

**PH.D. IN POLYMER AND FIBER
ENGINEERING**

Auburn University

Graduate Student Handbook

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1. Introduction

This handbook presents guidelines and regulations required to obtain a Ph.D. degree in Polymer and Fiber Engineering (PFEN). This document should be used in conjunction with “Auburn University Graduate Bulletin”. If in doubt about interpretation of rules and policies contained in this manual or the Graduate Bulletin, consult your Advisor, Graduate Program Officer (GPO), or Department Head.

2. Program Description

This program is offered as a graduate degree in the Department of Polymer and Fiber Engineering, Samuel Ginn College of Engineering. Students joining the Ph.D. program will have either a B.Sc. degree or a M.Sc. degree in polymer engineering, fiber engineering, materials engineering, chemical engineering, mechanical engineering, chemistry, biology, physics, or other associated fields. Building upon introductory courses attended during their degrees, students will receive advanced education in polymer synthesis, processing, characterization, rheology, natural polymers, fiber/preform processing, composite materials, and other topics of interest to the students and their respective research fields. They will also be encouraged to attend advanced classes offered by the College of Engineering, College of Science and Math, etc. All of these classes taken by the students according to a specific plan of study will allow them to acquire knowledge adequate to form a comprehensive understanding in their area of interest and its contemporary problems and give them the information-base necessary for life-long learning.

2.1. Program Admission Requirements

The applicant must have successfully completed a Bachelor’s or Master’s degree in Polymer/Fiber Engineering or related field. All requirements of the Graduate School, including the minimum score of 1100 on the Graduate Record Exam (GRE) and the mandatory score for English proficiency must be satisfied. Further three letters of recommendation must be supplied by the candidate. A GPA of 3.0 must be maintained for all courses of the program.

2.2. Course Work

Students must finish a total of 60 semester credit hours (B.S. degree followed by Ph.D.) with a minimum of 30 semester credit hours of graded graduate course work of 6000-level courses or above (with M.S. degree), beyond the Bachelor’s degree. At least 18 hours of these credit hours must be completed at Auburn University. Of the 30 additional semester hours of course work (at the 6000-level or above) some may be ungraded. A minimum of 10 credit hours of Research and Dissertation PFEN 8990 must be taken. A maximum of four semester hours

of 7990 (Research and Thesis) for a completed Master's program can be counted in the 30-hour minimum. Graduate students must maintain a GPA of 3.0 or better to remain in the graduate school. After completion of the core courses, a written qualifying exam given by the faculty will have to be passed, followed by a written and oral presentation of the student's Ph.D. proposal (administered by the student's advisory committee). For final graduation the student must present his/her research work in form of a written thesis and pass an oral exam (Defense).

2.2.1. Currently Offered Courses

Course Number	Title	Credit Hours
PFEN 6100	Fabrics for Papermaking	3
PFEN 6200	Advanced Polymer Processing	4
PFEN 6250	Advanced Engineering Fibrous Structures	3
PFEN 6510	Polymer Chemistry	4
PFEN 7210	Fabric Formation and Properties	3
PFEN 7310	Structure and Properties of Polymers	4
PFEN 7410	Coloration of Polymers and Fibers	4
PFEN 7500	Mechanics of Reinforced Materials	3
PFEN 7610	Advanced Polymers from Renewable Resources	2
PFEN 7620	Advanced Mechanics of Flexible Structures	3
PFEN 7700	Advanced Methods in Polymer Characterization*	4
PFEN 7770	Conductive Polymers	3
PFEN 7900	Directed Studies	1-3
PFEN 7910	Polymer Rheology*	3
PFEN 7950	Graduate Seminar	1
PFEN 7970	Special Problems in Polymer and Fiber Engineering	1-3
PFEN 7980	Graduate Project	1-3
PFEN 8200	Advanced Textile Structure Design and Development	3
PFEN 8990	Research and Dissertation	1-10

Courses under Development (Special Topics Courses)

- Polymer Physics
- Polymer and Fiber Thermodynamics

- Polymer Colloids and Emulsion Polymerization
- Polymer Nano-composites

2.2.2. Course Selection

Students in the Ph.D. program will work with their Graduate Advisory Committee to select graduate level PFEN courses to meet the requirements of the student's career objectives in addition to the required Ph.D. core courses (see below). Students with a Master's level background in polymer/fiber science or engineering may have prior credit in some of these courses; those without either an undergraduate or Master's level background in these subjects will be required to take a number of courses in the subject area to provide the knowledge base for the Ph.D. in PFEN. Specific courses will be determined by the student's Advisory Committee. Supporting courses outside the Department Polymer and Fiber Engineering are encouraged. Students will discuss an appropriate selection with their major advisor.

2.2.3. Ph.D. Core Classes

Core courses include PFEN 6200, PFEN 6510, PFEN 7310, PFEN 7700, PFEN 7950, beyond a minimum of 10 credit hours of Research and Dissertation (PFEN 8990). In addition, the Graduate Seminar PFEN 7950 must be taken, for credit, a minimum of two times.

2.3. Compliance with Residency

According to the Auburn University Bulletin, "... graduate students enrolled in a degree program cumulating in a dissertation must directly engage in research with the major professor, must have access to the research tools needed for the research activity, must be immersed in the culture of graduate education, must engage in the professional activities of the discipline, and must complete the research activity in a reasonable period of time. Graduation requires the major professor to certify compliance with these requirements."

2.4. Graduate Advisory Committee and Plan of Study

The student will consult with the department faculty and establish a 3-member (minimum) faculty committee that will be responsible for working with the student in planning the program of study, administering the thesis research, and ensuring that the thesis is of high quality. The committee will include at least two PFEN faculty members, one of which will serve as Graduate Advisor. The third member of the committee may be from PFEN or from another discipline. All members of the committee must be members of the Graduate Faculty, Level II.

The electronic form for the Plan of Study can be found on the Graduate School website at <http://graduate.auburn.edu/gspoststudent/main.aspx>. The student will include all

course work and all members of the student's Graduate Advisory Committee as well as the Department Head will electronically sign the form. Should any changes become necessary, the student will inform the GPO or the Graduate School.

2.5. Qualifying Exam

A written general exam will be given after the student successfully completed the core courses (at the end of the 3rd or 4th semester of graduate study) to demonstrate an understanding of the broad body of knowledge in the field of study. The exam will be administered by a committee of 3 faculty members and the responsibility will be rotated. The exam will consist of a written test consisting of open-ended questions. The questions are selected from a test bank created by the faculty of the department. The exam will be offered twice per year. The student is allowed to repeat the examination twice; however the student must successfully pass the Qualifying Exam within one year after the first attempt. Ph.D. candidates have a maximum of four additional years after passing the Qualifying Exam in which to complete all additional degree requirements.

2.6. Dissertation Proposal

After successful completion of the Qualifying Exam, students will submit a concise written proposal to their Graduate Advisory Committee. Subsequently, the Oral Dissertation Proposal, using the form obtained from the Graduate School, is scheduled. The Dissertation Proposal must be scheduled with the Graduate School at least one week in advance of the examination. Upon successful completion of the Dissertation Proposal (which requires unanimous agreement of the Advisory Committee), the student becomes a candidate for the Doctor of Philosophy degree and may proceed with the dissertation research. If the student fails the Dissertation Proposal, a re-examination may be given on the recommendation of the Advisory Committee and the approval of the Dean of the Graduate School. Candidates have a maximum of four additional years after passing the Dissertation Proposal in which to complete all additional degree requirements.

2.7. Written Dissertation

Upon completion of the course and exam requirements and the research work, the student will submit a written copy of the thesis to the Graduate Advisor for preliminary review. Guidelines for the written dissertation can be found on the webpage of the Graduate School www.grad.auburn.edu. As a common style guide, the ACS Style Guide is recommended. When the Advisor agrees that the dissertation is ready for committee review, the student will provide copies to the Advisory Committee 2-3 weeks prior to scheduling a final oral dissertation defense. A copy is also provided to the Graduate School for review by an Outside Reader. The Outside Reader will be present at the oral defense of the dissertation. The thesis defense will consist of a formal presentation of

the thesis research followed by a comprehensive oral examination by the faculty committee that will cover the thesis research and the student's graduate studies. The faculty committee will determine if the defense of the thesis was successful (pass or fail). The student must pass the thesis defense in order to complete the program.

Alternatively, if in agreement with the major Advisor and the Graduate Advisor Committee, a dissertation can also be prepared by tying three publications together with a joint introduction, summary and reference list. The following basic rules apply: The majority of the actual research and the writing of each published paper used in the thesis/dissertation must represent the efforts of the primary student author and not collaborators. The research should represent work performed while in the graduate program at Auburn University. The student must be the primary author of each manuscript and normally would share authorship only with the major professor. Papers that include other authors can be used provided the efforts of the other authors represent less than half of the total effort. The primary (student) author's effort should represent, in the judgment of the faculty supervisor and the student's advisory committee, a majority of the total effort expended in performing the research and preparing the manuscript (51 percent or more).

2.8. Oral Defense

In the oral defense, the student will be asked about his/her research efforts and any other relevant questions. Final passage in this oral exam requires unanimous approval of all committee members and the outside reader. The committee vote is reported on Form 9, Report of Ph.D. Candidate Examining Committee, to be obtained by the student from the Graduate School prior to the exam. In case of failure to pass the oral test, the student will be allowed one re-examination contingent on the committee approval and the approval of the Graduate Dean.

2.9. Important Deadlines

For important deadlines, such as add/drop courses, graduation check, etc. the student is referred to the Graduate School website/calendar on <http://www.grad.auburn.edu/>. All necessary forms can also be found on this website under "Forms and Policies".

2.10. Full Time Students

A student is considered a full time student if he/she is registered for nine or more credit hours per semester. Graduate students may register for a maximum of 16 hours per semester, excluding PFEN 8990 Research and Dissertation. Part time students do have a lighter course load. After all course work and research efforts are completed, if the student still has to maintain a full time load (e.g., international students), he/she can register for GRAD89@@0 plus a minimum of one hour of PFEN 8990.

All international students must maintain a full time course load through the duration of the program. If the student cannot maintain such status for any reason (e.g., no courses are given, etc.), the student may obtain a waiver from the International Student Office to be signed by the student's advisor and Department Head.

2.11. Graduate Assistantships

Graduate assistantships for research (GRE) or teaching (GTA) are subject to availability of funds. Assistantships may be renewed each semester based on satisfactory progress toward meeting degree requirements, satisfactory performance of assistantship responsibilities, and availability of funding. A limited number of Graduate Teaching Fellowships and Graduate Research Fellowships are available to students holding assistantships of one fourth time or greater. These fellowships provide for remission of tuition for a maximum of 80 semester hours in 12 semesters. Guidelines are at the discretion of the Graduate School and subject to change.

2.12. Miscellaneous

Graduate Students Council (GSC)

Every year one of the graduate students is nominated to be the departmental representative for the GSA. The GSC will participate in various meetings organized by Auburn University and form the liaison for graduate students of the department with other graduate students and Auburn University as a whole.

Professional Organizations with Graduate Student Memberships

PFEN graduate students are encouraged to take advantage of membership in professional organizations related to their field of interest. Examples of organizations are Society for the Advancement of Material and Process Engineering (SAMPE), Fiber Society, Materials Research Society (MRS), American Chemical Society (ACS), American Society of Mechanical Engineers (ASME), American Institute of Chemical Engineers, American Association of Engineering Education, (ASEE), and Society of Plastics Engineers (SPE).