ENGINEERING, PHD

Doctor of Philosophy in Engineering

The Doctor of Philosophy in Engineering is an interdisciplinary doctoral program that provides advanced study and research, focusing on qualitative research methods and specialized classes designed to equip students with advanced scientific research skills. Students conduct original research alongside faculty and graduate students.

Admission Requirements

Applicants for the Doctor of Philosophy in Engineering must hold a bachelor's degree from a program that is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology at the time of graduation, or provide satisfactory evidence of an equivalent academic background to the Dean of the College of Engineering and Polymer Science.

Applicants with a master of science degree must provide satisfactory evidence of an equivalent engineering baccalaureate background to the Dean of the College of Engineering and Polymer Science.

Applicants must submit official undergraduate transcripts, undergraduate grade point average, three letters of recommendation, statement of purpose, and resume. Personal statements or descriptions of post-baccalaureate experience that provide a rationale for proposed graduate study may also be submitted.

Applicants with only a bachelor's degree must have a cumulative undergraduate grade point average of at least 3.0/4.0.

Applicants with a master's degree must have a cumulative graduate grade point average of at least 3.0/4.0.

Applicants whose native language is not English must have a score of at least 79 on the internet-based TOEFL which includes four sections (reading, listening, speaking, and writing) or a minimum IELTS score of 6.5. Requirements for students wishing to be a teaching assistant are given under the Graduate School guidelines.

Applicants with a bachelor's degree in a discipline other than engineering may be required to take additional bridge-up courses depending on their background. Necessary bridge-up coursework will be determined by the admitting department/program graduate committee.

Transfer Credits

A student who has a master's degree from another university or from one of the graduate programs in the College of Engineering and Polymer Science, or who has graduate credits but has not completed the degree requirements for the master's degree, may transfer credits in accordance with the policies set by the Graduate School for doctoral degrees. An official transcript from the educational institution that offered the courses is required for all transfer coursework.

Any transfer courses used to meet degree requirements must be approved by the student's Interdisciplinary Doctoral Committee for inclusion on the student's individualized Plan of Study. A student's home department of study may specify limits on the number of credits of transfer coursework on the Plan of Study.

Degree Requirements

The University's Academic Requirements (see **Academic Requirements** in this Graduate Bulletin) for the Doctoral Degree and the following College of Engineering and Polymer Science academic requirements for the Doctoral Degree must be satisfied.

- An entering doctoral student will have the chair of the Interdisciplinary Doctoral Committee (IDC) in his/her home department/program.
- Student's plan of study should include 96 credit hours and be in accordance with the guidelines established by the student's admitting department/program.
- A Plan of Study will be established by the IDC satisfying guidelines established by the home department/program.
- Identify an interdisciplinary field of study, a dissertation director, and an Interdisciplinary Doctoral Committee before completion of 18 credits of coursework.
- Pass a departmental Qualifying Examination. The purpose of the qualifying examination is to determine admissibility to the doctoral program and any technical weakness.
- Satisfy the language requirement specified by the Interdisciplinary Doctoral Committee.
- Pass a Candidacy Examination. The purpose of the candidacy examination is to test the student's ability to conduct independent research.
- Present an acceptable Dissertation Proposal that describes the proposed research to the Interdisciplinary Doctoral Committee.
- Present and successfully (no "fail" votes) defend the dissertation to the Interdisciplinary Doctoral Committee.

A copy of the Ph.D. in Engineering Program Procedures (https://www.uakron.edu/engineering/academics/graduate/) may be obtained online at the College of Engineering and Polymer Science website.

Doctoral Student's Responsibilities

Doctoral students are completely responsible for all aspects of their graduate education. Specifically, these responsibilities include:

- Understanding, adhering to, and implementing the procedures of the Graduate School, as described in The University of Akron Graduate Bulletin, and the Interdisciplinary Doctoral Procedures of the College of Engineering and Polymer Science.
- Selecting an interdisciplinary program, Dissertation Director, and Interdisciplinary Doctoral Committee.
- Arranging, through the Dissertation Director, all Interdisciplinary Doctoral Committee meetings.
- Initiating, through the Dissertation Director, the forms that monitor their progress toward the doctoral degree.
- Presenting an acceptable Research Proposal to the Interdisciplinary Doctoral Committee and executing the proposed research.
- Preparing a scientifically acceptable and comprehensive dissertation whose format meets all the accepted standards of the Interdisciplinary Doctoral Committee, the College of Engineering and Polymer Science, and the Graduate School.
- Successful defense of the dissertation. (no "fail" votes)

Interdisciplinary Fields of Study

The proposal to establish a doctoral program in the College of Engineering was approved by the Board of Trustees of The University of Akron and the Ohio Board of Regents in 1967-68. Five undergraduate departments: Biomedical; Chemical, Biomolecular, and Corrosion; Civil; Electrical and Computer; and Mechanical are the basic disciplines for the

interdisciplinary programs. These interdisciplinary programs are broadly defined as follows:

- *Biomedical Engineering* studies the theoretical and experimental application of engineering principles to biomedical problems. Some typical areas of interest are biomaterials, biomechanics as well as signal and image processing.
- *Environmental Engineering* includes the study of water and air pollution, environmental health, chemical disposal, waste management, noise control, resource engineering, and appropriate fields of urban planning.
- *Mechanics* includes the theoretical and experimental study of the stresses, strains, and endurance of structures, machines and various materials, mechanics of solids, fluids, solid, and composite materials.
- *Systems Engineering* includes analysis, design, simulation and control of integrated operational systems, and interaction effects among the components of engineering systems. Applications include advanced electric power, communication, control, information security, and learning systems.
- *Electrical and Computer Engineering* studies and develops solutions for important problems in areas including energy, health, transportation and information technology. Some areas of interest include sensors, motor drives and controls, networked and distributed systems, alternative energy, software solutions, communications and embedded systems.
- *Materials Engineering* studies the materials from the physical/mechanical, chemical, and electrical standpoints. Its purpose is to develop a better understanding of the composition, properties, and performance of various materials, and to develop new materials and manufacturing methods for applications including sensors, electronics, etc.
- *Transport Processes* include the theoretical and experimental study of the transfer of mass, energy, and power, as related to engineering systems and processes.
- *Chemical Reactions and Process Engineering* studies chemical reactions, homogeneous chemical reactions, heterogeneous chemical reactions, and catalysis as applied to process engineering.
- *Microscale Physiochemical Engineering* studies small particles, surface science, agglomeration, and separation as applied to process engineering.

The interdisciplinary doctoral program has succeeded in providing doctoral students access to the resources of the entire college while providing an economically sound administration for a program that deals with a doctoral population that is much smaller than those for undergraduate or master's degrees.