

Materials Science & Engineering

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Degree Requirements

Interdisciplinary PhD in Materials Science & Engineering

To earn a PhD degree, students must complete the requirements of the McKelvey School of Engineering, along with program-specific requirements. Courses include the following:

- Four IMSE Core Courses (12 units)

Code	Title	Units
MEMS 5610	Quantitative Materials Science & Engineering	3
MEMS 5619 or EECE 502	Thermodynamics of Materials Advanced Thermodynamics in EECE	3
Physics 537	Kinetics of Materials	3
Chem 5620	Solid-State and Materials Chemistry (or Physics 5072 Solid State Physics)	3
Total Units		12

- Two semesters of IMSE 500 First-Year Research Rotation (6 units)
- Three courses (9 units) from a preapproved list of Materials Science & Engineering electives
- A minimum of three graduate-level technical elective courses (9 units) in mathematics or any science or engineering department, to reach a total of at least 36 academic credit units
 - A maximum of 3 units of IMSE 505 Material Science Journal Club will be permitted toward this requirement.
 - Any 400-level courses not included on the preapproved list of Materials Science & Engineering electives must be approved by the Graduate Studies Committee.
- A maximum of 12 units of 400-level courses may be applied toward the required 36 academic credit units. Undergraduate-only courses (below the 400 level) are generally not permitted and may not be used to fulfill this requirement.
- IMSE 501 IMSE Graduate Seminar every semester of full-time enrollment

- 18 to 36 units of IMSE 600 Doctoral Research (Students must identify an IMSE faculty member willing and able to support their dissertation research on a materials-related topic.)
- Students must maintain a grade-point average of at least 3.0 for all graded courses and have no more than one grade of B- or below in a core course or a Materials Science & Engineering elective.

Additional program requirements include the following:

- Pass the IMSE Qualifying Examination (oral and written components)
- Identify an IMSE graduate program faculty member willing and able to support the student's dissertation research on a materials-related topic
- Maintain satisfactory research progress on a topic in materials science and engineering, as determined by the dissertation advisor and the mentoring committee
- Successfully complete research ethics training by the end of the third semester
- Successfully complete teaching requirements by the end of the third year:
 - Attend two or more Teaching Center workshops
 - Complete 15 units of Mentored Teaching Experience
- Successfully complete the dissertation proposal and presentation, with approval from the dissertation examination committee
- Successfully complete and defend a PhD dissertation, with final approval from the dissertation examination committee

Failure to meet these requirements will result in dismissal from the program.

Recommended Course Plan

Year 1

Fall Semester (12 credits)

- IMSE First-Year Research Rotation (IMSE 500)
- IMSE Graduate Seminar (IMSE 501)
- Quantitative Materials Science & Engineering (MEMS 5610)
- Thermodynamics of Materials (MEMS 5619) (or elective if taking Advanced Thermodynamics in EECE (EECE 502) in the spring)
- Solid-State and Materials Chemistry (Chem 5620) (or elective if taking Solid State Physics (Physics 5072) in the spring)

Spring Semester (12 credits)

- IMSE First-Year Research Rotation (IMSE 500)
- IMSE Graduate Seminar (IMSE 501)
- Kinetics of Materials (Physics 537)
- Solid State Physics (Physics 5072) (if Chem 5620 not taken in the fall) or elective
- Advanced Thermodynamics in EECE (EECE 502) (if MEMS 5619 not taken in the fall) or elective

Summer

- Begin dissertation research
- Prepare for IMSE Qualifying Examination (typically taken in August):
 - Written document and oral presentation on research rotation
 - Oral examination on fundamentals from core courses
- Participate in Graduate Student Mentored Teaching Orientation offered in August by the Center for Teaching and Learning (if not completed during the fall orientation)

Years 2 and Beyond

- Complete remaining electives (discuss with dissertation advisor)
- IMSE Graduate Seminar (IMSE 501)
- Doctoral Research (IMSE 600)
- Teaching requirements (to be completed by the end of the third year):
 - Attend two or more Teaching Center workshops
 - Complete 15 units of Mentored Teaching Experience
- Regular meetings (at least once per year) with the mentoring committee
- Dissertation proposal and presentation (fifth semester)
- Dissertation and oral defense