## COURSEWORK (MINIMUM OF 12 COURSES REQUIRED)

### Core Courses

<table>
<thead>
<tr>
<th>COURSE</th>
<th>UNITS</th>
<th>GRADE</th>
<th>QTR/YR</th>
</tr>
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<tbody>
<tr>
<td>Crystalline Solids</td>
<td>MSE 200</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Fundamentals of Microfabrication or Advanced Manufacturing</td>
<td>MAE 252 or ENGR 265</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Mechanical Behavior of Solids – Atomistic Theories</td>
<td>MAE 259</td>
<td>4</td>
<td></td>
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<tr>
<td>Biomedical Microdevices (Not offered so students will take an extra emphasis course - General Petition needed)</td>
<td>TBD</td>
<td>4</td>
<td></td>
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</tbody>
</table>

**Total Core Course Units**

### Emphasis Courses

Choose an Area of Emphasis (2nd page)

<table>
<thead>
<tr>
<th>COURSE</th>
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**Total Emphasis Course Units**

### Elective Courses

Students can choose to take elective graduate-level courses numbered 200-289. No more than 2 upper-division (100+) undergraduate courses taken as a graduate student may be counted.

<table>
<thead>
<tr>
<th>COURSE</th>
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**Total Elective Units**

**Total Units**

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**Signature of Student:** _______________________________  **Date:** __________________

**Program Director:** ________________________________  **Date:** __________________

**Associate Dean of Engineering:** ______________________  **Date:** __________________

Revised: 9/2020
There are four primary areas of emphasis within Materials and Manufacturing Technology (MMT): Chemical Processing and Production, Electronic and Photonic Materials and Devices, Biomedical and Electronic Manufacturing and Materials Engineering. Electives within each of the emphasis areas are listed below.

### Elective Courses by Areas of Emphasis

#### Chemical Processing and Production
- CHEM 213 (Chemical Kinetics)
- CBE 200 (Applied Engineering Mathematics I)
- CBE 210 (Reaction Engineering)
- CBE 220 (Transport Phenomena)
- CBE 240 (Advanced Engineering Thermodynamics)
- CBE 278 (Chemistry and Technology for the Nuclear Fuel Cycle)
- ENGRCEE 262 (Environmental Chemistry II)
- ENGRCEE 265 (Physical-Chemical Treatment Processes)
- ENGRCEE 266 (Drinking Water and Wastewater Biotechnology)
- ENGRCEE 276 (Hydrology)

#### Electronic and Photonic Materials and Devices
- BME 210 (Molecular and Cellular Engineering)
- BME 225 (Tissue and Organ Biophotonics)
- BME 251 (Engineering Medical Optics)
- CHEM 242A (Physical and Geometrical Optics)
- EECS 174 (Semiconductor Devices)
- EECS 176 (Fundamentals of Solid-State Electronics and Materials)
- EECS 188 (Optical Electronics)
- EECS 277A (Advanced Semiconductor Devices I)
- EECS 277B (Advanced Semiconductor Devices II)
- EECS 277C (Nanotechnology)
- EECS 285A (Optical Communications)
- EECS 285B (Lasers and Photonics)
- EECS 280A (Advanced Engineering Electromagnetics I)
- EECS 280B (Advanced Engineering Electromagnetics II)
- ENGRMAE 220 (Conduction Heat Transfer)
- ENGRMAE 221 (Convective Heat and Mass Transfer)

#### Biomedical and Electronic Manufacturing
- BME 222 (Biofluid Mechanics)
- BME 251 (Engineering Medical Optics)
- BME 260 (Microfluids and Lab-On-A-Chip)
- BME 262 (Microimplants)
- CBE 288 (Optoelectronics Packaging)
- EECS 279/ENGRMAE 249 (Micro-Sensors and Actuators)
- ENGRMAE 212 (Engineering Electrochemistry: Fundamentals & Apps)
- ENGRMAE 242 (Robotics)
- ENGRMAE 247/EECS 278 (Micro-System Design)
- ENGRMAE 250 (Biorobotics)
- ENGRMAE 253 (Advanced BIOMEMS Manufacturing Techniques)

#### Materials Engineering
- CHEM 225 (Polymer Chemistry)
- ENGRCEE 242 (Advanced Strength of Materials)
- ENGRCEE 243 (Mechanics of Composite Materials)
- ENGRCEE 254 (Advanced Reinforced Concrete Behavior and Design)
- ENGRCEE 255 (Advanced Behavior and Design of Steel Structures)
- ENGRMAE 212 (Engineering Electrochemistry: Fundamentals & Apps)
- ENGRMAE 224 (Advanced Transport Phenomena)
- ENGRMAE 230A (Inviscid Incompressible Fluid Mechanics I)
- ENGRMAE 230B (Viscous Incompressible Fluid Mechanics II)
- ENGRMAE 230C (Compressible Fluid Dynamics)
- ENGRMAE 254 (Mechanics of Solids and Structures)
- ENGRMAE 255 (Composite Materials and Structures)
- ENGRMAE 258 (Mechanical Behavior of Solids – Continuum Theories)
- ENGRMSE 205 (Materials Physics)
- ENGRMSE 241 (Nano-Scale Materials and Applications)
- ENGRMSE 254 (Polymer Science and Engineering)
- ENGRMSE 255A (Design with Ceramic Materials)
- ENGRMSE 256A (Mechanical Behavior of Engineering Materials)
- ENGRMSE 259 (Transmission Electron Microscopy)
- ENGRMSE 261 (High Temperature Deformation of Engineering Materials)
- ENGRMSE 264 (Scanning Electron Microscopy)
- ENGRMSE 265 (Phase Transformations)
- ENGRMSE 273 (Electroceramics & Solid State Electrochemical Systems)
- PHYSICS 238A-238B-238C (Condensed Matter Physics)