



iMTech Curriculum Presentation

Effective from Batch 2015 Onwards

April, 2015

Course Structure



- Every course has a fixed number of credits associated with it (e.g., 4 credits)
- One has to earn 200 credits to graduate
- Every course has a lecture component and an optional lab component

iMTech (CSE) Overview



Course Categories	Sum of Credits	Percent
Basic Engineering Science / Skills	16	8%
Mathematics and Basic Sciences	28	14%
Common Core	18	9%
CSE Core	26	13%
Elective	52	26%
HSS/M	16	8%
Masters Project	40	20%
Others	4	2%
Grand Total	200	100%

iMTech (ECE) Overview



Course Categories	Sum of Credits	Percent
Basic Engineering Science / Skills	16	8%
Mathematics and Basic Sciences	28	14%
Common Core	18	9%
ECE Core	34	17%
Elective	44	22%
HSS/M	16	8%
Masters Project	40	20%
Others	4	2%
Grand Total	200	100%



Courses Common to CSE and ECE

Basic Engineering Science / Skills



Common to both CSE and ECE

Course Name	Credits
Programming I	4
Digital Electronics	4
Programming II	4
Signals and Systems	4

Mathematics and Basic Sciences



Course Name	Credits
Chemistry	3
Chemistry Lab	1
Mathematics - 1	4
Mathematics - 2	4
Mathematics - 3	4
Physics - 1	3
Physics Lab - 1	1
Mathematics - 4	4
Physics - 2	3
Physics Lab - 2	1

Common to both CSE and ECE

HSS / M Core Courses



Course Name	Credits
Economics	4
History of Ideas	4

Common to both CSE and ECE

Common Core



Common to both CSE and ECE

Course Name	Credits
Data Structures and Algorithms	4
Data Structures Lab	2
Computer Networks	4
Computer Architecture	3
Computer Architecture Lab	1
Operating Systems	3
Operating Systems Lab	1

Others



Common to both CSE and ECE

Course Name	Credits
Physical Education 1	0
English	2
Physical Education 2	0
Technical Communication	2



CSE and ECE Core Courses

CSE core courses



CSE Course Name	Credits
Design and Analysis of Algorithms	4
Discrete Mathematics	4
Formal Languages and Automata Theory	4
Software Engineering	4
Database Systems	3
Database Lab	1
Programming Languages	3
Computer Graphics	3

ECE core courses



ECE Course Name	Credits
Basic Electronics	2+2
Signal Processing	3
Electronic Devices and Circuit Theory	3+1
Principles of Communication	3+1
Analog CMOS Design	3+1
Microprocessors and Microcontrollers	3+1
Control Theory	3
Digital Communication	3+1
EMT+Antenna Theory	3



Electives

CSE and ECE Electives



- CSE: 13 electives (52 credits)
- ECE: 11 electives (44 credits)
- A minimum of 60% of the electives to be from within the same branch
- The rest of the courses could be taken from outside of the branch provided the relevant pre-requisites are met



Thesis / Internship

Masters Project Options



- Student option 1
 - 6 months Masters Project in the industry in the 9th semester followed by 6 months Masters Project in the 10th semester
 - Subject to academic conditions, permission will be granted to continue the project carried out in the industry during the 10th semester too

Masters Project Options



- Student option 2
 - Two semesters of Master Project work in the 9th and 10th semesters culminating in the submission of a Thesis



Specializations

Branch-specific specializations



- Areas of specializations within respective programmes will help define the unique character of the IITB programme to both students and the external world (e.g., industry, universities, etc.)
- Students need to complete 5 elective courses from that area to recognize a given area of specialization
- Considering that students get to do more than 10 electives in both CSE and ECE, they may be able to earn multiple specializations

Areas of specializations



- CSE Specializations
 - Theoretical Computer Science
 - Data Science
 - Software Engineering
- ECE Specializations
 - Microelectronics and VLSI
 - Networking and Communication
 - Signal and Data Processing (will work across ECE and CSE branches)



Tentative Elective List

CSE Specialization Electives



- Theoretical Computer Science
 - Theory of Computation
 - Advanced Algorithms
 - Foundations of Big Data Algorithms
 - Foundations of Cryptography
 - Distributed Computing
 - Automated Formal Verification
 - Machine Learning
 - Approximation Algorithms
 - Advanced Cryptography
 - Algorithms for Massive Data

CSE Specialization Electives



- Data Science
 - Data Modeling
 - Network Science for the Web
 - Multi-Agent Systems
 - Algorithms for Massive Data
 - Foundations of Big Data Algorithms
 - Advanced Database Management Systems
 - Geographic Information Systems
 - Data Analytics
 - Data Visualization
 - Algorithms for Massive Data
 - Machine Perception

CSE Specialization Electives



- Software Engineering
 - OOAD UML and Intro to Web 2.0
 - Software Testing
 - Design Patterns and Enterprise System Development
 - Automated Formal Verification
 - Usability Engineering
 - Software Architecture
 - Software Factory

ECE Specialization Electives



- Networking and Communication
 - Wireless Access Networks
 - Mathematical Analysis of Networks
 - Mobile Computing with IMS Architecture
 - Network Security
 - Digital Communication
 - Internet of Things
 - Cryptography

ECE Specialization Electives



- Signal and Data Processing
 - Digital Image Processing
 - Machine Perception
 - Advanced Machine Perception
 - Advance Digital Image Processing
 - Data Analytics
 - Medical Imaging
 - Geographical Information Systems
 - Machine Learning
 - Web Information Retrieval

ECE Specialization Electives



- Microelectronics and VLSI
 - Circuit Simulation
 - Model Based Hardware-Software Co-Synthesis of Embedded Systems
 - Low Power CMOS VLSI Design
 - Introduction to RF Electronics
 - Principles of Multimedia & Multimedia Architectures
 - Functional Verification of SOCs
 - Introduction to RF Electronics