Pre-Pharmacy

The primary objective of the Doctor of Pharmacy (Pharm.D.) program is to educate practitioners for current and future roles in the profession of pharmacy. The Pharm.D. program comprises four years of professional study preceded by a minimum of two years of pre-pharmacy coursework in a U.S. or Canadian accredited college of arts and sciences. To prepare for the professional curriculum, students must complete a pre-pharmacy curriculum that emphasizes the biological and chemical sciences. In addition, pre-pharmacy students must complete a variety of courses of their choosing in the arts, humanities, and social sciences. Student will go through a competitive application process in the year prior to intended matriculation to the four year professional curriculum. Details regarding the pre-pharmacy course requirements can be found on the major tab.

Pharm.D. Admissions

Admissions are competitive. It should be noted that applicants with overall or prerequisite GPAs below 3.0 are not admitted. Criteria used to evaluate candidates include academic performance, as measured by the grade point averages (GPA) for all the above-noted prerequisite courses and the cumulative GPA achieved in all prior college-level coursework, Pharmacy College Admissions Test (PCAT) scores (including a written essay), a personal interview, and letters of recommendation. All prerequisite courses must be taken at a U.S. or Canadian accredited institution of higher education and completed with a grade of C or better. Coursework completed outside the U.S. or Canada will not be considered for admission. Priority is given to qualified West Virginia residents, applicants who have performed the majority of their prerequisite coursework in a West Virginia college or university, and applicants who have already earned a bachelor's degree. Careful consideration is given to those personal qualifications which bear upon the fitness of applicants for the study and practice of the profession of pharmacy.

All applicants must first file an initial electronic application with the Pharmacy College Application Service (PharmCAS). Instructions for completing the application are found on the PharmCAS website: http://www.pharmcas.org/. Application deadlines are subject to change; check PharmCAS, the School of Pharmacy website at http://pharmacy.hsc.wvu.edu or contact the School to verify current deadlines. Supplemental applications specific to the WVU School of Pharmacy will then be sent to selected candidates deemed qualified by the Committee on Admissions. A $50 application fee must accompany the supplemental application.

Each applicant who is recommended for acceptance is required to pay a deposit of $400 (if WV resident) or $800 (if non-WV resident) before his or her name is added to the official list of those accepted by the School of Pharmacy. If the applicant enrolls, this sum is applied to the first-semester tuition. If the applicant fails to enroll, this deposit is forfeited.

With enrollment in the School of Pharmacy, all students must comply with the immunization and diagnostic procedures required by the WVU Board of Governors, WVU, the WVU Robert C. Byrd Health Sciences Center, and the School of Pharmacy.

Complete information may be obtained from:

School of Pharmacy Office of Student Services
WVU Robert C. Byrd Health Sciences Center
P.O. Box 9500
Morgantown, WV 26506-9500

or from:
Office of Admissions
WVU Robert C. Byrd Health Sciences Center
P.O. Box 9815 Morgantown, WV 26506-9815

Pharmacy College Admission Test

Completion of the Pharmacy College Admission Test is a requirement for admission to the School. It is recommended that the student take this test in the summer or fall before making application for admission. Information concerning time and place of the test can be obtained from a pre-pharmacy advisor, the School of Pharmacy, or by writing:
Personal Interview

The Committee on Admissions requires a personal interview with selected candidates who qualify for a supplemental application. The Committee on Admissions will determine which applicants are to receive the supplemental application. Interviews are held during the spring semester at the WVU Robert C. Byrd Health Sciences Center in Morgantown.

Recommendations on Academic Performance

Two academic recommendations are required and must be provided by course instructors in any two of the pre-pharmacy science areas: biology, chemistry, math, and physics. The third recommendation may be provided by a variety of individuals. Please refer to the PharmCAS website for more detailed information.

Early Decision

The Early Decision program is a binding option for applicants who have decided that West Virginia University is the degree program of their first choice and that they will enroll if accepted. As an Early Decision applicant, you can apply to only one pharmacy degree program.

The Early Decision application deadline is typically the first of September. In addition to completing the PharmCAS application, you must arrange for PharmCAS to receive all of your official transcripts and fee by the September deadline. If your application, transcripts, or fee arrives after the deadline, PharmCAS will automatically change your file from early decision status to regular status.

You may be offered early admission, denied admission, or deferred to regular applicant status. If you are offered admission as an Early Decision applicant, you are obligated to accept the offer and you will not be permitted to apply to other PharmCAS institutions. If, however, you are denied admission as an Early Decision applicant, you may apply to other PharmCAS institutions for an additional fee. Refer to the PharmCAS application fee schedule to determine the cost to apply to each additional program. PharmCAS institutions will make admission decisions on early decision applicants by mid October.

Admission to Advanced Standing for Transfer Students

If space is available, students from other accredited schools of pharmacy may be admitted, provided they meet the prerequisite course requirements of the WVU School of Pharmacy, have at least a 2.5 professional grade point average, are in good academic and professional standing at the school of origin, and are eligible for continuation toward a degree in pharmacy at the school initially attended. Grades of D in professional courses cannot be transferred.

Conditions Following Acceptance of Admission

An applicant accepted into the first year, or an advanced standing transfer student, is expected to have met all entrance requirements and satisfactorily completed all pre-pharmacy coursework in progress prior to matriculation or, if a transfer student prior to transfer. A satisfactory performance in the completion of such coursework is defined as one that is consistent with the student’s previous academic record and must include no grades of D or lower in prerequisite courses. While it is preferred that all prerequisite coursework be completed by the end of the spring term prior to matriculation, it is possible to complete up to two non-sequential prerequisite courses before the start of pharmacy student orientation in the fall semester of matriculation. Failure to do so will result in revocation of the acceptance by the Admissions Committee.

Applicants must remain free of any violations of local, state, or federal law that would prohibit their ability to obtain an intern license from the West Virginia Board of Pharmacy.

Furnishing or causing to furnish false or incorrect information for the purpose of gaining admission to the School of Pharmacy constitutes grounds for disciplinary action including, but not limited to, expulsion or revocation of acceptance.

Students in the School of Pharmacy agree to abide by the provisions of the Student Code of Academic and Professional Integrity. Upon admission, each student is required to return a signed statement to the Office of Student Services indicating the student has read and understands the Policy on Academic and Professional Standards and the Student Code of Academic and Professional Integrity of the West Virginia University School of Pharmacy. The code and copies of the statement are available in the Office of Student Services in the School of Pharmacy, and on the School of Pharmacy website.
## Academic and Technical Standards

Please see this section under the Pharm.D. program heading for details.

## Pre-Pharmacy Curriculum Requirements

### Biochemistry Requirement

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGBI 410</td>
<td>Introduction to Biochemistry</td>
<td>3-4</td>
</tr>
<tr>
<td>BIOC 339</td>
<td>Intro To Biochemistry</td>
<td></td>
</tr>
<tr>
<td>BIOL 115</td>
<td>Principles of Biology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 101-104 can be taken in place of BIOL 115. BIOL 115 is preferred.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 117</td>
<td>Introductory Physiology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 215</td>
<td>Cell-Biology for Pre-Pharmacy</td>
<td>3</td>
</tr>
</tbody>
</table>

BIOL 219 (4 cr. hrs.) may be taken in place of BIOL 215 for biology majors only. If cell biology is not available at your institution, please contact the WVU School of Pharmacy Office of Student Services (304-293-1552) for an alternative course.

### Chemistry Requirement

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 115</td>
<td>Fundamentals of Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 116</td>
<td>Fundamentals of Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 233</td>
<td>Organic Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 235</td>
<td>and Organic Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM 234</td>
<td>Organic Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CHEM 236</td>
<td>and Organic Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>ECON 201</td>
<td>Principles of Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 101</td>
<td>Composition And Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 102</td>
<td>Composition And Rhetoric (ENGL 103 replaces ENGL 101 &amp; 102)</td>
<td></td>
</tr>
</tbody>
</table>

### Math Requirement

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 150</td>
<td>Applied Calculus</td>
<td>3-8</td>
</tr>
<tr>
<td>MATH 153</td>
<td>Calculus 1a with Precalculus</td>
<td></td>
</tr>
<tr>
<td>&amp; MATH 154</td>
<td>and Calculus 1b with Precalculus</td>
<td></td>
</tr>
<tr>
<td>MATH 155</td>
<td>Calculus 1</td>
<td></td>
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</table>

### Microbiology Requirement

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>AEM 341</td>
<td>General Microbiology</td>
<td>3-4</td>
</tr>
<tr>
<td>AEM 401</td>
<td>Environmental Microbiology</td>
<td></td>
</tr>
<tr>
<td>MICB 200</td>
<td>Medical Microbiology</td>
<td></td>
</tr>
<tr>
<td>SPA 270</td>
<td>Effective Public Speaking</td>
<td></td>
</tr>
<tr>
<td>STAT 211</td>
<td>Elementary Statistical Inference</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 225</td>
<td>Elementary Business/Economics Stat</td>
<td></td>
</tr>
<tr>
<td>WVUE 191</td>
<td>First Year Seminar (or equivalent)</td>
<td>1</td>
</tr>
</tbody>
</table>

### General Education Curriculum

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEC #3</td>
<td></td>
</tr>
<tr>
<td>GEC #5</td>
<td></td>
</tr>
<tr>
<td>GEC #7</td>
<td></td>
</tr>
<tr>
<td>GEC #9</td>
<td></td>
</tr>
</tbody>
</table>

Total Hours: 64-71
Suggested Plan of Study

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 115</td>
<td>4</td>
<td>BIOL 117</td>
<td></td>
<td>4 Only required for students who took Math 153 in the Fall semester</td>
<td></td>
</tr>
<tr>
<td>CHEM 115</td>
<td>4</td>
<td>CHEM 116</td>
<td>4 MATH 154</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3-4 ENGL 101</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 150</td>
<td></td>
<td>GEC #3</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 153</td>
<td></td>
<td>STAT 211 or ECON 225</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 155</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPA 270</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WVUE 191 (or equivalent)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>15-16</td>
<td></td>
<td>17</td>
<td>17</td>
<td>4</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3-4 Select one of the following:</td>
<td>3-4</td>
</tr>
<tr>
<td>AEM 341</td>
<td></td>
<td>AGBI 410</td>
<td></td>
</tr>
<tr>
<td>AEM 401</td>
<td></td>
<td>BIOC 339</td>
<td></td>
</tr>
<tr>
<td>MICB 200</td>
<td></td>
<td>CHEM 234</td>
<td></td>
</tr>
<tr>
<td>BIOL 215</td>
<td></td>
<td>CHEM 236</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 219 (4 cr. hrs.)</td>
<td></td>
<td>ECON 201</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 215 (4 cr. hrs.)</td>
<td></td>
<td>may be taken in place of BIOL 215 for biology majors only. If cell biology is not available at your institution, please contact the WVU School of Pharmacy Office of Student Services (304-293-1552) for an alternative course.</td>
<td></td>
</tr>
<tr>
<td>CHEM 233</td>
<td></td>
<td>GEC #7</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 235</td>
<td></td>
<td>GEC #9</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 102</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEC #5</td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td>16-17</td>
<td></td>
<td>16-17</td>
</tr>
</tbody>
</table>

Total credit hours: 68-71

COURSES

PHAR 497. Research. 1-6 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation.

PHAR 498A-Z. Honors. 1-3 Hours.
PR: Students in Honors Program and consent by the honors director. Independent reading, study or research.

PHAR 691A-Z. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

PHAR 693A-Z. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.
PHAR 694A-Z. Seminar. 1-6 Hours.
Seminars arranged for advanced graduate students. Grading may be S/U.

PHAR 696. Graduate Seminar. 1 Hour.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

PHAR 697. Research. 1-15 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U).

PHAR 700. Pharmacy as a Profession. 1 Hour.
PR: First professional year standing or consent. Introduces students to the concept of professionalism, the scope of pharmacy practice opportunities, the health care system as it relates to pharmacy, and other contemporary issues in pharmacy practice. (Grading will be S/U).

PHAR 701. Pharmaceutical Care Lab 1. 2 Hours.
PR: First professional year standing or consent. Students will develop skills in medical terminology, communications, information retrieval, dispensing, compounding, calculations, pharmaceutical care, and problem-solving skills.

PHAR 702. Pharmaceutics 1. 3 Hours.
PR: First professional year standing or consent. Introduces drug physical-chemical characteristics relevant to the design and performance of delivery systems. Pharmaceutical dosage forms taught include disperse and polydisperse systems (suspensions, emulsions, creams, ointments, aerosols and transdermals).

PHAR 703. Pharmacy Practice Experience 1. 1 Hour.
PR: First professional year standing or consent. Provides an overview of the roles and responsibilities of community pharmacists and provides experiential learning in a community pharmacy setting. First course in a six-semester sequence that introduces students to various pharmacy practice settings.

PHAR 704. Introduction to Research. 1 Hour.
Provides pharmacy students with a forum for the discussion of a wide variety of research activities and careers. Also provides an appreciation for the science on which the pharmacy profession is based and continually evolves.

PHAR 708. Pharmaceutics 2. 3 Hours.
PR: PHAR 702. Continuation of PHAR 702. Solids dosage forms (tablets, capsules, sustained-release), regulatory pathways for marketing drugs, and biopharmaceutical principles (dosage form behavior in body).

PHAR 709. Immunology/Biotechnology. 2 Hours.
PR: First year professional standing or consent. Students will learn basic functions of the immune system, elements of the pharmaceutical applications of biotechnology, and be introduced to the chemotherapy of infections.

PHAR 710. Pharmacy Practice Experience 2. 1 Hour.
PR: PHAR 703 or consent. Provides an overview of the roles and responsibilities of community pharmacists and provides experiential learning in a community pharmacy setting. Second course in a six-semester sequence that introduces students to various pharmacy practice settings.

PHAR 711. Chemical Properties of Drugs. 2 Hours.
PR: First year professional standing or consent. Principles of chemical stability and chemical properties as they relate to drug molecules. Topics to be covered include functional group analysis, solubility, oil/water partitioning, organic acids and bases, and drug decomposition and metabolism.

PHAR 712. Pharmaceutical Care Lab 2. 2 Hours.
PR: First professional year standing or consent. Continuation of PHAR 701.

PHAR 714. Intro Community Rotation. 4 Hours.
PR or CONC: PHAR 710. Students will gain experience preparing prescriptions, providing basic drug information to patients, and participating in disease prevention activities in a community pharmacy setting.

PHAR 715. Pharmacotherapeutics 1. 4 Hours.
PR: Second professional year standing or consent. Principles and concepts of pathophysiology and pharmacotherapeutics. An organ system approach to disease states and their therapeutic management is followed.

PHAR 716. Chemistry of Drug Action 1. 3 Hours.
PR: PHAR 711 or consent. Provides a basic understanding of relationships between the chemical structure of a drug and its biological effect. Physiochemical properties, enzymatic transformations and structure-activity relationships (SAR) of important pharmaceutical agents are discussed.

PHAR 717. Pharmacy Practice Experience 3. 1 Hour.
PR: Second professional year standing or consent. Introduces students to the principles of service learning through development of an on-site healthcare-related service project. Third course of a six-semester sequence that introduces students to various pharmacy practice settings.

PHAR 718. Pediatric Pharmacotherapy, 2 Hours.
PR: Second professional year standing or consent. Overview of common pathophysiology and pharmacotherapy principles in the pediatric population and selection of drug therapy to treat the pediatric patient.
PHAR 719. Pharmacy Practice Experience 4. 1 Hour.
PR: PHAR 717 or consent. Introduces students to the principles of service learning through implementation of an on-site healthcare related service project. Fourth course of a six-semester sequence that introduces students to various pharmacy practice settings.

PHAR 720. Patient Health Education. 2 Hours.
PR: Second professional year standing or consent. Interpersonal communication skills will be enhanced in the areas of patient-centered and colleague-centered communications. Students will learn processes for providing pharmaceutical care (e.g., interviewing and counseling patients; formulating a plan; monitoring; and documenting information).

PHAR 721. Advocacy and Leadership. 2 Hours.
PR: Second and third professional year standing or consent. The course will focus on developing the student’s leadership skills as an advocate for the profession of pharmacy.

PHAR 722. WMD and Disaster Planning. 1 Hour.
Through didactic, hands on instruction, and participation in real world disaster planning sessions and/or drills, students learn about weapons of mass destruct (WMD) surveillance and mitigation in addition to disaster planning principles.

PHAR 723. Pharmaceutical Care Lab 3. 1 Hour.
PR: Second professional year standing or consent. Continuation of PHAR 712.

PHAR 724. Pharmaceutical Care Lab 4. 2 Hours.
PR: Second professional year standing or consent. Continuation of PHAR 723.

PHAR 725. Pharmacotherapeutics 2. 4 Hours.
PR: PHAR 715 or consent. A continuation of PHAR 715.

PHAR 726. Chemistry of Drug Action 2. 2 Hours.
PR: PHAR 716 or consent. A continuation of PHAR 716.

PHAR 727. Medical Literature Evaluation. 2 Hours.
PR: Second professional year standing or consent. Emphasis is placed on the critical analysis and evaluation of the primary literature. Second year and computerized information resources are also discussed, including other selected aspects of drug information.

PHAR 728. Pharmacy Management. 2 Hours.
PR: Second professional year standing or consent. This course provides an introductory survey of the basic principles of personnel and fiscal management as they apply to organizational planning and decision-making, organizational design and structure, leadership and control in organizations, and the issues facing pharmacy managers.

PHAR 729. Intro Institutional Rotation. 2 Hours.
PR or Conc: (PHAR 719 and PHAR 724) or consent. Gain experience in an institutional pharmacy setting.

PHAR 730. Pharmacotherapeutics 3. 4 Hours.
PR: PHAR 725 or consent. A continuation of PHAR 725.

PHAR 731. Biopharm & Pharmacokinetics. 3 Hours.
PR: Third year professional standing or consent. Fundamental principles of biopharmaceutics (physicochemical and biological processes affecting drug transit into the systemic circulation) and pharmacokinetics (kinetic and biological processes a drug undergoes upon entering the body).

PHAR 732. Non-Prescription Drugs. 3 Hours.
PR: Third year professional standing or consent. An advanced level course on the appropriate selection, and use of non-prescription drug products in the contemporary practice setting, the basis for self-medication, assessment of patient condition, and approach to patient counseling.

PHAR 733. Pharmacy Systems. 2 Hours.
PR: Third year professional standing or consent. Basic principles of financial management as they apply to the day-to-day operations in pharmacy systems present in institutional, community, long-term care facilities and other pharmacy venues.

PHAR 734. Pharmacy Law and Ethics. 3 Hours.
PR: First professional year standing or consent. The legal and ethical basis of pharmacy practice. Students learn about federal and state statutes, rules, and regulations that affect pharmacy practice. Ethics related situations that can arise during pharmacy practice will also be discussed.

PHAR 735. Pharmaceutical Care Lab 5. 1 Hour.
PR: PHAR 724. Continuation of PHAR 724.

PHAR 736. Pharmaceutical Care Lab 6. 1 Hour.
PR: Third Year Professional standing or consent. Experience in pharmaceutical compounding, patient assessment and monitoring, professional/ethical decision making, pharmacokinetic dosing of medications, and prevention of adverse drug-related events and medication errors.

PHAR 737. Disease Prevent Health Promo. 2 Hours.
PR: Third year professional standing or consent. This course exposes pharmacy students to pharmacoepidemiology and public health. Instruction focuses on pharmacists as integral to preventing and detecting disease and promoting community health. Emphasis is given to rural health care and Appalachian culture.
PHAR 738. Outcomes Assessment/Quality Improvement. 2 Hours.
PR: Third professional year standing or consent. Outcomes assessment and quality improvement will expose students to the development and implementation of formularies, drug use evaluations, outcomes assessment, and quality improvement. Emphasis will be placed on how these issues relate to pharmaceutical services.

PHAR 739. Therapeutic Patient Monitoring. 3 Hours.
PR: Third professional year standing or consent. Employs both didactic and experiential instruction to provide students with the knowledge and skills required to assess the health status of medicated patients with special emphasis on monitoring therapeutic endpoints.

PHAR 740. Pharmacotherapeutics 4. 4 Hours.
PR: PHAR 730 or consent. A continuation of PHAR 730.

PHAR 741. Clinical Pharmacokinetics. 3 Hours.
PR: PHAR 731 or consent. This course will review advanced concepts in pharmacokinetics and cover the basic pharmacokinetic properties of commonly used drugs and apply these principles to drug dosing, patient management, and rational therapeutic drug monitoring.

PHAR 742. Pharmacy Practice Experience 5. 1 Hour.
PR: Third professional year standing or consent. Provides experiential learning in an acute or ambulatory care pharmacy practice setting. Fifth course in a six-semester sequence that introduces students to various pharmacy practice settings.

PHAR 743. Teach to Learn: Learn to Teach. 3 Hours.
Provides pharmacy students the opportunity to learn how to teach in higher education/pharmacy and develop their teaching skills by participating in select teaching and learning activities.

PHAR 745. Critical Care Pharmacotherapy. 2 Hours.
PR: Third professional year standing or consent. Gain knowledge in multiple facets of critical care pharmacotherapy, particularly for students interested in pharmacy residency training in a clinical setting.

PHAR 746. Pharmacy Practice Experience 6. 1 Hour.
PR: PHAR 742 or consent. Provides experiential learning in an acute or ambulatory care pharmacy practice setting. Sixth course in a six-semester sequence that introduces students to various pharmacy practice settings.

PHAR 747. History of Pharmacy. 2 Hours.
Gives the student a deeper appreciation of the background of pharmacy and its development from ancient times to present.

PHAR 748. Acute Care Case Studies. 2 Hours.
PR: Third professional year standing or consent. Gain experience developing pharmaceutical care plans in an acute care setting. Further prepares students interested in pursuing pharmacy residency training.

PHAR 749. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.)

PHAR 749A. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.)

PHAR 749B. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy or clinical pharmacy. (Grading may be P/F.)

PHAR 749C. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy or clinical pharmacy. (Grading may be P/F.)

PHAR 749D. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy or clinical pharmacy. (Grading may be P/F.)

PHAR 749E. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy or clinical pharmacy. (Grading may be S/U.)

PHAR 749F. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy or clinical pharmacy. (Grading may be P/F.)

PHAR 749G. Pharmaceutical Investigation. 2-3 Hours.
PHAR 749G. Pharmaceutical Investigation. 2-3 Hr, PR: Consent. Original Investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.)
PHAR 749H. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749I. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749J. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749K. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749L. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749M. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749N. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749O. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749P. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749Q. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749R. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749S. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749T. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749U. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749V. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749W. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749X. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).

PHAR 749Y. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.).
PHAR 749Z. Pharmaceutical Investigation. 2-3 Hours.
PR: Consent. Original investigation in pharmaceutics, medicinal chemistry, pharmacology, pharmaceutical systems and policy, or clinical pharmacy. (Grading may be P/F.)

PHAR 750. Automation and Technology. 2 Hours.
PR: Second year professional standing or consent. Provides an understanding of the newest technology that is available to a pharmacist in a retail or institutional setting. Students will learn to use PowerPoint, and gain experience making presentations and public speaking.

PHAR 751. Geriatrics. 2 Hours.
PR: Second or third year pharmacy students. A review of common pharmacotherapeutics and social issues of importance to older adult patients.

PHAR 752. History of Drug Discovery. 2 Hours.
This course is concerned with the way in which advances in chemistry and biochemistry have influenced advances in drug discovery and therapeutics beginning with the late 18th century through today.

PHAR 753. Soc/Bhvrl Thry/Hlth Otcm Rsrch. 3 Hours.
Basic social and behavioral theories related to the health behavior change and health outcomes. Open to graduate students in pharmacy, public health, or other health care fields.

PHAR 754. Decision Analysis-Healthcare. 3 Hours.
Core skills in clinical decision analysis which builds on concepts derived from epidemiology, biostatistics, computing, economics and operations research and applies them to medical and pharmacological decisions.

PHAR 755. Pharmacoeconomics. 3 Hours.
This course-level course is intended to train graduate students in evaluating and conducting pharmacoeconomic research.

PHAR 756. Health Survey Research Methods. 3 Hours.
This course seeks to increase students' understanding of survey research methods and to develop basic skills in survey development and administration.

PHAR 758. Ethcl/Rgtry Aspcts-Clin Rsrch. 1 Hour.
Provides overview of ethical and regulatory aspects of clinical research. Grading will be Pass/Fail.

PHAR 759. Clinical/Population Practicum. 1 Hour.
Exposes students to a population of interest in preparation for a research project. This course will help students to understand the lived experience of the population of interest and expose students to aspects of the healthcare system. Students will either work with a clinical population or community-based population to address one or more disease states. Grading will be Pass/Fail.

PHAR 760. Acute Care Rotation 1. 5 Hours.
PR: Fourth year professional standing or consent. Five-week experience in the delivery of pharmaceutical care in an acute care setting.

PHAR 761. Acute Care Rotation 2. 5 Hours.
PR: Fourth year professional standing or consent. Experience in the delivery of pharmaceutical care in an acute care setting.

PHAR 762. Ambulatory Care Rotation 1. 5 Hours.
PR: Fourth year professional standing or consent. Experience in the delivery of pharmaceutical care in an ambulatory care setting.

PHAR 763. Ambulatory Care Rotation 2. 5 Hours.
PR: Fourth year professional standing or consent. Five-week experience in the delivery of pharmaceutical care in an ambulatory care setting.

PHAR 764. Elective Rotation 1. 5 Hours.
PR: Fourth year professional standing or consent. Five-week experience in a pharmacy practice setting, such as acute care, ambulatory, community, hospital, poison center, drug information, home health, long term care, or research.

PHAR 765. Elective Rotation 2. 5 Hours.
PR: Fourth year professional standing or consent. Five-week experience in a pharmacy practice setting, such as acute care, ambulatory, community, hospital, poison center, drug information, home health, long term care, or research.

PHAR 766. Elective Rotation 3. 5 Hours.
PR: Fourth year professional standing or consent. Five-week experience in a pharmacy practice setting, such as acute care, ambulatory, community, hospital, poison center, drug information, home health, long-term care, and research.

PHAR 769. Adv Hlth Service Rsrch Methods. 3 Hours.
Provides a working knowledge of health services research methods and how to apply these methods to answer typical research questions in health services research. The course will examine concepts but will have an applied focus with hands-on research using publicly available data sets or those that the students have access for their dissertations/ manuscripts.

PHAR 770. Community Rotation. 5 Hours.
PR: Fourth year professional standing or consent. Five-week experience in the delivery of pharmaceutical care in a community pharmacy setting.

PHAR 772. Institutional Rotation. 5 Hours.
PR: Fourth year professional standing or consent. Five-week experience in the delivery of pharmaceutical care in a health system setting.
PHAR 775. Advanced Biopharmaceutics. 3 Hours.
Concepts of biopharmaceutics and pharmacokinetics in relation to the design and evaluation of dosage forms and determination of rational dosage regimens in health and disease.

PHAR 779. Drugs: Bench to Market. 3 Hours.
PR: Graduate standing or permission of instructor. This is an introductory course that describes the process of drug discovery to the development of new forms for therapeutic use. Topics covered include drug design/discovery, pharmacokinetics and dynamics, pharmaceutics and industry pharmacy.

PHAR 780. Introductio-Molecular Modeling. 4 Hours.
PR: Graduate standing or permission of instructor. Introduction to molecular modeling describes computational methods for chemical and biological problems and is designed to enable the student to use molecular modeling methods as a research tool in their current or future research activities.

PHAR 781. Drug Metabolism. 3 Hours.
PR: Graduate standing or permission of instructor. This course presents a comprehensive review of the field of drug metabolism with an emphasis on the chemistry and enzymology of drug biotransformation, and current methods in drug metabolism research.

PHAR 783. Pharm Cell Biology Seminar. 1 Hour.
A literature review course in which each student will present and critically analyze primary literature in cell and molecular biology as pertinent to pharmaceutical and biomedical sciences.

PHAR 784. Pharmacology Journal Club. 1 Hour.
A primary literature based course that critically evaluates the latest findings and methods used in pharmacological research.

PHAR 785. Pharmacoepidemiology. 3 Hours.
This course covers basic principles and research study designs used in pharmacoepidemiology, as well as a review of the primary literature that details case examples of drugs withdrawn from the US drug market.

PHAR 786. Health Svcs Res/Sec Databases. 3 Hours.
PR: PHAR 785. This course presents various topics related to large databases including common study designs, advantages and limitations, and basic steps to extracting and analyzing large databases.

PHAR 787. Drug Discovery & Development. 1 Hour.
This seminar will teach students in the Pharmaceutical Sciences and related disciplines the current state-of-the-art of drug discovery, design, and development, develop student presentation skills, and convey the importance of staying current with key developments.

PHAR 788. Grad Sem-Hlth Outcomes Rsrch. 1 Hour.
(May be repeated for credit toward graduation.) Forum for graduate students to present research, discuss research issues and contemporary topics of interest, develop an understanding of research methods through discussion, while focusing on scientific presentation skills. Topics vary from semester to semester.

PHAR 789. Seminar in Nanoscience. 2 Hours.
Facilitates interdisciplinary research at the nanoscale by providing a forum for discussion and exploration of nanoscale science and engineering from a variety of perspectives including research and development of nanoscale devices and systems. Grading will be Pass/Fail.

PHAR 790. Teaching Practicum. 1-3 Hours.
PR: Consent. Supervised practice in college teaching of pharmacy. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on assistantships to gain teaching experience. (Grading will be P/F.)

PHAR 791A-Z. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

PHAR 792A-Z. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

PHAR 793A-Z. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

PHAR 794A-Z. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

PHAR 795. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

PHAR 796. Graduate Seminar. 1 Hour.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

PHAR 797. Research. 1-15 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U.)
PHAR 798. Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.

PHAR 799. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but who wish to meet residency requirements, use the University’s facilities, and participate in its academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department’s 699/799 Graduate Colloquium to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is P/F; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement of registration in the semester in which graduation occurs.