MATERIALS SCIENCE

Becton Center, 203.432.4255
https://engineering.yale.edu/materials-science
M.Phil., Ph.D.

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* A secondary appointment with primary affiliation in another department or school.

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FIELDS OF STUDY

Quantum and low dimensional materials; energy materials; soft, polymer, and bio materials; electronic and optical materials; metals, ceramics, and structural materials; and computational materials science.

INTEGRATED GRADUATE PROGRAM IN PHYSICAL AND ENGINEERING BIOLOGY (PEB)

Students applying to the Ph.D. program in materials science may also apply to be part of the PEB program. See the description under Non-Degree-Granting Programs, Councils, and Research Institutes for course requirements and http://peb.yale.edu for more information about the benefits of this program and application instructions.

QUANTUM MATERIALS SCIENCE AND ENGINEERING (QMSE)

Students applying to the Ph.D. program in materials science may also apply to be part of the QMSE program. See the description under Non-Degree-Granting Programs, Councils, and Research Institutes for course requirements.

SPECIAL REQUIREMENTS FOR THE PH.D. DEGREE

Students must complete at least nine graduate-level courses of one credit each. Two of the courses must in an area outside the specific field of study relating to the subject of the dissertation, as judged by the research adviser and approved by the director of graduate studies (DGS). Courses such as Dissertation Research, Master's Thesis, or

Seminar do not count towards the nine-course requirement, but up to two terms of Special Investigation are acceptable. Courses counted toward the nine-course unit minimum must be full-credit graduate courses with clear technical, scientific, or mathematical focus that are related to materials science in the judgment of the first-year adviser or research adviser and the DGS.

Due to the interdisciplinary nature of the department, the detailed program of study for each student is determined in consultation with the student's first-year adviser (or research Adviser after the first year). Students are expected to take three to four graduate courses in each semester of their first year, including three core classes selected from the core requirements listed below. The remaining elective course requirements must be complete by the end of the second year unless an exception is approved by the DGS. Course selections are approved by the DGS, in consultation with the student's adviser.

The core courses will cover foundational materials science topics from a selection of a minimum of three out of six of the following areas:

- Thermodynamics of materials
- Kinetics and phase transformations
- At least one graduate-level math course
- Materials characterization techniques
- Materials synthesis and processing
- Materials theory and modeling

Students are required to take two terms of Special Investigations in their first year. The choice of Ph.D. adviser will normally be finalized at the end of the first year when feedback is given on the Special Investigation, after which students will be funded by their adviser or through external fellowships.

After completing coursework, the next step toward a degree is admission to candidacy, indicating that the student is prepared to do original and independent research. To be admitted to candidacy, students must submit a written research prospectus and pass an area examination by the end of the first semester of the third academic year. If a student has faced unusual circumstances, this deadline can be extended, with the support of the research adviser and approval of the DGS.

The culmination of the program will be original, publishable research presented as a doctoral dissertation. The dissertation defense will include a public seminar and a closed examination by the Dissertation Committee. The dissertation must report original research in an area of materials science, as judged by the faculty of the department, and demonstrate creative thought and scholarly achievement by the student. There is no foreign language requirement.

Teaching experience is regarded as an integral part of the graduate training program at Yale University, and all materials science graduate students are required to serve as teaching fellows for two terms, typically during years two and three. Teaching duties normally involve assisting in laboratories or discussion sections and grading papers. Teaching duties are not expected to require more than ten hours per week. Students are not permitted to teach during the first year of study.

If a student was admitted to the program having earned a score of less than 26 on the Speaking section of the Internet-based TOEFL, the student will be required to take and English as a Second Language (ESL) course each term at Yale until the graduate school's Oral English Proficiency Standard has been met. This must be achieved by the end of the third year for the student to remain in good standing.

HONORS REQUIREMENT

In order to remain in good standing in the program, students are expected to make steady progress in meeting their course requirements and to obtain Honors grades in at least two full-term courses by the end of their fourth term of full-time study. Courses such as Master's Thesis, seminars, or Special Investigations cannot be used to fulfill the requirement for two Honors grades. An extension may be granted on a case-by-case basis at the discretion of the DGS, in consultation with the student's adviser. Students are also expected to maintain an average grade of High Pass during their time at Yale, following the averaging methodology determined by the graduate school.

MASTER'S DEGREES

M.Phil. See Degree Requirements under Policies and Regulations.

M.S. Doctoral students who withdraw from the Ph.D. program may be eligible to receive the M.S. if they have not already received the M.Phil. and have met the following requirements: successful completion of eight full-credit graduate courses (not seminars), no more than two of which may be Special Investigations; an average grade of at least High Pass; and at least one grade of Honors.