APPLIED PHYSICS

Becton Center, 203.432.2210
http://appliedphysics.yale.edu
M.S., M.Phil., Ph.D.

Chair
Vidvuds Ozolins

Director of Graduate Studies
Peter Schiffer (BCT 329; 203.432.2647; peter.schiffer@yale.edu)

Professors Charles Ahn, Sean Barrett (Physics), Hui Cao, Michel Devoret, Paul Fleury (Emeritus), Steven Girvin (Physics), Leonid Glazman (Physics), Jack Harris (Physics), Victor Henrich (Emeritus), Sohrab Ismail-Beigi, Marshall Long (Mechanical Engineering and Materials Science), Simon Mochrie, Corey O’Hern (Mechanical Engineering & Materials Science), Vidvuds Ozolins, Daniel Prober, Nicholas Read, Peter Schiffer, Robert Schoelkopf, Ramamurti Shankar (Physics), Mitchell Smooke (Mechanical Engineering & Materials Science), A. Douglas Stone, Hong Tang (Electrical Engineering), Robert Wheeler (Emeritus), Werner Wolf (Emeritus)

Associate Professors Michael Choma (Biomedical Engineering), Peter Rakich

Assistant Professors Yu He, Owen Miller, Shruti Puri

FIELDS OF STUDY
Fields include areas of theoretical and experimental condensed-matter and materials physics, optical and laser physics, quantum science, quantum information, and nanoscale science. Specific programs include surface and interface science, first principles electronic structure methods, photonic materials and devices, complex oxides, magnetic and superconducting artificially engineered systems, quantum computing and superconducting device research, quantum transport, quantum optics, and random lasers.

INTEGRATED GRADUATE PROGRAM IN PHYSICAL AND ENGINEERING BIOLOGY (PEB)
Students applying to the Ph.D. program in Applied Physics 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.

SPECIAL REQUIREMENTS FOR THE PH.D. DEGREE
The requirements for a Ph.D. in applied physics include passing at least nine course units. Courses such as Dissertation Research, Master’s Thesis, or seminars do not count towards the nine-course requirement, but two terms of Special Investigation courses are acceptable. Other than the Special Investigation courses, the courses counting toward the nine-course requirement must be full-credit graduate courses. Courses outside of those identified as acceptable in the departmental degree guidelines must
have a clear technical, scientific, or mathematical focus that is related to applied physics in the judgement of the student’s adviser and the DGS.

Within the nine-course requirement, students must pass the three core courses, unless they are substituted or waived with approval by the DGS. The three core courses are Electromagnetic Theory I (PHYS 502), Quantum Mechanics I (PHYS 508), and Statistical Physics I (PHYS 512).

Students must also take the Research in Applied Physics Seminar (APHY 576) and the Responsible Conduct in Research for Physical Scientists Seminar (APHY 590).

Students typically complete most of their course requirements in the first year, and sufficient progress toward meeting the course requirements is necessary to remain in good standing in the program. Note that the required courses are just the minimum, and students are strongly encouraged to consult with their adviser about taking additional courses that are needed to facilitate their dissertation research.

By the end of the first year, students must find a research adviser who is willing to supervise a project that is consonant with the research program of that faculty. Research advisers must have an appointment in the graduate school and be engaged in research that falls broadly within the subject of applied physics, although they do not need to be members of the department’s faculty.

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 early in their third 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.

There is no foreign language requirement.

Teaching experience is regarded as an integral part of the graduate training program at Yale University, and all applied physics 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. Students who require additional support from the graduate school must teach for up to an additional two terms, if needed.

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 an 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 in order for the student to remain in good standing.

HONORS REQUIREMENT

In order to remain in good standing in the program, students are expected 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. Students may apply for a terminal master’s degree in applied physics. For the M.S. degree, the requirements are that the student pass eight full-credit graduate courses (not seminars), typically courses similar to those that would meet the course requirements for the Ph.D. No more than two of the courses may be Special Investigations. Students may substitute other graduate courses with a clear technical, scientific, or mathematical focus that is related to applied physics in the judgement of the student’s adviser and the DGS. An average grade of at least High Pass is required, with at least one grade of Honors. This terminal degree program is normally completed in one year. Doctoral students who withdraw from the Ph.D. program may be eligible to receive the M.S. if they have met the above requirements and have not already received the M.Phil.

Program materials are available upon e-mail request to applied.physics@yale.edu, or at http://appliedphysics.yale.edu.