

POLYMER ENGINEERING, PHD

Doctor of Philosophy in Polymer Engineering

The School of Polymer Science and Polymer Engineering administers a graduate program in which students, with primarily engineering backgrounds, are guided through a course of study and research under the supervision of a faculty member. Students may be admitted directly to the Ph.D. program upon screening of their qualifications and recommendation by the department chair and dean.

Students will earn the degree of Doctor of Philosophy in Polymer Engineering.

Requirements in the interdisciplinary field of Polymer Engineering for that degree are as follows:

- Complete courses as developed in a plan of study approved by the student's advisor and the department chair.
- A minimum of 96 credits of graduate work must be earned.
- A total of 36 credit hours of lecture courses and 60 credit hours of research must be completed.
- Twelve credit hours of the 60 credits must be dissertation research.

Code	Title	Hours
Polymer Engineering Core		
9841:611	Fundamentals of Polymer Structure Characterization	3
9841:621	Rheology of Polymer Fluids	3
9841:641	Polymer Chem & Thermodynamics	3
9841:650	Introduction to Polymer Engineering	3
Polymer Engineering 600-level Electives		
Select ten credits of the following:		10
9841:601	Seminar in Polymer Engineering ¹	
9841:622	Analysis & Design of Polymer Processing Operations I ²	
9841:623	Analysis & Design of Polymer Processing Operations II	
9841:631	Engineering Properties of Solid Polymers	
9841:651	Polymer Engineering Laboratory ³	
9841:661	Polymerization Reactor Engineering	
9841:675	Carbon-Polymer Nanotechnology	
9841:680	Polymer Coatings	
Mathematics Electives		
Select three credits of the following:		3
3450:532	Introduction to Partial Differential Equations	
3450:535	Systems of Ordinary Differential Equations	
3450:538	Advanced Engineering Mathematics I	
3450:539	Advanced Engineering Mathematics II	
3450:627	Advanced Numerical Analysis I	
3450:628	Advanced Numerical Analysis II	
Technical Electives		
Select two credits of the following:		2
4300:681	Advanced Engineering Materials	
4600:622	Continuum Mechanics	

9871:613	Polymer Science Laboratory	
9871:674	Polymer Characterization	
9841:xxx	Approved Elective Course in Polymer Engineering	
Polymer Engineering 700-level Electives		
Select nine credits of the following:		9
9841:712	Rheo-Optics of Polymers	
9841:715	Advanced Characterization of Functional Polymers	
9841:720	Molecular Aspects of Polymer Rheology	
9841:723	Rheology & Processing of Elastomers	
9841:724	Advanced Extrusion & Compounding	
9841:725	Chemorheology & Processing of Thermosets	
9841:727	Advanced Polymer Rheology	
9841:728	Numerical Methods in Polymer Engineering	
9841:731	Stress Analysis of Polymers & Composites	
9841:745	Liquid Crystals	
9841:747	Polymer Colloids	
9841:749	Phase Transitions in Polymer Blends and Alloys	
9841:761	Injection and Compression Molding Fundamentals	
9841:770	Polymer Nanocomposites	
9841:773	Advanced Polymer Coating Technology	
9841:777	Modeling of Nanoscale Materials	
9841:778	Advanced Functional Polymers	
9841:797	Advanced Topics in Polymer Engineering	
Total Hours		36

¹ Doctoral students are also required to take 9841:601 Seminar in Polymer Engineering two times to earn two credits.

² 9841:622 Analysis & Design of Polymer Processing Operations I is a prerequisite for 9841:651 Polymer Engineering Laboratory.

³ 9841:651 Polymer Engineering Laboratory is a required elective class for doctoral students.

Electives may be taken from other departments such as polymer science, chemical engineering, mechanical engineering, physics, mathematics, computer science, or other engineering departments with the adviser's approval.

Research - 60 Credits

Students may take a combination of 9841:898 Preliminary Research and 9841:899 Doctoral Dissertation to meet this requirement, however, a minimum of 12 credits of the total 60 required must be of 9841:899 Doctoral Dissertation.

Research Proposal

Each doctoral student must

1. present his/her research proposal and
2. pass an oral examination of basic knowledge of polymer engineering during his/her proposal defense to be held within 18 months of entry into the program.

Dissertation and Oral Defense

Each candidate must pass an oral examination in defense of the dissertation.

Submit the written Doctoral Dissertation to the Graduate School by the required deadlines.

Transfer of Credits from Master's Degree

A student receiving a Master of Science degree from The University of Akron in Polymer Engineering may use all lecture course credits toward the 36 lecture course credit requirement.

A student entering with a master's degree or graduate credits from another institution may be given 18 credit hours toward the lecture course requirement.