

MATERIALS SCIENCE GRADUATE MAJOR (MENG, MS, PHD)

This program is available at the following location:

- Corvallis

Option available: Advanced Manufacturing (<https://catalog.oregonstate.edu/college-departments/engineering/school-nuclear-science-engineering/materials-science-meng-ms-phd/advanced-manufacturing-option/>)

The discipline of materials science is inherently interdisciplinary, involving fundamental aspects of engineering, chemistry, physics, biology, geoscience, and mathematics.

Reflecting this characteristic, the Materials Science Program at Oregon State University, initiated in the 1980s, involves over 60 tenured and tenure-track faculty members spanning the OSU Colleges of Engineering, Science and Forestry. This allows students to earn MEng, MS and PhD degrees in Materials Science in many different areas of concentration, including all classes of materials over a wide spectrum of materials behavior. The coursework requirements are extremely flexible to allow students to tailor their program of study to directly support their research activities.

Contact Information

For more information, visit the program website (<https://engineering.oregonstate.edu/academics/programs/materials-science/graduate>).

Major Code: 3200

Upon successful completion of the program, students will meet the following learning outcomes:

MEng

- Conduct research or produce some other form of creative work.
- Demonstrate mastery of subject material.
- Conduct scholarly or professional activities in an ethical manner.

MS

- Conduct research or produce some other form of creative work.
- Demonstrate mastery of subject material.
- Conduct scholarly or professional activities in an ethical manner.

PhD

- Produce and defend an original significant contribution to knowledge.
- Demonstrate mastery of subject material.
- Conduct scholarly activities in an ethical manner.

MEng

| Code | Title | Credits |
|-------------------------------------|---|---------|
| Required Fundamental Courses | | |
| MATS 570 | STRUCTURE-PROPERTY RELATIONS IN MATERIALS | 4 |
| MATS 581 | THERMODYNAMICS OF SOLIDS | 4 |
| Core Curriculum | | |

Select two courses from the following: 7-8

| | |
|----------|--|
| MATS 571 | ELECTRONIC PROPERTIES OF MATERIALS |
| MATS 582 | RATE PROCESSES IN MATERIALS |
| MATS 584 | ADVANCED FRACTURE OF MATERIALS |
| MATS 588 | COMPUTATIONAL METHODS IN MATERIALS SCIENCE |

Characterization Requirement

Select one course from the following: 3-4

| | |
|----------|--|
| CH 616 | CRYSTALLOGRAPHY AND X-RAY DIFFRACTION |
| MATS 555 | EXPERIMENTAL TECHNIQUES IN MATERIAL SCIENCE |
| MATS 659 | PRINCIPLES OF TRANSMISSION ELECTRON MICROSCOPY |
| NSE 546 | NUCLEAR MATERIALS CHARACTERIZATION & QUALIFICATION |
| OC 528 | MICROPROBE ANALYSIS |

Processing Requirement

Select one course from the following: 3-4

| | |
|----------|---|
| CHE 544 | THIN FILM MATERIALS PROCESSING |
| CHE 545 | POLYMER ENGINEERING AND SCIENCE |
| CHE 546 | POLYMER SYNTHESIS AND PROCESSING |
| CHE 611 | ELECTRONIC MATERIALS PROCESSING |
| ECE 611 | ELECTRONIC MATERIALS PROCESSING |
| ECE 518 | SEMICONDUCTOR PROCESSING |
| MATS 545 | WELDING METALLURGY |
| MATS 578 | THIN FILM MATERIALS CHARACTERIZATION AND PROPERTIES |

Ethics

| | | |
|-------------|--|---|
| BA 550 | LEADERSHIP IN ORGANIZATIONS | 3 |
| or EMGT 554 | PROFESSIONAL RESPONSIBILITY AND ETHICS | |

Technical Writing

| | | |
|--------|---|---|
| WR 545 | TECHNICAL WRITING FOR PROFESSIONAL ENGINEERS ¹ | 3 |
|--------|---|---|

Electives

| | |
|--|-------|
| Chosen by student and approved by their major professor ² | 15-18 |
|--|-------|

Total Credits 45

¹ Before enrolling in the technical writing course, students are required to complete a total of 30 credits that includes the ethics requirement, required fundamental courses, core curriculum, characterization requirement, and processing requirement

² MEng students may count up to one seminar credit toward their degree

MS

| Code | Title | Credits |
|--|--|---------|
| Required Fundamental Courses | | |
| MATS 570 | STRUCTURE-PROPERTY RELATIONS IN MATERIALS | 4 |
| MATS 581 | THERMODYNAMICS OF SOLIDS | 4 |
| Core Curriculum | | |
| Select two courses from the following: | | 7-8 |
| MATS 571 | ELECTRONIC PROPERTIES OF MATERIALS | |
| MATS 582 | RATE PROCESSES IN MATERIALS | |
| MATS 584 | ADVANCED FRACTURE OF MATERIALS | |
| MATS 588 | COMPUTATIONAL METHODS IN MATERIALS SCIENCE | |
| Characterization Requirement | | |
| Select one course from the following: | | 3-4 |
| CH 616 | CRYSTALLOGRAPHY AND X-RAY DIFFRACTION | |
| MATS 555 | EXPERIMENTAL TECHNIQUES IN MATERIAL SCIENCE | |
| MATS 659 | PRINCIPLES OF TRANSMISSION ELECTRON MICROSCOPY | |
| NSE 546 | NUCLEAR MATERIALS CHARACTERIZATION & QUALIFICATION | |
| OC 528 | MICROPROBE ANALYSIS | |
| Processing Requirement | | |

2 Materials Science Graduate Major (MEng, MS, PhD)

| | | |
|---|---|-----------|
| Select one course from the following: | | 3-4 |
| CHE 544 | THIN FILM MATERIALS PROCESSING | |
| CHE 545 | POLYMER ENGINEERING AND SCIENCE | |
| CHE 546 | POLYMER SYNTHESIS AND PROCESSING | |
| CHE 611/ECE 611 | ELECTRONIC MATERIALS PROCESSING | |
| ECE 518 | SEMICONDUCTOR PROCESSING | |
| MATS 545 | WELDING METALLURGY | |
| MATS 578 | THIN FILM MATERIALS CHARACTERIZATION AND PROPERTIES | |
| Electives | | |
| Chosen by student, as approved by their major professor | | 6-20 |
| Seminar | | |
| ME 507 | SEMINAR ¹ | 1-3 |
| Thesis or Non-Thesis Project | | |
| Select one of the following: | | 3-12 |
| MATS 503 | THESIS (6-12 credits) | |
| MATS 506 | PROJECTS (3-6 credits) | |
| Total Credits | | 45 |

¹ At least one credit of ME 507 must be the section titled "Materials Science Seminar"

Major Code: 3200

¹ At least one credit of ME 507 must be the section titled "Materials Science Seminar"

PhD

| Code | Title | Credits |
|---|---|------------|
| Required Fundamental Courses | | |
| MATS 570 | STRUCTURE-PROPERTY RELATIONS IN MATERIALS | 4 |
| MATS 581 | THERMODYNAMICS OF SOLIDS | 4 |
| Core Curriculum | | |
| Select two courses from the following: | | 7-8 |
| MATS 571 | ELECTRONIC PROPERTIES OF MATERIALS | |
| MATS 582 | RATE PROCESSES IN MATERIALS | |
| MATS 584 | ADVANCED FRACTURE OF MATERIALS | |
| MATS 588 | COMPUTATIONAL METHODS IN MATERIALS SCIENCE | |
| Characterization Requirement | | |
| Select one course from the following: | | 3-4 |
| CH 616 | CRYSTALLOGRAPHY AND X-RAY DIFFRACTION | |
| MATS 555 | EXPERIMENTAL TECHNIQUES IN MATERIAL SCIENCE | |
| MATS 659 | PRINCIPLES OF TRANSMISSION ELECTRON MICROSCOPY | |
| NSE 546 | NUCLEAR MATERIALS CHARACTERIZATION & QUALIFICATION | |
| OC 528 | MICROPROBE ANALYSIS | |
| Processing Requirement | | |
| Select one course from the following: | | 3-4 |
| CHE 544 | THIN FILM MATERIALS PROCESSING | |
| CHE 545 | POLYMER ENGINEERING AND SCIENCE | |
| CHE 546 | POLYMER SYNTHESIS AND PROCESSING | |
| CHE 611/ECE 611 | ELECTRONIC MATERIALS PROCESSING | |
| ECE 518 | SEMICONDUCTOR PROCESSING | |
| MATS 545 | WELDING METALLURGY | |
| MATS 578 | THIN FILM MATERIALS CHARACTERIZATION AND PROPERTIES | |
| Electives | | |
| Chosen by student, as approved by their major professor. Total credits required for coursework is 45. | | 21-24 |
| Seminar | | |
| ME 507 | SEMINAR ¹ | 1-3 |
| Thesis | | |
| MATS 603 | THESIS | 36-62 |
| Total Credits | | 108 |