Indian Institute of Technology Madras

WEB - ENABLED
M.TECH FOR WORKING
PROFESSIONALS

COMPUTER SCIENCE & ENGINEERING

INDUSTRIAL AI

MECHANICAL ENGINEERING

AEROSPACE ENGINEERING

ELECTRICAL ENGINEERING

ENGINEERING DESIGN

About IITM CODE

Welcome to the Centre for Outreach and Digital Education (CODE), formerly known as the Centre for Continuing Education (CCE), established by IIT Madras in 1986.

Our mission is to promote lifelong learning and equip individuals with essential skills for success in the digital era.

We offer diverse programs emphasizing skill - based training in areas such as eMobility, Quantum Computing, Construction Technology, Additive Manufacturing Technologies, and Analytical Operations and Supply Chain Strategies. Additionally, we provide executive education programs to enhance leadership capabilities and strategic acumen for industry professionals. Our portfolio includes certification programs like Web-enabled MTech programs and undergraduate programs such as BS in Programming and Data Science and BS in Electronic Systems, catering to various industries.

We prioritize accessibility and inclusivity, welcoming individuals of all ages, educational backgrounds, and locations to benefit from our quality education initiatives.

CUTTING-EDGE SKILL PROGRAMS
Gain practical insights and hands-on experience in areas like eMobility, Quantum Computing, and

EXECUTIVE EDUCATION
Enhance leadership skills and strategic thinking through tailored programs for industry professionals.

FULL-TIME UNDERGRADUATE PROGRAMS
Accessible pathways for further education, regardless of age or background.

WEB-ENABLED MTECH PROGRAMS
Upskill while working with flexible, career-enhancing programs.

ACCESSIBILITY
Quality education for all, with programs open to individuals from all walks of life.

Web-enabled M.Tech Programs

OVERVIEW

IIT Madras started the Web-Enabled M.Tech Program in 2017 to enable professionals obtain an M.Tech degree while working

ELIGIBILITY FOR THE PROGRAM

- Minimum 2 years of work experience
- Candidate must possess relevant background and should have completed a BTech/BE in associated engineering discipline with first class

PROGRAM MODALITIES

- Weekly interactive session with Faculty
- Online/In-person exams at centres
- Intermediate exit with PG Diploma
- M.Tech Project with Company/Employer support

TIMELINES

Entrance Exam and/or interview is typically held in Summer and classes will commence in Aug/Sept

SELECTION CRITERIA

Entrance exam and/or interview

M.Tech in Computer Science & Engineering

Specialization offered:

- Information Security

ELIGIBILITY

B.E./B.Tech in any Engineering branch/discipline, MCA, M.Sc.(CS) Information Security (IS)

SYLLABUS AND STUDY MATERIAL

Discrete Mathematics, Programming & Data Structure, Computer Organisation & Architecture

SELECTION CRITERIA

Interview (based on the syllabus)

COURSE CURRICULM

Core Courses

- CS5800 and CS6140: Advanced Data Structures and Algorithms with Lab
- CS6030: Logic and Combinatorics in Computer Science
- CS6530: Applied Cryptography Basics

Lab

- Advanced Programming Lab
- Advanced Computer Organization and Lab
- Advanced Operating Systems with Lab
- Advanced Networking with Lab

Elective Courses

- CS5011: Machine Learning
- CS6620: Advanced Computer Organization Architecture with lab
- CS6745: Mining Massive Data Sets
- CS6898: Embedded Systems Security
- CS6748: Elements of Computing Systems
- CS6013: Modern Compilers
- CS6650: Smart Sensing for IoT
- CS6464: Statstical Learning
- CS6700: Reenforcement Learning
- CS6858: Distributed Trust

M.Tech in Aerospace Engineering

Specialization offered:

- Aerospace Engineering
- Ammunition Technology

ELIGIBILITY

The candidates should possess Bachelor's degree in Aerospace / Civil/ Chemical / Computer Science/ Electrical/ Mechanical/Metallurgical/ Naval Architecture or Master's degree in Physics / Mathematics/ Chemistry

SYLLABUS AND STUDY MATERIAL

Strength of Materials, Fluid Mechanics, Thermodynamics, Basic Mathematics

SELECTION CRITERIA

- Online objective type assessment
- Other modalities will be based on the MoU and in association with the parent company

COURSE CURRICULM

Core Courses

- AS5010: Aerodynamics and Aircraft Performance
- AS5011: Compressible Fluid Flows
- AS5020: Aerospace Propulsion
- AS5030: Aerospace Structures
- AS5040: Flight Mechanics
- AS6520: Mathematics for Aerospace Engineers

List of electives can be viewed at

Aerospace Engineering
https://ae.iitm.ac.in/documents/ webMTech_curriculum.pdf

Ammunition Technology:
https://ae.iitm.ac.in/documents/webMTech_ curriculum_ammunition.pdf

M.Tech in Electrical Engineering

Specialization offered:

- Integrated Circuits & Systems
- Communication & Signal Processing
- Microelectronics
- Multimedia
- Quantum Science & Technology (Inter disciplinary with Physics dept)

ELIGIBILITY
BE/B.Tech with specialization in ECE, EEE, Electronics & Instrumentation, Instrumentation & Control

SYLLABUS AND STUDY MATERIAL
Basic CT Signal and Systems, Time-Domain Analysis, Fourier Series, Continuous-Time Fourier Transform

SELECTION CRITERIA
Online Exam (True/False, MSQ/MCQ, Numerical answer type)

COURSE CURRICULM

INTEGRATED CIRCUITS & SYSTEMS
Core Courses
- EE5310: Analog Electronic Circuits
- EE5311: Digital IC Design

Elective Courses
- EE5130: Digital Signal Processing
- EE5110: Probability Foundations for Electrical Engineers
- EE5332: Mapping Signal Processing Algorithms to DSP Architectures
- EE5320: Analog IC Design
- EE5325: Power Management Integrated Circuits
- EE5350: Linear algebra techniques for data analysis and modelling
- EE6320: RF Integrated Circuits
- EE6322: VLSI Broadband Communication Circuits
- EE6323: Wireless System Design
- EE6324: Phase-Locked Loops
- EE6325: Advanced Power Management Systems
- EE5313: Semiconductor Device Modelling
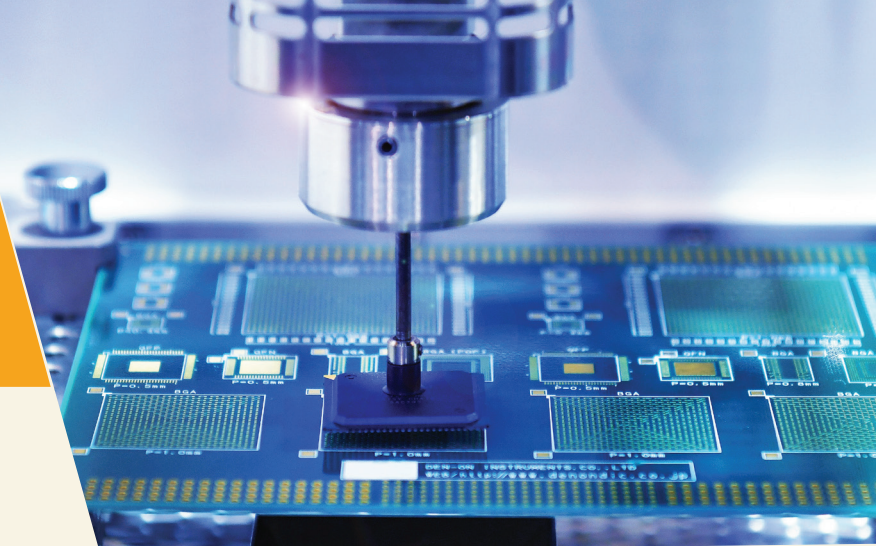- EE5140: Digital modulation and coding

Project
- EE6901: Project I
- EE6902: Project II
- EE6903: Project III

🌐 **code.iitm.ac.in/integratedcircuits**

M.Tech in Electrical Engineering

COMMUNICATION & SIGNAL PROCESSING

Core Courses
- EE5110: Probability Foundations for Electrical Engineers
- EE5120: Applied Linear Algebra I for EE
- EE5130: Digital Signal Processing
- EE5140: Digital Modulation and Coding
- EE5150: Communication Networks
- EE5505: Wave Propagation in Communication
- EE5142: Introduction to Information Theory and Coding

Elective Courses
- EE5111: Estimation Theory
- EE5112: Detection Theory
- EE5177: Machine Learning for Computer Vision
- EE5178: Modern Computer Vision
- EE5179: Deep Learning for Imaging
- EE5180: Introduction to Machine Learning
- EE6180: Advanced Topics in Artificial Intelligence
- EE5113: Detection and Estimation Theory
- EE5121: Convex Optimization
- EE5131: Selected Topics in Digital Signal Processing
- EE5141: Introduction to Wireless & Cellular Communication
- EE5143: Information Theory
- EE5152: Broadband Communication Systems
- EE5155: Wireless Networks
- EE5156: Internet of Things and Management of Discrete Entities

Project
- EE6901: Project I
- EE6902: Project II
- EE6903: Project III

🌐 **code.iitm.ac.in/communicationsignals**

MICROELECTRONICS

Core Courses
- EE5311: Digital IC Design
- EE5310: Analog Electronic Circuit
- EE5320: Analog IC Design
- EE5313: Semiconductor Device Modelling
- EE5312: VLSI Technology
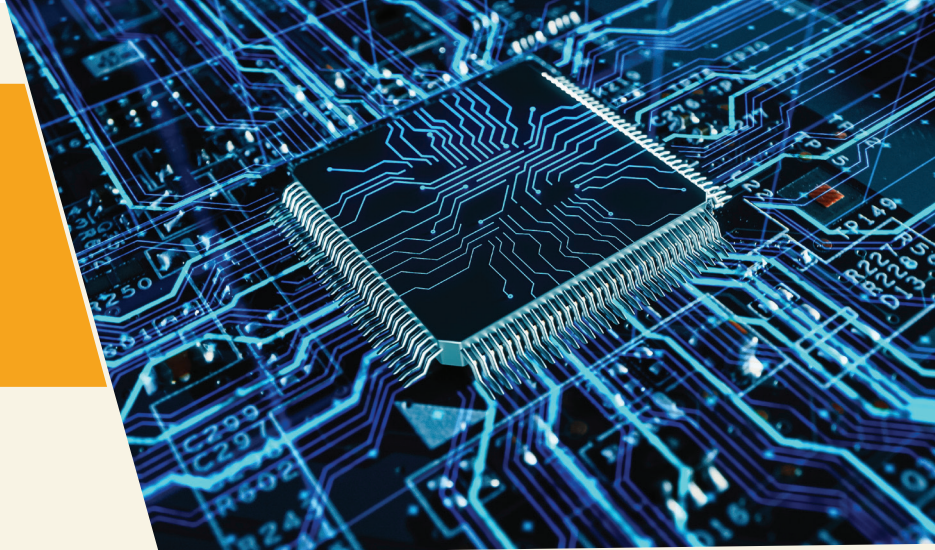- EE5130: Digital Signal Processing

Elective Courses
- EE5180: Machine Learning
- EE5130: Digital Signal Processing
- EE4371: Data Structures and Algorithms
- EE5332: Mapping Signal Processing Algorithms to DSP Architectures
- EE6132: Advanced Topics in Signal Processing (Computer Vision)
- EE6132: Advanced Topics in Signal Processing (Deep Learning for Imaging)
- EE5110: Probability Foundations for Electrical Engineers
- EE5111: Estimation Theory
- EE5112: Detection Theory
- EE5178: Modern Computer Vision
- EE5179: Deep Learning for Imaging
- EE6180: Advanced Topics in Artificial Intelligence
- EE514: Introduction to Wireless & Cellular Communication
- EE5143: Information Theory
- EE5152: Broadband Communication Systems

🌐 **code.iitm.ac.in/microelectronics**

M.Tech in Electrical Engineering

MULTIMEDIA
Core Courses
- EE5110 Probability Foundations for Electrical Engineers
- EE5120 Applied Linear Algebra
- EE5130 Digital Signal Processing
- EE5175 Image Signal Processing

Elective Courses
- EE5180 Machine Learning
- EE4371 Data Structures and Algorithms
- EE5332 Mapping Signal Processing Algorithms to DSP Architectures

- EE6110 Adaptive Signal processing
- EE6132 Advanced Topics in Signal Processing (Computer Vision)
- EE6132 Advanced Topics in Signal Processing (Deep Learning for Imaging)

Project
- EE6901 Project I
- EE6902 Project II
- EE6903 Project III

🌐 code.iitm.ac.in/multimedia

QUANTUM SCIENCE & TECHNOLOGY
Core Courses
- PH 5840: Quantum Computing and Quantum information
- ID 5843: Experimental Techniques for Quantum Computation and Metrology
- EE5120: Applied Linear Algebra
- EE 5347: Quantum Photonics Devices & Technology
- EE 6502: Optical Signal Processing and Quantum Communications

Elective Courses
- CS5011: Introduction to Machine Learning
- CS6111: Foundations of cryptography
- CS7111: Advanced Topics in Cryptography
- CS7260: Post-quantum Cryptography
- EE5501: Photonics Laboratory

- EE5110: Probability Foundations
- EE5142: Introduction to Information and Coding theory
- EE5160: Error control coding
- EE5504: Fibre Optic Communication Technology
- E6500: Integrated Optoelectronic Devices and Circuits
- EE6700: Advanced Photonics Laboratory
- EE7500: Advanced topics in RF and Photonic
- ID5841: Quantum Computing Laboratory
- PH 5842 Advanced Topics in Quantum Information
- PH 5100: Quantum Mechanics
- PH 5170: Quantum Mechanics
- PH 5620: Coherent and Quantum Optics
- PH 5680: Superconductivity and applications
- PH 5500: Dynamical Systems

🌐 code.iitm.ac.in/quantumscience

M.Tech in Industrial AI

ELIGIBILITY

- B.Tech/B.E. (4 years) in any branch with mathematics as compulsory subject in 10+2 system
- B.Sc.: (Maths/ IT/ Statistics/Computing) + M.Sc. (Maths/ IT/ Statistics /Computing and with mathematics) as compulsory subject in 10+2+3 system
- B.Sc. (Maths/ IT/ Statistics / Computing) + M.C.A. with mathematics as compulsory subject in 10+2+3

SYLLABUS AND STUDY MATERIAL

Introduction to Probability including Conditional and Joint Probability, Random Variables and Distributions, Descriptive Statistics and Inferential Statistics, Introduction to Regression and Classification Linear Algebra including Eigenvalue Decomposition, Singular Value Decomposition, Calculus including Maxima and Minima

SELECTION CRITERIA
Written exam and/or interview

COURSE CURRICULM

Core Courses

- Mathematical Foundations for Data Science
- Applied Time Series Analysis
- Multivariate Data Analysis
- Machine Learning and its applications
- Applied Deep Learning
- Online and Reinforcement Learning

Possible Electives

- AI in predictive Maintenance, Reliability and warranty
- AI in process and logistic optimization
- Industrial Vision AI

Lab

- Industrial AI
- Industrial AI at scale

M.Tech in Mechanical Engineering

Specialization offered:

- Mechanical Design
- Automotive Technology

ELIGIBILITY

B.E/B.Tech in any specialization with adequate professional experience

SELECTION CRITERIA

Written Test and/or Interview (Interview will be based on the work experience)

COURSE CURRICULM

MECHANICAL DESIGN

Core Courses
- Computational Methods in Engineering
- Advanced Mechanics of Solid
- Principles of Product Design
- Theory of Vibration
- Product Reliability (Core)

Elective Courses
- Failure Analysis and Design
- Advanced Heat & Mass Transf
- Finite Element Analysis
- Optimization Methods for Mechanical Design
- Design of Mechanical Transmission systems

Project
- One year Project

Lab
- One Laboratory to be done over a weekend for

🌐 **code.iitm.ac.in/mechanicaldesign**

COURSE CURRICULM

AUTOMOTIVE TECHNOLOGY

Core Courses
- ME5201: Computational Methods in Engineering
- ME5109: Measurements in Thermal Engineering
- ME6162: IC engine combustion and pollution control
- ED5220: Vehicle Dynamics

Project
- ME64xx Project - 1
- ME64xx Project - 2

Lab
- ME54xx Laboratory

List of electives can be accessed at
https://drive.google.com/file/d/1udvw0mVqWAl5dCk_spu9tUVWeWpAMKmJ/view?usp=sharing

🌐 **code.iitm.ac.in/automotive**

M.Tech in Engineering Design

Specialization offered:

- E-Mobility

ELIGIBILITY

- Completed a BTech/BE in any engineering discipline with a minimum CGPA of 6.0 (out of 10) or 60% &
- Minimum of 2 years of work experience

SELECTION CRITERIA

- Applicants would be selected based on a computer-based proctored written test on fundamental Mathematics and Physics principles.
- Applicants would be provided with recorded videos and sample questions to help them prepare for this selection test.

COURSE CURRICULM

Core Courses
- Electric Vehicle Engineering and Development
- Power Electronics and Motor Drives for Electrified Vehicles
- Design and Control of AC Machines for Electrified Vehicles
- Battery Charging Technology
- Energy Storage Devices and Systems
- Electric Vehicle System Dynamics and Control

Elective Courses
- Electrochemistry: Fundamentals and Applications
- High Voltage Technology
- Mechatronics System Design
- Powertrain and Fuels
- Fundamentals of Thermal Management in Electric Vehicles
- Electromagnetic Compatibility for Automotive Electronics
- Electric Vehicle Evaluation and Testing
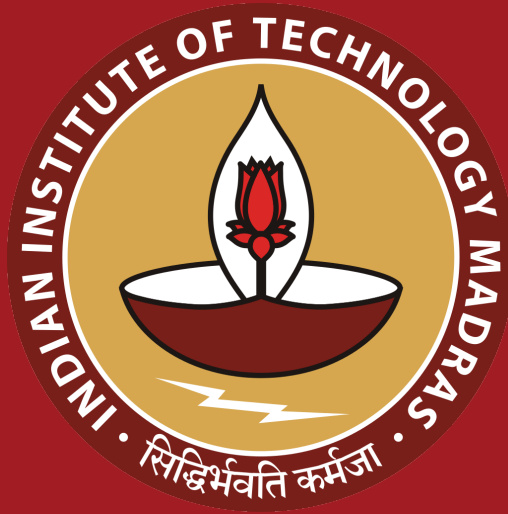- AI Algorithms for E-Mobility Applications

Lab
- E-Mobility Lab

Project
- Mini Project
- Main Project for WEMEM - with employer / company support

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