Pharmaceutical and Pharmacological Sciences

Degree Offered

• Doctor of Philosophy

Introduction

The WVU School of Pharmacy offers graduate programs in the pharmaceutical and pharmacological sciences for the Ph.D. degree. The school is advantageously located in the Health Sciences Center complex which also houses all departments of the Schools of Medicine, Nursing, and Dentistry, as well as a comprehensive medical library, audio-visual and computer-based learning center, research core facilities, and laboratory animal quarters. State-of-the-art research laboratories are located throughout the Health Sciences Center complex to facilitate interactions with the Mary Babb Randolph Cancer Center, Center for Neuroscience, and Center for Cardiovascular and Respiratory Sciences. In addition, the Health Sciences Center has easy access to the Evansdale and Downtown campuses of WVU through a personal rapid transit (PRT) system. The scientific community, which is especially well-developed, draws on area scientists throughout WVU, the Centers of Disease Control/National Institute on Occupational Safety and Health (CDC/NIOSH), Federal Bureau of Investigation (FBI), and a variety of research centers supported by the National Institutes of Health (NIH), National Science Foundation (NSF), and the Department of Energy (DOE). A CDC/NIOSH research facility is two blocks away, and Mylan Pharmaceuticals, a leading generic drug producer in the world, is located across the street from the Health Sciences Center. In addition, the school has long-standing collaborations with several state agencies and multinational pharmaceutical companies.

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Research interests are complementary to the focus of pharmaceutical and pharmacological sciences. Key areas of research interest and expertise in pharmaceutical and pharmacological sciences include: pharmaceutical sciences, pharmacology, cancer, neuroscience, nanoscience, and toxicology.

Graduate Program Pharmaceutical and Pharmacological Sciences

The School of Pharmacy offers a doctor of philosophy (Ph.D.) degree in pharmaceutical and pharmacological sciences. The graduate program provides interdisciplinary, research-oriented curricula designed to develop the interests, capabilities, and potential of the individual student. Specialty areas of study include: pharmacology, drug metabolism, cancer cell biology, nanotechnology.

Upon completion of the second year of study, students must submit a formal plan of study and a research plan that is approved by their Ph.D. committee. Progress is expected to continue with guidance from the student’s research committee. Final admission to candidacy requires satisfactory performance on written and oral qualifying examinations as well as a dissertation proposal defense. Subsequent to admission to candidacy, a substantial part of the program is devoted to an original research project which culminates in a first-authored publication and dissertation. To be recommended for a Ph.D., the dissertation must be satisfactorily completed and defended at an oral examination.

Academic Standards

No credits are acceptable toward a graduate degree with a grade lower than a C. A graduate student is expected to have a cumulative grade point average of at least 3.0 in all graduate courses to continue in the program and to qualify for a Ph.D. degree.

Admission Requirements

Applicants for admission into the graduate program must satisfy the WVU and Health Sciences Center general requirements for admission as a graduate student. The applicant must possess a baccalaureate degree, background in a suitable area of study, an overall grade point average of at least 3.0, and the aptitude and interest for graduate work in pharmaceutical and pharmacological sciences or health outcomes research to be admitted. Graduate Record Examination (GRE) scores in the verbal, quantitative, and analytic essay portions are required from all students planning on entering the graduate program. TOEFL scores are required of international students from countries where English is not the primary language.

To obtain specific information related to the school’s graduate programs, graduate faculty research interests, and availability of graduate assistantships or fellowships, applicants may contact:

Office of Research and Graduate Programs
WVU School of Pharmacy
2037 Health Sciences Center North
P.O. Box 9530 Morgantown, WV 26506
Telephone: (304) 293-0944
e-mail: prlockman@hsc.wvu.edu
Doctor of Philosophy

The School of Pharmacy offers a doctor of philosophy (Ph.D.) degree in pharmaceutical and pharmacological sciences aimed at training competent researchers and educators.

MAJOR REQUIREMENTS

BMS 700  Scientific Integrity  1
BMS 706  Cellular Methods  1
BMS 720  Scientific Writing  2
BMS 747  Foundations for Contemporary Biomedical Research I  4
BMS 777  Foundations for Contemporary Biomedical Research 2  4
BMS 791  Advanced Topics (Short Laboratory Rotations)  2
Graduate Seminar
  PHAR 796  Graduate Seminar  7
  Research  56-62
Journal Clubs (Select from the following)  7
  PHAR 783  Pharmacy Cell Biology Seminar
  PHAR 784  Pharmacology Journal Club
  PHAR 787  Drug Discovery and Development
Advanced Courses/Electives  15-21
  BIOC 791  Advanced Topics
  CHEM 335  Methods of Structure Determination
  CHEM 346  Physical Chemistry
  CHEM 514  Mass Spectrometry Principles and Practices
  CHEM 531  Advanced Organic Chemistry 1
  PCOL 745  Advanced Pharmacology 1
  PCOL 746  Advanced Pharmacology 2
  PHAR 779  Drugs: Bench to Market
  PHAR 780  Introduction to Molecular Modeling
  PHAR 781  Drug Metabolism
  PHAR 801  Drug Delivery
  PHAR 812  Drug Chemistry and Biotechnology
  PHAR 813  Biopharmaceutics and Pharmacogenomics
  PHAR 814  Biochemical Pharmacology
Qualifying Exams
Dissertation Proposal Defense
Dissertation Defense

Total Hours  99

PHARMACEUTICAL AND PHARMACOLOGICAL SCIENCES PATHWAY SUGGESTED PLAN OF STUDY

First Year

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<tr>
<th>Fall</th>
<th>Hours Spring</th>
<th>Hours Summer</th>
<th>Hours</th>
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<td>1 Advanced Courses/Elective Modules</td>
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<tr>
<td>BMS 791 A (Short</td>
<td>2 PHAR 796</td>
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### Second Year

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#### Advanced Courses/Elective Modules (Select from the list)
- 3-6 advanced courses/elective modules
- 1 PHAR 796
- Journal Club (Select from the following)
  - PHAR 783
  - PHAR 784
  - PHAR 787
- PHAR 797

#### Journal Club (Select from the following)
- 1 PHAR 796
- PHAR 783
- PHAR 784
- PHAR 787

#### Take Qualifying Exams
- 4-5 PHAR 797

### Third Year

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#### Advanced Courses/Elective Modules (Select from list)
- 3 PHAR 796
- Journal Club (Select from the following)
  - PHAR 783
  - PHAR 784
  - PHAR 787

#### Proposal Defense
- 4 *Students must sign up for a minimum of 9 hours

### Fourth Year

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<td>6</td>
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#### Advanced Courses/Elective Modules (Select from list)
- 7 PHAR 797
- Journal Club (Select from the following)
  - PHAR 783
  - PHAR 784
  - PHAR 787

**Total credit hours: 99-111**
DOCTOR OF PHILOSOPHY (PHD)

Student Learning Outcomes of the Pharmaceutical & Pharmacological Sciences graduate education program are focused on preparing students to become independent researchers. To be successful in our program pathways, students will need to develop competencies in the scientific research process through didactic studies in an area of emphasis and then conceptualizing, designing, conducting, and reporting original research.

Student Learning Outcomes

- Learn basic and applied principles in specific disciplines and related fields in order to develop a broad background of knowledge.
- Develop research skills including scientific communication and critical thinking/problem solving ability by participating in seminars and designated research skill courses.
- Gain hands-on experience in conducting original research, including acquisition of background information (e.g. literature research), experimental design and experimentation.
- Develop research communication skills by writing abstracts for research presentations, manuscripts for publication, research grant proposals, and a thesis or dissertation.
- Gain additional insight into research and scholarship by participating in scholarly exchanges with faculty and students in the WVU School of Pharmacy, the Health Sciences Center (HSC), and the West Virginia University community.
- Be able to pursue independent research in specialized fields in interdisciplinary teams and to function and contribute as members of research teams.
- Be competent scientists that are able to contribute to health-related research, industrial research and development, pharmaceutical education, and scholarship.