IIT Bombay

U.G. curriculum
UG Programmes

- B. Tech
- B.Tech (honours)
- Minor
- Dual Degree
  - Ceramics & Composites
  - Process Engineering
UG Programmes
Basic Components

- Basic Core
  - Basic Sciences
    - Basic/General Engineering
    - Liberal Education

- Departmental Core
  - Understanding Materials
  - Engineering Sciences

- Materials Specific & Job Oriented
  - Laboratory
Basic Core

Basic Sciences
- Chemistry (Org, Inorg & Physical)
- Physics (Electy & Magntsm)
- Modern Physics
- Calculus & Linear Algebra
- Biology

- Physics Lab
- Chemistry Lab
Basic Core

- Basic Engineering Skills
  - Computer Programming
  - Data Analysis & Interpretation
  - Numerical Analysis
  - Introduction of Elec. Engg. & Electronics
  - Theory of Machines

- Workshop Lab
- Engineering Drawing & Graphics Lab
- Experimentation & Measurement
- Electronics & Electrical Lab
Basic Core

Liberal Education
- Economics
- Humanities & Social Sciences
- Environmental Science
- Institute Elective – 1
- Institute Elective - 2
Departmental Core

- Understanding Materials
  - Structure of Materials
  - Phase Transformations
  - Mechanical Behaviour of Materials
  - Electronic Properties of Materials

- Metallography Lab
- Mechanical Testing of Materials
Departmental Core

Engineering Sciences
- Mechanics of Materials (Solid Mechanics)
- Thermodynamics of Materials
- Transport Phenomena
- Kinetics of Processes
- Instrumentation & Process Control
Departmental Core

Material Specific (Job Oriented)
- Ceramic & Powder Metallurgy
- Metal Casting & Joining
- Engg. Polymers & Composites
- Process Metallurgy Principles (Mineral & Non-Ferrous Extraction)
- Iron & Steel Making
- Corrosion & Protection
Departmental Core

- **Processing Labs**
  - Casting & Joining
  - Heat Treatment
  - Manufacturing Processes (Materials Processing)
  - Corrosion & Protection
  - Thin Films
  - Manufacturing Process Seminar

- **Others Engineering Skills Lab**
  - Computational Lab
  - Instrumentation & control lab
  - Seminar (Making Reports & Presentation)
Departmental Electives

- Mechanical Working of Materials
- or
- Semiconductor Devices & Processing
Honors

Additional Courses

Colloidal Science and Interfaces
Experimental Techniques in Materials Science
Elective 1
Elective 2
Project
Ceramics & Composites
   Advanced Ceramics
   Advanced Composites
   Elective I & II
   Master's project

Process Engineering

   Simulation & Optimization
   Plant Engineering
   Electives 1 & 2
   Master's Project
PG curriculum

M.Tech (Materials Science)

M.Tech (Process Engineering)

M.Tech (Steel Technology)

M.Tech (Corrosion & Protection)
<table>
<thead>
<tr>
<th>Course Title</th>
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<tbody>
<tr>
<td>Thermodynamics of Materials</td>
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<tr>
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<tr>
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<tr>
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<td>M.Tech (Materials Science)</td>
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<tr>
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<tr>
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Restricted Elective Group A

Electrical and Magnetic Materials

Organic Semiconductors and Devices

Materials and Processes for Semiconductor Devices

Laser Processing and Nanostructures

Magnetism and Magnetic Materials

Thermoelectric Materials

Introduction to Ab-initio methods in Materials Modeling
Restricted Elective Group B

Topics in Mechanical Behaviour of Materials
Mechanical Behavior of Thin Films
Tribology of Materials
Fracture and Failure Analysis
Plastic Deformation and Microstructure Evolution
  • Computational Methods for Metal Forming Analysis

Modeling of Microstructural Evolution
Mtech (Process Engineering)

Thermodynamics of Materials
Transport Phenomena
Structural Characterization of Materials
Mechanical characterization of materials/
or
Electrical characterization of materials/
or
Materials Characterization at High Temperatures/
or
Characterization of Materials for Corrosion Control
Restricted Elective I
Open Elective I
Experiments in Advanced Materials Processing
Mtech (Process Engineering)

Diffusion and Kinetics

Restricted Elective II

Open Elective II

Institute Elective

Seminar

Communication and Presentation Skills
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<tr>
<td>Materials and Processes for Semiconductor Devices</td>
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<tr>
<td>Welding Science and Technology</td>
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<td>Solidification Processing</td>
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MTech (Steel Technology)

Thermodynamics of Materials
Advanced Physical and Mechanical Metallurgy
Structural Characterization of Materials
Mechanical characterization of materials
or
Electrical characterization of materials
or
Materials Characterization at High Temperatures
or
Characterization of Materials in Corrosion Control
Restricted Elective I
Transport Phenomena
Processing and Characterization of Steel (Lab)
Seminar
Communication and Presentation Skills
# M.Tech (Steel Technology)

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### Restricted Elective (Steel Technology)

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M.Tech (Corrosion Sci. & Engg.)

Aqueous Corrosion and its Control
High Temperature Corrosion
Structural Characterization of Materials
Mechanical characterization of materials
or
Electrical characterization of materials
Or
Materials Characterization at High Temperatures
Or
Characterization of Materials for Corrosion Control

Corrosion Laboratory
Restricted Elective-I
Restricted Elective - II