## MATERIALS SCIENCE AND ENGINEERING, MS

### Requirements for Students Matriculating in or before Academic Year 2023-2024

Learn more about Graduate College Academic Regulation 7.0 (http://catalog.okstate.edu/graduate-college/#70).

### Thesis Option

Total Hours: 30

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 5010</td>
<td>Materials Science and Engineering Seminar for Masters Students</td>
<td>0</td>
</tr>
<tr>
<td>MSE 5013</td>
<td>Advanced Thermodynamics of Materials</td>
<td>3</td>
</tr>
<tr>
<td>MSE 5023</td>
<td>Diffusion and Kinetics</td>
<td>3</td>
</tr>
<tr>
<td>MSE 5043</td>
<td>Advanced Materials Characterization</td>
<td>3</td>
</tr>
<tr>
<td>MSE 5093</td>
<td>Fundamentals of Materials Science</td>
<td>3</td>
</tr>
<tr>
<td>MSE 5193</td>
<td>Advanced Materials Processing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Hours Subtotal</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

**Electives**

Select 9 hours of the following:

- MSE 5030  Independent Study in Materials Science and Engineering
- MSE 5053  Smart Materials
- MSE 5063  Biomedical Materials
- MSE 5073  Tissue Engineering
- MSE 5093  Fundamentals of Materials Science
- MSE 5103  Electrical and Optical Properties of Ceramics
- MSE 5113  Diffraction in Materials
- MSE 5123  Advanced Composites Manufacturing: Materials, Methods and Applications
- MSE 5133  Solid Oxide Fuel Cells
- MSE 5143  Batteries and Supercapacitors for Energy Storage
- MSE 5153  Crystal Physics and Materials Properties
- MSE 5173  Organic Electronic Materials and Devices
- MSE 5174  Fundamentals of Photovoltaics
- MSE 5193  Advanced Materials Processing
- MSE 5200  Applied Innovation I
- MSE 5223  Additive Manufacturing: Materials, Methods and Applications
- MSE 5553  Fatigue and Fracture
- MSE 5583  Corrosion Engineering
- MSE 5693  Phase Transformations in Materials
- MSE 5683  Thermodynamics and Thermostatistics of Materials

or MAE 5683  Thermodynamics and Thermostatistics of Materials

- MAE 5503  Mechanics of Advanced Composites for Structural Design
- MAE 5543  Modern Materials
- ECEN 5843  Microelectronic Fabrication
- ECEN 6843  Advanced Microelectronic Fabrication

The following related MS&E graduate courses currently offered in various departments at OSU are also available to satisfy degree requirements. MSE program approval will be required for registration.

### Chemistry

- CHEM 5223  Polymer Chemistry
- CHEM 5263  Foundations of Inorganic Chemistry
- CHEM 5283  Solid State Chemistry
- CHEM 6113  Analytical Spectroscopy
- CHEM 5623  Quantum Chemistry I
- CHEM 5963  Advanced Inorganic Chemistry

### Physics

- PHYS 5613  Quantum Mechanics I
- PHYS 5663  Solid State Physics I
- PHYS 5713  Solid State Physics II
- PHYS 5960  Problems in Chemical Physics
- PHYS 6243  Semiconductors I
- PHYS 6313  Quantum Mechanics II

### Biological/Health Science

- BIOM 6175  Molecular And Cellular Biology

### Chemical Engineering

- CHE 5283  Advanced Bioprocess Engineering
- CHE 5293  Advanced Biomedical Engineering

### Electrical and Computer Engineering

- ECEN 6840  Photonics III: Microscopy I
- ECEN 6843  Advanced Microelectronic Fabrication
- ECEN 6840  Photonics III: Microscopy I
- ECEN 6850  Photonics III: Microscopy II
- ECEN 6860  Photonics III: Microscopy III and Image Processing
- ECEN 6890  Photonics IV: Semiconductor Synthesis and Devices III

### Mechanical and Aerospace Engineering

- MAE 5143  Tribology
- MAE 5243  Micro Flows
- MAE 5573  Continuum Mechanics
- MAE 5633  Advanced Thermal Energy Systems Analysis
- MAE 5993  Microstructural Mechanics
- MAE 6133  Surface Mechanics

**Hours Subtotal** 9

### Thesis Research

6 hours of MSE 5000

**Hours Subtotal** 6

**Total Hours** 30
With departmental approval, these courses may be substituted for a required MSE course.

## Non-Thesis Option

**Total Hours:** 35

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 5010</td>
<td>Materials Science and Engineering Seminar for Masters Students</td>
<td>0</td>
</tr>
<tr>
<td>MSE 5013</td>
<td>Advanced Thermodynamics of Materials</td>
<td>3</td>
</tr>
<tr>
<td>MSE 5023</td>
<td>Diffusion and Kinetics</td>
<td>3</td>
</tr>
<tr>
<td>MSE 5043</td>
<td>Advanced Materials Characterization</td>
<td>3</td>
</tr>
<tr>
<td>MSE 5093</td>
<td>Fundamentals of Materials Science</td>
<td>3</td>
</tr>
<tr>
<td>MSE 5193</td>
<td>Advanced Materials Processing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Hours Subtotal:** 15

### Electives

Select 18 hours of the following:

- **Materials Science and Engineering**
  - MSE 5030: Independent Study in Materials Science and Engineering
  - MSE 5053: Smart Materials
  - MSE 5063: Biomedical Materials
  - MSE 5073: Tissue Engineering
  - MSE 5093: Fundamentals of Materials Science
  - MSE 5103: Electrical and Optical Properties of Ceramics
  - MSE 5113: Diffraction in Materials
  - MAE 5113: Diffraction in Materials
  - MSE 5123: Advanced Composites Manufacturing: Materials, Methods and Applications
  - MSE 5133: Solid Oxide Fuel Cells
  - MSE 5143: Batteries and Supercapacitors for Energy Storage
  - MSE 5153: Crystal Physics and Materials Properties
  - MSE 5173: Organic Electronic Materials and Devices
  - MSE 5174: Fundamentals of Photovoltaics
  - MSE 5193: Advanced Materials Processing
  - MSE 5200: Applied Innovation I
  - EEE 5200: Special Topics in Entrepreneurship
  - MSE 5223: Additive Manufacturing: Materials, Methods, and Applications
  - MSE 5553: Fatigue and Fracture
  - MSE 5583: Corrosion Engineering
  - MAE 5583: Corrosion Engineering
  - MSE 5693: Phase Transformations in Materials
  - MAE 5693: Phase Transformations in Materials
  - MSE 5683: Thermodynamics and Thermostatistics of Materials
  - MAE 5683: Thermodynamics and Thermostatistics of Materials
  - MAE 5543: Modern Materials
  - ECEN 5843: Microelectronic Fabrication

**Hours Subtotal:** 20

**Total Hours:** 35

1. With departmental approval, these courses may be substituted for a required MSE course.

---

Graduate College Master's Program Requirements

Learn more about Graduate College 2023-2024 Master's Degree Program Requirements (http://catalog.okstate.edu/graduate-college/). Check
the General Graduate College academic regulations for minimal GPA, language proficiency and other general requirements.