### MATERIALS SCIENCE AND ENGINEERING, PHD

Requirements for Students Matriculating in or before Academic Year 2019-2020. Learn more about Graduate College Academic Regulation 7.0 (http://catalog.okstate.edu/graduate-college).

**Total Hours:** 90 Hours (Group I - Beyond the Bachelor's Degree)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td><strong>Required Courses</strong></td>
<td>21</td>
<td></td>
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<tr>
<td>Select from the following:</td>
<td></td>
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<tr>
<td>MSE 5013</td>
<td>Advanced Thermodynamics of Materials</td>
<td></td>
</tr>
<tr>
<td>MSE 5023</td>
<td>Diffusion and Kinetics</td>
<td></td>
</tr>
<tr>
<td>MSE 5033</td>
<td>Composite Materials</td>
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</tr>
<tr>
<td>MSE 5043</td>
<td>Advanced Materials Characterization</td>
<td></td>
</tr>
<tr>
<td>MSE 5083</td>
<td>Advanced Ceramics Processing</td>
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<tr>
<td>MSE 5010</td>
<td>Materials Science and Engineering Seminar for Masters Students</td>
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<tr>
<td>MSE 5113</td>
<td>Diffraction in Materials</td>
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<tr>
<td>or MAE 5113</td>
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<tr>
<td>MSE 5693</td>
<td>Phase Transformations in Materials</td>
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<td><strong>Hours Subtotal</strong></td>
<td>21</td>
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**Dissertation and Other Requirements**

Combination of Dissertation and Electives to total 69 hours: 69

**Electives**

- 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 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 5200 | Applied Innovation I
  or EEE 5200 | Special Topics in Entrepreneurship
  - MSE 5223 | Additive Manufacturing: Materials, Methods and Applications
  - MSE 5583 | Corrosion Engineering
  or MAE 5583 | Corrosion Engineering

**Chemical Engineering**

- CHE 5413

**Electrical and Computer Engineering**

- ECEN 5843 | Microelectronic Fabrication
- ECEN 6843 | Advanced Microelectronic Fabrication

**Mechanical and Aerospace Engineering**

- MAE 5133 | Mechanical Behavior of Materials
- MAE 5503 | Mechanics of Advanced Composites for Structural Design
- MAE 5543 | Modern Materials

**Thesis Research**

- MSE 6000 (Offered for variable credit, 1-9 credit hours, maximum of 60 credit hours.)

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<tr>
<td><strong>Total Hours</strong></td>
<td>90</td>
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</tbody>
</table>

1 With approval of the student’s advisory committee, additional elective courses may be taken, with a corresponding reduction in required credits in MSE 6000.

**Total Hours:** 60 Hours (Group II - Beyond the Master's Degree from Outside OSU)

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**Electives**

Select 9 hours of the following:

- 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 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 5200 | Applied Innovation I
  or EEE 5200 | Special Topics in Entrepreneurship
- MSE 5583 | Corrosion Engineering

**Chemical Engineering**

- CHE 5413

**Electrical and Computer Engineering**

- ECEN 5843 | Microelectronic Fabrication
- ECEN 6843 | Advanced Microelectronic Fabrication
Materials Science and Engineering, PhD

or MAE 5583  Corrosion Engineering

Chemical Engineering
CHE 5413

Electrical and Computer Engineering
ECEN 5843  Microelectronic Fabrication
ECEN 6843  Advanced Microelectronic Fabrication

Mechanical and Aerospace Engineering
MAE 5133  Mechanical Behavior of Materials
MAE 5503  Mechanics of Advanced Composites for Structural Design
MAE 5543  Modern Materials

Hours Subtotal  9

Thesis Research
MSE 6000 (Offered for variable credit, 1-9 credit hours, maximum of 60 credit hours.)

Hours Subtotal  30

Total Hours  60

1 With approval of the student's advisory committee, additional elective courses may be taken, with a corresponding reduction in required credits in MSE 6000.

Total Hours: 60 Hours (Group III · Beyond the Master's Degree from OSU)

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<td>MSE 5593</td>
<td>Phase Transformations in Materials</td>
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Hours Subtotal  21

Electives and Dissertation
Combination of electives and dissertation to equal 39 hours:  39

Electives
Select a minimum of 12 hours (max of 24) from the following:  1

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 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 5200  or EEE 5200  Applied Innovation I
or Special Topics in Entrepreneurship
MSE 5223  Additive Manufacturing: Materials, Methods and Applications
MSE 5583  Corrosion Engineering
or MAE 5583  Corrosion Engineering

Chemical Engineering
CHE 5413

Electrical and Computer Engineering
ECEN 5843  Microelectronic Fabrication
ECEN 6843  Advanced Microelectronic Fabrication

Mechanical and Aerospace Engineering
MAE 5133  Mechanical Behavior of Materials
MAE 5503  Mechanics of Advanced Composites for Structural Design
MAE 5543  Modern Materials

Thesis Research
MSE 6000 (Offered for variable credit, 1-9 credit hours, maximum of 60 credit hours.)

Hours Subtotal  39

Total Hours  60

1 With approval of the student's advisory committee, additional elective courses may be taken, with a corresponding reduction in required credits in MSE 6000.

Additional Materials Science and Engineering, PhD, Requirements

• Upon approval by the committee, students may choose other appropriate elective courses from engineering, physics and chemistry departments.

• Requirement for taking the "Required" courses for Group III Ph.D. students will be waived if they have taken that course while doing their M.S. degree at OSU. The same course however, cannot be counted towards fulfilling the credit hour requirements for two degrees (M.S. and Ph.D.) at OSU. The student will be required to fulfill the remaining coursework credit hour requirement for the Ph.D. degree by taking "Elective" courses.

• Students entering the Ph.D. program without an undergraduate/graduate degree in Materials Science and Engineering or related degree will be required to complete the ENSC 3313 Materials Science (undergraduate course) with an "A" grade or better in their first year at OSU. This will not be counted towards their degree requirements.

General Graduate College Requirements

• A minimum Grade-Point-Average of 3.00 is required
• A minimum Grade of "C" is required in all degree applicable courses
• No courses utilizing the Pass-No Pass grading system are permitted
• GRAD 5082 or GRAD 5092 may not be used to meet degree requirements
Additional Doctor of Philosophy (PhD.) Requirements

- 90 credits beyond the Bachelor’s degree, 60 credits beyond the Master’s degree are required
- At least seventy-five percent of coursework on the Plan of Study must include 5000 and 6000 level courses
- A minimum of 15 hours at the 6000 level with a grade of SR for the doctoral dissertation must be complete. The maximum number of dissertation hours (6000 with a grade of SR) permissible on a Plan of Study must not exceed three-fourths of the total credit hours in the approved graduate degree program
- Credit for all courses on a graduate Plan of Study must have been awarded within 10 years of completion of all degree requirements
- A minimum of 30 in-residence credit hours are required
- Non-Course requirements:
  - Doctoral Candidacy
  - Dissertation Defense
  - Dissertation Submission/Approval