

**NC STATE**

Wilson College of Textiles

**Fiber and Polymer Science Ph.D.  
Graduate Student Handbook**

**2021 - 2022**

# Wilson College of Textiles FPS Handbook

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# Roadmap to Graduation

The Fiber and Polymer Science Ph.D. requires 72 credits for graduation. Full details are provided in Section II: Program Structure. All students are required to take FPS 770 Introduction to Polymer Science and TMS762 Physical Properties of Fiber Forming Polymers and two semesters of FPS 801 along with two additional courses from the list given in the Appendix. Students must also successfully defend a critical literature review and research proposal and a final dissertation defense.

**Semester 1:** Take FPS770 (Fall) or TMS762 (Spring), FPS801, and one or two additional courses from the list given in the Appendix. Find a research advisor from program faculty and a research project in consultation with research advisor. Program faculty can be found at: (<http://www.grad.ncsu.edu/catalog/default.asp>, then scroll down to FPS)

**Semester 2:** Take TMS762 (Spring) or FPS770 (Fall), FPS 801, and, if qualifier courses have not been completed, take one or two of the courses from the list given in the Appendix.

**Semester 3:** Complete required coursework (minimum of six 3-credit courses) and create Plan of Work.

**Semester 4:** Defend prelim exam.

**Semester 4 → graduation:** Perform research.

**Last Semester:** Defend dissertation and get dissertation approved by ETD.

## I. Program Introduction

The Ph.D. degree symbolizes the ability of the recipient to undertake original and scholarly work at the highest levels without supervision. The degree is, therefore, not granted simply upon the completion of a stated amount of course work but rather upon demonstration by the student of a comprehensive knowledge base and high attainment in scholarship. The student demonstrates this ability by passing a series of courses, creating a written critical literature review and original research proposal, defending an oral preliminary examination, writing a dissertation reporting the results of an original investigation, and making a final oral defense of the research before the student's advisory committee and other interested members of the University community.

A minimum of 72 credit hours is required of students entering the program with a B.S. degree, or a minimum of 54 credit hours beyond the M.S. degree is required. (Students, who enter the Ph.D. program directly upon completion of an M.S. at NC State, may be allowed credit for up to 30 hours of their M.S. and thus would require 42 additional credit hours to complete the Ph.D.) Most of these credit hours are expected to be research credits (FPS 893 or FPS 895). The student generally selects courses, in consultation with her/his advisory committee, so as to prepare for admission to candidacy for the degree and to carry out his/her proposed research. (Students are admitted to candidacy after meeting the course requirements and passing the preliminary oral examination.)

The Fiber and Polymer Science program requires successful completion of a specific set of four qualifying courses plus a minimum of 2 additional graduate courses plus two semesters of FPS 801 (which may be waived for students who have taken TC, TE or TMT 601). These additional courses (which should be selected with input from the advisory committee) can be part of an "official minor", which will require approval from the Minor Director of Graduate Programs, or can be courses chosen to provide a better foundation for the research work. The coursework must be followed by the successful defense of a research proposal, after which the student is a candidate for the Ph.D. degree. The student must subsequently submit and successfully defend a dissertation, based on a body of their original research. Upon successful completion of the above requirements, the committee can recommend that the doctorate be awarded.

The anticipated time for completion of the Ph.D. program is four years for a student entering from a B.S. degree and three years for entry from an M.S. degree. The minimum time required (in exceptional cases) is two years beyond entry if the student obtained an M.S. degree from NC State.

Students are expected to comply with the University guidelines on course load unless special justification for an exception has been made and approved by the Graduate Program Director and approved by the Dean of the Graduate School in advance. Such exceptions will normally not be allowed to extend beyond one semester. A maximum of 15 credit hours per semester is allowed if the student is self-funded and 12 credit hours if the student is funded. A maximum of 9 credit hours for any combination of FPS 893, 895, 899, and 830 are permitted in any single semester. At least 18 credit hours of research are required and more are expected.

For a complete summary of procedures governing the Ph.D. degree, see the appropriate sections of the [Graduate Catalog](#) and [The Graduate Handbook](#).

## II. Program Structure

### II. A. Overview

The program contains “milestones” that shall be met by the student. These consist of:

- Successful completion of a specified set of four “qualifying courses” plus at least two additional graduate courses (selected with advice from student’s committee chair)
- Satisfactory completion of a written critical review of literature in the area of the student’s proposed research
- Oral defense of the review of literature and a presentation of an original research proposal
- Preparation of a dissertation based on student’s original research
- Oral defense of the dissertation

Guidance in the planning of these activities will be given by the student’s chair and committee and will form the basis of the “student plan of work”.

### II. B. Qualifying Courses

All students must take:

- Advanced Polymer Science - FPS 770 and
- Physical Properties of Fiber Forming Polymers, Fibers and Fibrous Structures - TMS 762

Plus two additional courses selected from the list given in Appendix 1 with guidance from their advisor (committee chair).

Every student must obtain a grade of B or better in each of these four courses.

The list has four focus areas:

- Fiber Science
- Polymer Science
- Coloration and Wet Processing
- Formation and Properties of Fibrous Assemblies

Courses on the prescribed list will be offered annually.

All students are expected to complete the “qualifying course” requirement by the end of the third semester.

### **II.C. Critical Review of Literature and Research Proposal**

Students who have successfully passed all 4 qualifying courses will proceed to produce a scholarly, in-depth, critical review of the existing knowledge in the field of specialization in which the student hopes to base his/her dissertation proposal. The review should be of “publishable quality” and must be submitted to the student’s committee along with an original research proposal. The proposal should include the motivation for the work, the literature review, preliminary methods and procedures, and preliminary results along with the measurable goals of the research. It should include a projected timeline (e.g. Gantt chart) for completion of the student’s studies.

### **II.D. Preliminary Oral Examination for Admission to Candidacy**

After the chair of the committee has agreed that the written critical review and proposal are acceptable, the student is expected to present and defend the literature review and research proposal. The literature review and proposal shall be provided to the committee at least 17 days prior to the exam with a copy to the Director of Doctoral Graduate Programs. The exam form must be submitted online at least 17 days prior to the defense date. (Form can be found at: <https://grad.ncsu.edu/faculty-and-staff/forms/graduate-school-forms/>). The presentation will be made to an examining committee consisting of the student’s advisory committee. The presentation will also be open to interested faculty, staff and students. After the presentation the student will be orally examined by the examining committee, to test his/her ability to relate factual knowledge to specific circumstances, to use knowledge with accuracy and promptness, and to demonstrate a comprehensive understanding of the field of specialization and related areas.

Upon satisfactory completion of the oral examination, the student is admitted to candidacy for the degree. The student must complete the preliminary exam by the end of their 4th semester. In the event of a “Conditional Pass”, the terms specified in the conditions must be satisfied before the end of the 5th semester.

### **II.E. Preparation of Dissertation**

Under the advisement of his/her chair and committee, the student will write a dissertation covering the original research they have carried out. The committee decides on the format of the dissertation, which can be:

Either “traditional” (consisting of various chapters, such as – Introduction and Motivation, Literature Review, Experimental Design and Methodologies, Trials,.....Conclusions, etc).

Or a collection of papers that have either been submitted or are ready for submission to a refereed journal.

The dissertation will follow the guidelines set by Graduate School ([ETD Guide](#)) and shall be distributed to the members of the examining committee with a copy to the Director of Doctoral Graduate Programs at least 17 days before the final oral examination is scheduled.

### **II.F. Final Examination**

The final examination is an oral exam where the student presents and defends her/his research procedures, results and conclusions. The presentation will be made to an examining committee consisting of the student’s advisory committee and is open to interested faculty, staff and students. After the presentation the student will be orally examined by the examining committee. The final oral examination can be scheduled once all coursework requirements have been fulfilled and the committee is satisfied that the dissertation is complete, but not earlier than one semester after admission to candidacy. The exam must be scheduled no later than 17 days

prior to the proposed examination date and the final dissertation must be provided to the committee at least 17 days prior to the exam date. Failure to meet this deadline will result in the exam being cancelled.

After successfully defending the dissertation, the student shall provide a copy to ETD within 24 hours of the end of the exam. Additional details are provided in the [Graduate Catalog](#).

## **II.G. Changes in Degree Objectives, Committee Composition and Plan of Work**

Changes in degree objectives, committee composition, and Plan of Work should be requested as the need arises. Handling these matters at the time of scheduling examinations will create delays.

## **II.H. Deadlines for Submission of Dissertations**

- Deadline to graduate during the current semester: The student must have passed the oral examination “unconditionally” or have passed “conditionally” and have cleared all conditions while being registered for the semester he/she is graduating in; and dissertation submitted online to ETD for the initial review by four weeks before the last day of class.
- Deadline to graduate, but not register for the current semester: The student must have passed oral examination “unconditionally”, or passed “conditionally” and have cleared all conditions; and dissertation submitted online to ETD for initial ETD review by the last working day before the first day of classes for that semester. The student must also have been registered in the semester preceding the one he/she plans on graduating in. It is not necessary to turn in the final dissertation by that date, just to have had the review. (For example, to graduate in the Fall semester but not register for the Fall semester, the student must satisfy these conditions prior to the first day of classes for the Fall semester.)

When all changes have been made, the thesis editor will accept the ETD in the system. (Once the ETD has been accepted there can be no further changes.) An automatic email will be sent to the student and the advisor notifying them that the ETD has been accepted. The URL will be noted on the email.

There will be no paper copies issued by the Graduate School. It is the student's responsibility to determine if anyone requires a paper copy and to provide it to them. See the [ETD Guide](#) for further details.

The student should also fill out the Survey of Earned Doctorate Form. <https://sed.norc.org/showRegister.do>

The student must submit the Doctoral Dissertation Agreement Form. Form can be found at: <https://grad.ncsu.edu/students/etd/doctoral-required-forms/>

## Checklist for Ph.D. Students

- \_\_\_ Ensure that registration is complete before census day and that course load is within the prescribed limits.
- \_\_\_ Submit Patent Agreement online. Navigation: MyPackPortal > Main Menu > Student Self Service > Academic Records > Graduate Plan of Work. Tab Name: Patent Agreement
- \_\_\_ Select dissertation research advisor and notify Office of Academic Programs by the end of the second month on campus.
- \_\_\_ Complete committee selection, fill out plan of work (POW) online. Navigation: MyPackPortal > Main Menu > Student Self Service > Academic Records > Graduate Plan of Work.
- \_\_\_ The POW shall be submitted before the student completes the second semester of the graduate study program.
- \_\_\_ Grade Point Average (GPA) must be maintained at 3.00 or higher.
- \_\_\_ Attend Graduate School Thesis Preparation Workshop during third semester and obtain a copy of the University's ETD guide: <https://grad.ncsu.edu/students/etd/>
- \_\_\_ Schedule the preliminary oral examination at least 2 weeks before the proposed date by submitting exam form. (Form can be found at: <https://grad.ncsu.edu/faculty-and-staff/forms/graduate-schoolforms/>).
- \_\_\_ Provide literature review and proposal at least 17 days before the proposed date.
- \_\_\_ The preliminary examination must be completed prior to the end of the fourth semester.
- \_\_\_ The doctoral residence requirements must be met prior to scheduling the final oral examination.
- \_\_\_ At least four calendar months must elapse between the preliminary and final oral examinations.
- \_\_\_ Schedule the final oral examination at least 17 days before the proposed date by submitting exam form. (Form can be found at: <https://grad.ncsu.edu/faculty-and-staff/forms/graduate-school-forms/>).
- \_\_\_ Distribute completed dissertation to advisory committee and Graduate School representative at least two weeks before the scheduled examination.
- \_\_\_ Within 24 hours of unconditionally passing Final Exam, submit dissertation online to ETD and obtain preliminary approval of your thesis.
- \_\_\_ Fill out Survey of Earned Doctorat Form. <https://sed.norc.org/showRegister.do>
- \_\_\_ Fill out Doctoral Dissertation Agreement Form and pay microfilming fee. Form can be found at: <https://grad.ncsu.edu/students/etd/doctoral-required-forms/>
- \_\_\_ Clean laboratory and office, take care of any fees owed to the University, and turn in your keys.
- \_\_\_ Clear all responsibilities (lab waste, office and lab keys, desk key, and library) and have separation form signed by appropriate COT personnel.

## Appendix: Qualifying Courses for FPS Program

All students must take two semesters of FPS 801.

All four qualifying courses (below) must be taken by the end of the 3<sup>rd</sup> semester.

All students must take:

- Introduction to Polymer Science (FPS 770) and
- Physical Properties of Fiber Forming Polymers, Fibers and Fibrous Structures (TMS 762)

Plus two additional courses selected from:

- Polymer Science
  - Polymer Microstructures, Conformations and Properties (TC 771)
- Fiber Science
  - Fiber Formation: Theory and Practice (TC 704)
  - Mechanical and Rheological Properties of Fibrous Material (TMS 761)
  - Characterization of Structure of Fiber Forming Polymers (TMS 763)
- Coloration and Wet Processing
  - Color Science (TC 706 and TC 707)
  - Textile Wet Processing (TC/FPS 710)
  - Dye Synthesis (TC 720)
- Formation and Properties of Textile Products
  - Yarn and Fabric Formation, Structure and Properties (FPS 750)
  - Special Studies in Fiber & Polymer Science related to textile products (FPS 792)

Every student must obtain a grade of B or better in each of the four qualifying courses chosen.