

Doctor of Philosophy Degree Program

Program Description

The Doctor of Philosophy Degree Program in Pharmaceutical Sciences uses an interdisciplinary approach to prepare students for careers in teaching and research in academic institutions, and for employment in industry, government and other agencies and institutions involved in health science-oriented research and development. The program of study may be individualized according to the academic background and area of research interest of the student, and includes: required and elective course work, participation in departmental activities such as seminars and teaching assignments, and in-depth research involving a topic of interest to the student and major professor.

Program Objectives

The objectives of the program are that students will be able to:

- demonstrate a comprehensive knowledge of the core areas of the pharmaceutical sciences: pharmacokinetics, statistics, pharmacology, medicinal chemistry, structure activity relationship, dosage forms, delivery systems, formulation, pharmacodynamics, analytical methods/instrumentation, scientific literacy, bioethics, biotechnology, and drug metabolism.
- demonstrate knowledge of research methodology in their selected field of the pharmaceutical sciences.
- demonstrate knowledge of the literature in their selected field of the pharmaceutical sciences.
- formulate appropriate solutions to research and development problems.
- appropriately gather and analyze data using current informatics.
- communicate effectively in both written and oral forms.
- demonstrate self-improvement and continuing professional development.
- demonstrate the ability to collaborate with peers and faculty to meet an objective.
- adhere to professional and ethical responsibilities.
- demonstrate teaching skills.

Admissions Process and Requirements

Application for admission must be made on forms that may be obtained from the Department of Pharmaceutical Sciences or the department web page. An application cannot be given final consideration until all required components have been received. A complete application consists of the following:

- A nonrefundable \$25 application fee, the application form, and additional information requested on the application form.
- Official transcripts. An official transcript is one that has been issued by an institution and received by the department in an envelope sealed by the issuing institution. The transcript will contain the official school seal or stamp and the signature of the registrar. You are required to submit one separate official transcript from each college or university you have previously attended or are currently attending. Faxed documents are not accepted as official.

- Official report of GRE scores. Please use institution code 5623 and department code 0613.
- Official report of TOEFL scores, if required. Please use institution code 5623 and department code 0613.
- International students with degrees that have not been earned at a regionally accredited institution are required to provide a report by a professional evaluation service for foreign course evaluations. The evaluation should name and describe all diplomas, certificates, degrees, periods of education or training and give U.S. equivalencies for each. Mercer University accepts evaluations from the following two services:
 - World Education Services [www.wes.org]
 - Josef Silny & Associates, Inc. [www.jsilny.com/html/foreign.htm]
- Recommendations on the supplied forms from three persons who are able to judge the applicant's accomplishments and academic ability. Recommendation forms should be sent directly to the Director of Graduate Programs.
- Minimum expectations for consideration for admission into the Ph.D. program include the following:
 - a Bachelor of Science in Pharmacy, Chemistry, Biology or an equivalent degree in a related area, or a Pharm.D. degree;
 - a minimum GPA of 3.0 based on a 4.0 scale;
 - a minimum Graduate Record Examination (GRE) score of at least 40 percentile in the verbal section and at least 60 percentile in the quantitative section;
 - for an applicant from a country where the primary language is other than English, a minimum official TOEFL score of 100 IBT (internet based TOEFL) or a score of 7.5 (IELTS).

For more information, contact the Director of Graduate Programs or the Program Specialist, or email: pharmsciphd@mercer.edu, telephone (678) 547-6730.

Special Student Classification

Certain individuals may apply as special students in the Ph.D. program. This classification allows students to enroll upon submission of an application and official transcripts and approval of the Director of Graduate Programs.

Applicants must have completed a minimum of a bachelor's degree from an institution accredited by an institutional accrediting agency recognized by the U.S. Secretary of Education and must possess appropriate credentials for admission to the graduate program with the exclusion of the GRE. Special student classification does not assure admission to the graduate program, and these students must reapply for admission to the graduate program and satisfy all admission requirements to be considered. A special student may apply a maximum of nine (9) credit hours as transfer credit toward the Ph.D. degree if the program of study can be completed within the stated time in residence. Special students must submit applications no later than thirty days before the beginning of the semester in which special student classification is sought.

Transfer Credit

Upon approval by the Director of Graduate Programs, up to 15 semester hours of graduate-level credit may be transferred from other approved institutions. The student must supply a transcript and the necessary descriptive materials from each course to the

Director of Graduate Programs. The Director of Graduate Programs will determine the equivalent course and the number of credit hours accepted. Courses cannot be transferred for credit if: a) they have been taken more than six years before admission into the Ph.D. Program; or b) a grade below B (or the equivalent) was earned.

Financial Support

Financial support for graduate students in the department is available through teaching assistantships and tuition waivers. Stipends will be provided on a competitive basis for participation in laboratories and other College activities. Additional financial aid may be available through grants and/or contracts as well as guaranteed student loans.

Health Policies

The Mercer University Student Health Form is required and must be signed by a physician or other health care provider, and stamped with the provider's name and address. Students are encouraged to keep a photocopy of this completed form for their personal records.

All students born after 1956 must provide a statement of immunization against Measles, Mumps, and Rubella (MMR), giving the month, day, and year of immunization. A statement of "up to date" is not sufficient. Two doses of Measles (Rubeola) vaccine, two doses of Mumps vaccine, and one dose of Rubella are required. Students must have been at least 12 months old when the first Measles dose was received. Previous diagnosis of disease is proof of immunity against Measles and Mumps (a physician's statement is required), but not proof of Rubella.

If a student is unable to provide dates of immunization to Measles, Mumps, and Rubella, he or she may document immunity by blood test, at the student's expense. If this testing shows no immunity to Measles, Mumps, or Rubella, the student may register following documentation of the first dose of MMR, with the second to follow in thirty (30) days, if required.

Tuberculosis (TB) screening (within the past year) is required of all new students. Students at risk for TB will be required to have a PPD skin test (Mantoux). The Tine tuberculosis test is not acceptable. Students should be tested regardless of prior BCG vaccination. Any student with a positive skin test will be required to provide a report of a normal chest x-ray (done after the positive PPD) to be eligible to register. A physician should evaluate individuals with a positive tuberculosis skin test.

Do not assume that childhood immunizations are adequate; requirements have changed during the past several years. Medical facilities in the U.S. and in other countries are required to keep records of vaccinations. Additional sources of immunization information include doctors' offices, health departments, and schools. Students should make copies of the completed health form for their own files, and then mail the original forms. Do not rely on health care providers, family members, or other colleges to mail the forms.

Exemptions from compliance with the immunization policy include:

- Religious exemption, written on letterhead stationery, signed by a religious official and notarized.
- Medical exemption, written on office stationery, and signed by a health care provider. The letter should state the reason for the exemption, and whether the exemption is permanent or temporary.
- Immunizations for the following diseases are recommended, but not mandatory: chickenpox (varicella), hepatitis A, hepatitis B, polio, and tetanus. The most recent tetanus booster should have been within the past 10

years. Immunization against meningococcal meningitis is recommended for college students.

Some academic programs have additional immunization requirements. Students are advised to check with their college or school program for any additional requirements.

Health Insurance Requirements

University policy mandates that all enrolled students (except those in distance learning and in the regional academic centers) must maintain health insurance coverage. Students are automatically charged by the University for health insurance every time they register for classes. This charge can be removed by completing the online waiver form before the end of the waiver period. To complete the waiver process, go to <https://bursar.mercer.edu/studentinsurance/>. Students must complete the waiver before the stated deadline. Failure to complete this form before the deadline will result in insurance being purchased for you and charged to your account.

Academic Policies and Procedures

Attendance

Attendance at the College of Pharmacy is a privilege and not a right. Each course coordinator is charged with the responsibility of establishing an absentee policy for his/her course, subject to the approval of the department chairperson. This policy must be a part of the course syllabus distributed to students. In those cases, in which the professor does not wish to establish an absentee policy, absenteeism cannot be considered in determining the grade for the course.

Leave of Absence

Any students wishing to take up to one week off from laboratory work, course work or other school duties must get prior approval from their major professor and the Director of Graduate Programs. In the absence of a permanent major professor, the Director of Graduate Programs should be consulted. When special circumstances arise, a student may make a request to the Director of Graduate Programs for an official leave of absence from the program. The student must submit the request in writing and state the reason for the request. A leave of absence may be granted for a maximum of one calendar year. Students on leave must complete course work for which an "I" grade was awarded in a prior term and are expected to comply with the one-year time limit for removing Incomplete grades. Students on stipends may be removed from the payroll for the duration of their absence unless the Financial Aid Office is notified otherwise by the Director of Graduate Programs.

Examinations

Students must report for scheduled examinations. Permission for make-up examination due to illness or other emergency may be obtained from the Director of Graduate Programs and the course coordinator.

Make-Up Examinations

It is the responsibility of each course coordinator to describe in the syllabus, or departmental policy and procedures manual, the course policy for making up examinations that are cancelled due to inclement weather or some emergency.

Dissertation Committee

This committee shall consist of five voting members. At least one must be from outside of the department. In addition to the major professor, at least one of the Mercer graduate faculty members must be from within the student's discipline. Because of special

knowledge and distinction in the area of the student's work, additional individuals from outside the University may be appointed to the Dissertation Committee with nonvoting status. To appoint an individual outside of the University to a Dissertation Committee, the major professor will submit a request with justification to the program director for approval.

The major responsibilities of the Dissertation Committee are: to suggest and review courses in the program of study; to monitor the progress of the student through semi-annual meetings in December and June, or more frequently if required; to solicit questions, develop the scope and format, and grade the preliminary examination; to approve the preliminary research protocol; to provide advice during the conduct of the research; and to critically evaluate and approve the dissertation and final oral defense.

Standards of Performance

Each candidate for the Doctor of Philosophy degree must secure credit for a minimum of 60 semester hours including 25 hours of approved graduate-level coursework and 35 hours of dissertation research. In securing this credit each candidate must have a cumulative grade point average (GPA) of at least 3.0. Any student whose semester and/or cumulative GPA drops below 3.0 or who does not provide regular, documented evidence of progress in their research program is making unsatisfactory academic progress. Evidence of progress in research is a score above 3 on at least 5 of the 8 research progress criteria on the annual Graduate Student Assessment Form. In these cases, the student's progress will be monitored.

Student Probation and/or Dismissal

A cumulative grade point of at least 3.0 is required for graduation from the Ph.D. program. Semester and cumulative grade point averages are indications of a student's academic performance. A student whose grade point average for a single semester drops below 3.0 or whose cumulative grade point average falls below 3.0 or who does not provide regular, documented evidence of progress in their research program is making unsatisfactory academic progress.

1. Academic Warning—An academic warning is issued the first time that a student's single semester and/or cumulative GPA falls below 3.0 or the first time a student receives a grade of less than B or S in any graduate level course.
2. Academic Exclusion—Students may be permanently excluded from the program for:
 - a) failing to maintain a cumulative GPA of 3.0 following a previous academic warning.
 - b) receiving a grade lower than B in more than two graduate-level courses.
 - c) two unsatisfactory performances on the Ph.D. preliminary examination.

Application for Graduation

Students who expect to qualify for graduation must file applications for graduation with the Registrar's Office in the semester prior to completing degree requirements.

Degree Requirements

1. Completion of a minimum of 62 semester hours in the Doctor of Philosophy curriculum, including 27 hours of approved graduate-level coursework and 35 hours of dissertation research, with a 3.0 cumulative grade point average.

2. Successful completion of preliminary research protocol, preliminary examination, and successful completion of an original research project as evidenced by submission of the written dissertation and successful oral defense.
3. Two years in residence at Mercer University. Graduates must be in residence at the time of completion of the dissertation.
4. Payment of all financial obligations to the University.

Course Requirements

The Doctor of Philosophy Degree is awarded to students of exceptional scholarly achievement who demonstrate the ability to conduct original research. A minimum of 62 semester hours including 35 hours of dissertation research is required for graduation. Requirements for the degree are not determined solely in terms of a fixed number of courses, credits, and years of residence. Graduate programs are highly individualized and are tailored to the characteristics and interests of the individual student. The program of study will be determined by the major professor in consultation with the Dissertation Committee.

Courses in addition to those in the core will be selected to develop strengths in the student's areas of interest and research. These courses may be chosen from those offered by the College of Pharmacy faculty or may be completed at another university through cross registration via the Atlanta Regional Consortium for Higher Education. Any course deemed appropriate by the Dissertation Committee may be included on the Program of Study. Non-pharmacy courses are most commonly selected from disciplines such as chemistry, engineering, mathematics, physiology, statistics, or related areas. In some instances, the Dissertation Committee may determine that certain undergraduate pharmacy courses are essential components of the program of study. No graduate credit will be given for such courses.

The core curriculum for the Ph.D. degree, as well as elective courses taught within the department, is listed below:

Core Curriculum Courses

PHA 715 Pharmacokinetics*	3 semester hours
PHA 742 Foundations in Pharmaceutical Sciences*	5 semester hours
PHA 743 Foundations in Research	3 semester hours
PHA 744 Scientific Writing	3 semester hours
PHA 745 Statistical Methods	3 semester hours
PHA 797 Graduate Seminar	3 semester hours
PHA 899 Doctoral Research	35 semester hours

*(waived for Combined Degree, Pharm.D./Ph.D. students)

Departmental Elective Courses

PHA 804 Methods in Cell and Molecular Biology	3 semester hours
PHA 807 Pharmaceutical Biotechnology	3 semester hours
PHA 814 Analytical Methods and Instrumentation	3 semester hours
PHA 832 Computer-Assisted Drug Design	3 semester hours
PHA 833 Advanced Pharmacokinetics	3 semester hours
PHA 835 Advanced Physical Pharmacy	3 semester hours
PHA 837 Advanced Biopharmaceutics	3 semester hours
PHA 840 Industrial Pharmacy and Advanced Drug Delivery Systems	4 semester hours
PHA 841 Advanced Pharmacology	3 semester hours
PHA 846 Current Topics in Pharmaceutical Sciences	3 semester hours

PHA 847 Molecular and Behavioral Neuropharmacology	3 semester hours
PHA 849 Special Topics in Pharmaceutical Sciences	3 semester hours
PHA 850 Immunology	3 semester hours

Seminar Requirements

Throughout the course of study, the student is expected to read the current literature, attend, and actively participate in the seminar programs offered by the department and the College of Pharmacy. The student will register for seminar during the fall semester of each year.

Pharmacy Teaching Certificate Program (PTCP)

Each student in the Ph.D. program is required to complete the PTCP. Graduate students who are in their third year and beyond in the program are required to enroll and participate in this teaching certificate program conducted by the College of Pharmacy. The goal of the program is to help students improve on their teaching related skills should they decide to pursue a career in academics. These skills include writing, presentation, curriculum development, and teaching.

Residence Requirements

Graduate students must complete all degree requirements within six years of the initial date of matriculation. Two years must be completed in residence at Mercer University. A student must be in residence at the time of completion of the dissertation.

Preliminary Examination

The purpose of the preliminary examination is to determine whether the student has been adequately prepared through course work and other activities to undertake an original research project. The breadth and depth of knowledge in the student's chosen discipline will also be examined. This examination will be timed and closed-book, and it will be related to the student's selected discipline and course work. The examination will be administered after completion of all course work and other requirements listed on the Program of Study form. Approval for the student to undertake this examination must be granted by the program director at the recommendation of the major professor. The examination will be composed of questions solicited by the Director of Graduate programs and the Dissertation Committee.

Preliminary Research Protocol

A protocol describing the student's dissertation project must be submitted to the Dissertation Committee written in the format of an NIH grant proposal. The student will defend the proposal orally before the Dissertation Committee. Approval of the protocol by the Dissertation Committee is required before the student can proceed formally with research activities. Students must defend the Preliminary Research Proposal within 2 semesters of passing the Preliminary Examination.

Admission to Candidacy

A student must apply for admission to candidacy following the successful completion of both the preliminary examination and the preliminary research protocol. The student must receive admission to candidacy at least 2 semesters prior to the date of expected graduation.

Progress Reports

Progress reports will be prepared by each student in conjunction with the major professor and submitted to the Director of Graduate Programs by June 30 of each year.

Manuscript Requirements

All candidates for the Ph.D. degree must demonstrate competence in scientific writing. At least one original research manuscript be accepted for publication, as first author or co-first author, before graduation, before the candidate's final oral defense can be scheduled.

Dissertation and Final Oral Defense

An essential component of the Ph.D. degree program is the student's successful completion of an original research project under the supervision of the major professor and in consultation with the Dissertation Committee. The work is expected to lead to one or more publications in refereed scientific journals.

The student must prepare a written dissertation based on his/her research work. The format of the dissertation must comply with the regulations contained in the Guide to the Preparation of Theses and Dissertations. After the dissertation has been approved by the Dissertation Committee, a final oral defense is scheduled during which the candidate's understanding of the completed research project and knowledge of the major discipline are evaluated.

Course Descriptions

PHA 715. Pharmacokinetics (3 hours)

This course is designed to provide the student with the advanced knowledge and skills necessary for employing pharmacokinetic principles in the selection and evaluation of drug therapy. Emphasis will be placed upon a complete understanding of the basic and clinically applicable pharmacokinetic formulas and the assumptions that are involved with their use. Aspects specifically related to multiple dosing and accumulation, drug protein binding, and non-linear pharmacokinetics will be addressed.

PHA 742. Foundation in Pharmaceutical Sciences (5 hours)

A didactic course that examines various dosage forms and drug delivery systems, as well as the principles of drug action from a pharmacology and medicinal chemistry perspective. This course is designed to teach the fundamental concepts and applications of pharmaceuticals, pharmacology, and medicinal chemistry. Emphasis will be placed on understanding the drug design and development process.

PHA 743. Foundations in Research (3 hours)

This course explores to assist in the general knowledge of the research compliance at Mercer, bioethics in research, basic safety procedures in the laboratory for graduate students and employees. A course designed for graduate students and employees to assist in the general knowledge of research compliance at Mercer, bioethics in research, basic safety procedures in the laboratory.

PHA 744. Scientific Writing (3 hours)

This course will focus on the basics of scientific writing and organization. Considerations related to writing a scientific publication, formatting, writing styles, grantsmanship and the development of hypotheses will be covered.

PHA 745. Statistical Methods (3 hours)

This course is designed to teach graduate students in pharmaceutical science statistical methods of data analysis. Theoretical fundamentals of statistical methods will be discussed. Major topics covered will include descriptive statistical methods, probability, discrete and continuous distributions, hypothesis testing, regression methods and nonparametric analysis.