for admission	21.07.2014 (Monday)
Orientation Programme	23.07.2014 (Wednesday)
Photo session and Workflow enrolment	24.07.2014 (Thursday)
Commencement of Classes	30.07.2014 (Wednesday)

ADDRESS FOR CORRESPONDENCE

GATE QUALIFIED CANDIDATES & IIT GRADUATES

The Chairman
M.Tech. Admission Committee
GATE Office, IIT Madras, Chennai 600036
Telephone : (044) 2257 8200/8205
Fax : (044) 2257 8204
Email : mtechadm@iitm.ac.in
Website : <http://mtechadm.iitm.ac.in>

SPONSORED & UOP CANDIDATES

The Deputy Registrar (Academic Courses)
Indian Institute of Technology Madras
Chennai 600036
Telephone : (044) 2257 8046
Fax : (044) 2257 8042
Email : cacad@iitm.ac.in
Website : <http://www.iitm.ac.in>



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