

## Cooperative Graduate Education

The P.C. Rossin College of Engineering and Applied Science permits graduate students to spend part of their academic experience in industry, business, or a government agency. In general, the external experience should be complementary to their graduate studies at Lehigh University and can count towards their degree program through ENGR 400 Engineering Experiential Learning for Engineering Graduate Students (see Graduate tab). Permission of the department chair is required in order to participate in this program.

Subject to university/federal regulations, when enrolled in courses at Lehigh University, a student can work for a maximum of 20 hours at the company/laboratory (external partner). If not enrolled in courses other than ENGR 400, a student may be permitted to work full time during the external experience. Full time employment over the summer may also be permitted. Maintenance of full-time status, however, requires that during the semester students must be registered for the minimum number of credit hours as listed in R&P or meet the qualifications to be certified as a full-time student.

### MS/MENG CO-OP PROGRAMS

- ENGR 400 can be taken for a maximum of 6 credits, with at most 3 credits in any registration period.
- Minimum of 18 course credit hours, excluding ENGR 400 and Thesis (ENGR 490) must be obtained through Lehigh University

### PH.D. PROGRAM

- 9 credits of ENGR 400 can be taken throughout a student's entire graduate study at Lehigh, with at most 3 credits in any registration period.

### Courses

#### ENGR 400 Experiential Learning for Engineering Graduate Students 1-3 Credits

Supervised work assignment outside of the university to obtain practical experience in field of study. Requires consent of department chairperson. When on an assignment, the student must register for this course to maintain continuous student status. Limit to at most three credits per registration period. No more than six credits may be applied towards a master's program and no more than nine credits may be used throughout a student's entire graduate study at Lehigh.

**Repeat Status:** Course may be repeated.

#### ENGR 401 Teaching/Presentation Skills 1 Credit

Development of teaching and presentation skills for scientific professionals. Presentation effectiveness, teaching/presentation methodologies, classroom management, course development/content preparation, lecture/presentation development and lecture/presentation delivery. Individualized undergraduate course specific modules selected by student. Enrollment limited to Rossin Doctoral Fellows.

#### ENGR 402 Preparing for the Professoriate 1 Credit

Overview of the job search, research program development and service skills for graduate students entering academic careers. Transition from graduate student to faculty responsibilities, the post-doctoral experience, time management, CV/resume preparation, faculty search process, tenure and promotion, research leadership and program development, research proposal preparation and research sponsorship. Enrollment limited to Rossin Doctoral Fellows.

#### ENGR 430 Technical Writing for Engineering and the Sciences 1 Credit

Formal composition and technical writing skills for advanced non-native English writers in Engineering and the Sciences. Instructor and peer review of writing, self-editing strategies, how to incorporate technical vocabulary and formulas, advanced sentence structure, and appropriate citation of research. Field-specific readings, which students must compile, critique, and model in their own writing. Designed for international graduate students who are writing or preparing to write publishable quality articles, theses, or dissertations.

#### ENGR 440 Intensive Teaching Workshop 0 Credits

Two-day intensive teaching workshop designed to prepare doctoral students for a teaching practicum experience. Various faculty will discuss a range of topics including fundamentals of effective teaching, motivating students, inclusive teaching, principles of teaching under a research perspective, explaining difficult topics, assessing student learning and enhancing learning with instructional technology. Students will be required to prepare and lead micro-teaching sessions. Course requires Dean's office permission and may not be repeated.

#### ENGR 441 Teaching Practicum 1-3 Credits

Mentored teaching experience focused on the design, organization, pedagogy and assessment of university courses in engineering. Students will work with a faculty member to develop teaching and communication skills and apply best practices in university teaching while receiving feedback. Specific course assignments will be determined by the student's home department and must be approved by the department chair. Course may be repeated for credit.

**Repeat Status:** Course may be repeated.

**Prerequisites:** ENGR 440

#### ENGR 452 (BIOE 452, CHE 452, ME 452) Mathematical Methods In Engineering I 3 Credits

Analytical techniques relevant to the engineering sciences are described. Vector spaces; eigenvalues; eigenvectors. Linear ordinary differential equations; diagonalizable and non-diagonalizable systems. Inhomogeneous linear systems; variation of parameters. Non-linear systems; stability; phase plane. Series solutions of linear ordinary differential equations; special functions. Laplace and Fourier transforms; application to partial differential equations and integral equations. Sturm-Liouville theory. Finite Fourier transforms; planar, cylindrical, and spherical geometries.

#### ENGR 490 Thesis (Moc) 1 Credit

#### ENGR 492 (ARTS 492, BUS 492) Summer Research 1-3 Credits

Summer research experience designated for engineering graduate students at both the master's and doctoral level who are participating in full-time research during the entire summer semester. Students must have a summer research appointment to be eligible to enroll in this course. The course is repeatable, however, credits earned for this course cannot be used to fulfill degree requirements.

**Repeat Status:** Course may be repeated.

#### ENGR 499 Dissertation (Moc) 1 Credit