Doctor of Pharmacy (Pharm. D.)

Degree Offered

- Doctor of Pharmacy (Pharm.D.)

Nature of the Program

INTERPROFESSIONAL EDUCATION OPPORTUNITIES

A wide array of health care learners at West Virginia University enables pharmacy students to learn with, from and about other health care professionals and students to prepare them to improve patient outcomes through interprofessional collaboration. Along with students from medicine, dentistry, public health, nursing, physical/occupational therapy, and others, students work collaboratively in interprofessional learning experiences. At WVU, interprofessional education is a longitudinal thread that is progressive and reinforced throughout all four years. These experiences are supplemented by co-curricular activities such as community service projects outside of the classroom and other extracurricular activities. Experiences include:

- First Year Experience: First year longitudinal experience with students from a variety of health professions discussing and working through hands-on activities related to professional roles, teamwork, communication, and quality and safety.
- Second Year Service Projects: Advancing the objectives of the US Department of Health and Human Services’ Healthy People 2030 through service initiatives. Students work collaboratively with students from other health professions to develop and implement health fairs across the state and to provide education to middle and high school students on the neurosciences behind drugs of abuse.
- Third Year Acute Care Pharmacy Practice Experience: Third year students work with nursing and medical students for a simulated patient care rounds experience in the West Virginia Simulation Training and Education for Patient Safety (WV STEPS) Center.
- Fourth Year Advanced Pharmacy Practice Experiences: Students work with a variety of students from other health professions providing direct patient care during five-week rotations in a variety of health care settings.

PROGRAM INFORMATION

AREA OF EMPHASIS IN ADVANCED CLINICAL PRACTICE

The Advanced Clinical Practice Area of Emphasis (AoE) is designed to enhance the preparation and competitiveness of Doctor of Pharmacy students applying for a PGY-1 residency. The AoE focuses on providing didactic and experiential education, as well as one-on-one mentorship, to allow students to understand and appreciate the nuances of clinical pharmacy practice. This track will offer a road map for students to be successful in critical areas including scholarship experience, organizational involvement, experiential education, and additional basic tools for navigating the application and interview process. The experiences provided in the AoE will provide students with a strong core foundation upon which further training in a residency program can expand upon. More information can be found on the School's web page (https://pharmacy.hsc.wvu.edu/student-services/pharmd-program/areas-of-emphasis-program/).

AREA OF EMPHASIS IN COLLEGE TEACHING IN PHARMACY

This area of emphasis program helps to prepare student pharmacists for teaching at the college level. The program combines courses and expertise at the university level with those at the School of Pharmacy to provide a broad range of knowledge and experience in pedagogy training, diversity issues in higher education, current issues in academic pharmacy education, and mentored teaching experience. Together, the program components will develop students’ ability to design and teach their own courses while implementing effective classroom techniques and assessment. By completing the area of emphasis, students will be more competitive for residency and fellowship programs with an emphasis in teaching and will also be prepared to participate in college teaching as an adjunct pharmacy instructor or preceptor. More information can be found on the School's web page (https://pharmacy.hsc.wvu.edu/student-services/pharmd-program/areas-of-emphasis-program/).

AREA OF EMPHASIS IN GERIATRIC PHARMACY

This area of emphasis program offers students pursuing the Doctor of Pharmacy degree the opportunity to explore the basic biological, psychological, sociological and medical processes of aging, the needs and experiences of older people, and the impact of social policies related to human aging. An understanding of the unique experiences and needs of older adults in Appalachia and other rural areas is emphasized. More information can be found on the School's web page (https://pharmacy.hsc.wvu.edu/student-services/pharmd-program/areas-of-emphasis-program/).

AREA OF EMPHASIS IN GLOBAL HEALTH (FOR PHARMACY)

The area of emphasis program in global health trains students to be able to provide patient-centered care at home and abroad. Its focus is on providing both didactic and experiential education that will allow students to have an understanding and an appreciation for the global nature of healthcare and how pharmacy practice can impact individuals worldwide. More information can be found on the School's web page (https://pharmacy.hsc.wvu.edu/student-services/pharmd-program/areas-of-emphasis-program/).

AREA OF EMPHASIS IN TRANSLATIONAL PHARMACY RESEARCH

The Area of Emphasis (AoE) in Translational Pharmacy Research will allow students to understand and recognize the importance of and participate in translational research (e.g., how basic sciences contributions are applied in improving the quality of patients' health, how observations in the...
clinic direct new scientific hypotheses, and how health services and outcomes research impacts access, cost, quality and outcomes of health care. Participants conduct original research under the mentorship of a faculty member. More information can be found on the School's web page (https://pharmacy.hsc.wvu.edu/student-services/pharmd-program/areas-of-emphasis-program/).

**DUAL PHARM.D./ONLINE HYBRID MASTER OF BUSINESS ADMINISTRATION (OHMBA)**

The dual Pharm.D./Online Hybrid Master of Business Administration (OHMBA) program provides outstanding career opportunities for graduates by building expertise in business administration principles and managerial practices coupled with therapeutic knowledge and expertise in medication management. The goal of the dual degree program is to prepare the next generation of leaders, managers, and administrators for rewarding careers in health care or pharmaceutical organizations. Opportunities for the dual degree graduates include leadership positions in hospitals and health systems, pharmacy benefit management companies, government organizations, the pharmaceutical industry, chain pharmacy corporations, and owning, franchising, or operating an independent pharmacy. Through a well-coordinated plan of study in both degree programs, the dual Pharm.D./OHMBA degree students will be able to obtain two nationally-accredited graduate degrees - OHMBA and Pharm.D. degrees - during the course of the 4-year Pharm.D. program. Additional information, including the plan of study, can be found at the School's web page (http://pharmacy.hsc.wvu.edu/student-services/pharmd-program/ohmba-program/).

**Academic and Technical Standards**

In accordance with section 504 of the Rehabilitative Act of 1973 (PL 93-112), and incorporating the guidelines of the Americans with Disabilities Act (ADA PL 101-336) enacted by Congress in 1990, the West Virginia University School of Pharmacy has adopted minimal technical standards for the assessment of admission, scholastic advancement, and graduation for its professional degree (Doctor of Pharmacy) program.

Because the Doctor of Pharmacy (Pharm.D.) degree signifies that the holder is a pharmacist prepared for entry into the practice of pharmacy, it follows that graduates must have the knowledge, skills, and demeanor to function in a broad variety of clinical situations and to conduct a wide spectrum of pharmaceutical care activities.

Candidates for admission into, progression through, and graduation from the Pharm.D. program must have the functional use of the senses of vision and hearing. Candidates’ pharmaceutical skills will also be lessened without the functional use of the senses of equilibrium, smell, and taste. Additionally, they must have sufficient motor function to permit them to carry out the activities described in the sections that follow. They must be able to consistently, quickly, and accurately integrate all information received by whatever sense(s) employed, and they must have the intellectual ability to learn, integrate, analyze, and synthesize data.

A candidate for the Pharm.D. degree must have abilities and skills of five varieties including:

- Observation
- Communication
- Motor
- Conceptual, integrative, and quantitative
- Behavioral and social

Technological compensation can be made for some handicaps in certain of these areas, but a candidate should be able to perform in a reasonably independent manner. The use of a trained intermediary means that a candidate’s judgment must be mediated by someone else’s power of selection and observation. For details, see the Technical Standards document published online (http://pharmacy.hsc.wvu.edu/media/1960/technical-standards-revised-november-17-2015.pdf).

**Student Course Load**

Students in the Doctor of Pharmacy program are expected to register for all required classes in a semester unless directed not to do so by the Committee on Academic and Professional Standards or the Office of Admissions and Student Affairs. Full-time students in the School of Pharmacy may not register for less than nine credit hours during any semester without written approval of the Committee on Academic and Professional Standards. For an exception, a letter of petition must be submitted to the Committee on Academic and Professional Standards through the School of Pharmacy’s Office of Admissions and Student Affairs.

**Promotion and Graduation Requirements**

**EVALUATION OF STUDENT PROGRESS**

Promotion of a student in the Doctor of Pharmacy program is evaluated in two major areas: successful completion of all curricular and co-curricular requirements, and appropriate adherence to the professional standards of the School of Pharmacy.

The following information is only a brief outline of the School of Pharmacy policies and procedures. Detailed requirements and policies for evaluation of student progress and graduation can be found in the Policy on Academic and Professional Standards Governing the Doctor of Pharmacy Degree Program at West Virginia University School of Pharmacy and may be viewed on the School of Pharmacy website. Copies are available at the Office of Admissions and Student Affairs. The Committee on Academic and Professional Standards administers all promotion and academic penalty rules.
ACADEMIC COURSEWORK REVIEW

The Committee on Academic and Professional Standards of the School of Pharmacy reviews the performance of each student in every course at the end of each academic period.

If a student has been found to have unsatisfactory performance in any course as indicated by a grade less than a C or a semester GPA less than 2.5, a student will be placed on probation. Students on probation are not eligible to hold office in student organizations or receive School of Pharmacy scholarships. Students on probation are expected to be present for all of their classes and laboratories. Students failing to complete any required remedial actions or meet the specified performance requirements during the probationary period may be subject to academic suspension or dismissal.

After academic dismissal, a student may apply for readmission to the School of Pharmacy. Readmission of a student is the decision of the Admissions Committee following a recommendation by the Committee on Academic and Professional Standards.

GRADING POLICY

Courses in the Doctor of Pharmacy degree program are graded either as A (excellent), B (good), C (fair), D (less than satisfactory), F (failing), I (incomplete), or on a (P) pass/(F) fail basis. Grades may be accompanied by a narrative report on the student’s progress, noting any factors requiring remedial work or counseling. It is customary that all experiential courses are accompanied by a narrative evaluation.

The grade of incomplete (I) is given when the instructor believes that the work is unavoidably incomplete. If the grade of I is not removed by the satisfactory completion of the work before the end of the next semester in which the student is in residence, it becomes a failure (F) unless special permission to postpone the work is obtained from the course coordinator of record. It is the responsibility of the student to consult the instructor about the means and schedule for completing incomplete courses. A contract specifying what work must be completed and when should be drawn up by the instructor and signed by the instructor and student.

PROFESSIONAL STANDARDS REVIEW

In view of public and professional responsibilities, the faculty of each of the professional schools of WVU has the authority to recommend the removal of any student from its program whenever, by formal decision reduced to writing, the faculty finds that the student is unfit to meet the qualifications and responsibilities of the profession. Further information is provided in The Policy on Academic and Professional Standards Governing the Doctor of Pharmacy Degree at West Virginia University School of Pharmacy, which is available at the School of Pharmacy Office of Admissions and Student Affairs.

Special Requirements

The Board of Pharmacy requires 1,500 clock hours of internship experience for licensure in West Virginia. Students are required to obtain an Intern Certificate from the West Virginia Board of Pharmacy in order to accrue intern hours. Any hours worked before becoming a registered intern will not apply toward meeting the WV board requirements. Students must have a valid Intern Certificate throughout their entire experiential years of the Pharm.D. program. The Board of Pharmacy holds final authority over internship rules and regulations. All 1,500 hours required by the WV Board of Pharmacy may be obtained via the WVU School of Pharmacy experiential program.

Students in the Pharm.D. program will perform one four-week experiential rotation in a community pharmacy setting at the conclusion of the first year and a two-week experiential rotation in an institutional pharmacy setting at the conclusion of the second year of the professional curriculum. Students complete eight, five-week advanced pharmacy practice experiences (APPE) during the final year of the program. One to two rotations are performed in rural/geographically diverse locations throughout West Virginia. Site placement and sequencing will occur in the semesters prior to the experiential activities. Students may incur additional housing and/or travel costs when taking part in the experiential rotations. Opportunity will be provided for students to prioritize their site selection; however, ultimate authority for site selection will be maintained by the School of Pharmacy. All didactic coursework (required and elective) must be successfully completed prior to beginning the fourth-year APPE experiential rotations.

Legal Requirements

To qualify for examination for licensure by the West Virginia Board of Pharmacy, information can be found at the West Virginia Board of Pharmacy website (https://www.wvbop.com/).

Interns must be registered with the West Virginia Board of Pharmacy and must be enrolled in or a graduate of an accredited school of pharmacy to gain experience acceptable for the internship requirement. Details may be obtained from the Office of Admissions and Student Affairs.

Course Exemptions

A student who seeks exemption from one or more professional courses based upon previous academic experience must submit a written petition to the Committee on Academic and Professional Standards. Only courses taken through an accredited school of pharmacy or medicine will be considered for possible substitution.
PharmD Admissions

Admissions are competitive. 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, a personal statement, letters of recommendation, and a personal interview. Prerequisite courses may be taken at an accredited U.S. or foreign institution of higher education and completed with a grade of C or better. 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. It is recommended students apply early as the PharmD Program operates on rolling admissions basis.

Each applicant recommended for acceptance is required to pay a deposit of $100 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 Health Sciences Center, and the School of Pharmacy.

Complete information may be obtained from:
School of Pharmacy Office of Admissions and Student Affairs
WVU Health Sciences Center
P.O. Box 9500
Morgantown, WV 26506-9500

Pharmacy College Admission Test

Completion of the Pharmacy College Admission Test is optional for admission to the School. Test results can only help an applicant's candidacy. If taking, 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 NCS Pearson, Inc.

Personal Interview

The Admissions Committee requires a personal interview with selected candidates. Interviews are held during the fall and spring semesters at the WVU Health Sciences Center in Morgantown.

Letters of Recommendation

A total of three recommendations are required. One academic recommendation is required and must be provided by a course instructor in any of the pre-pharmacy course requirements. The second and third recommendation may be provided by a variety of individuals including a second faculty member or advisor, employer, etc. Please refer to the PharmCAS or the School's PharmD Admissions page (pharmacy.hsc.wvu.edu/student-services/pharmd-admissions) for a list of appropriate letter sources.

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.

Provisional 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. 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.

Admitted students 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 Admissions and Student Affairs 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 Admissions and Student Affairs in the School of Pharmacy and on the School of Pharmacy website.

**Academic and Technical Standards and Policies**

http://pharmacy.hsc.wvu.edu/student-services/pharmd-program/

**ADMISSION REQUIREMENTS 2022-2023**

The Admission Requirements above will be the same for the 2022-2023 Academic Year.

Major Code: 8950

**General Education Foundations**

Please use this link to view a list of courses that meet each GEF requirement. (http://registrar.wvu.edu/gef/)

NOTE: Some major requirements will fulfill specific GEF requirements. Please see the curriculum requirements listed below for details on which GEFs you will need to select.

**General Education Foundations**

<table>
<thead>
<tr>
<th>F1 - Composition &amp; Rhetoric</th>
<th>3-6</th>
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</thead>
<tbody>
<tr>
<td>ENGL 101</td>
<td>Introduction to Composition and Rhetoric</td>
</tr>
<tr>
<td>&amp; ENGL 102</td>
<td>and Composition, Rhetoric, and Research</td>
</tr>
<tr>
<td>or ENGL 103</td>
<td>Accelerated Academic Writing</td>
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</table>

<table>
<thead>
<tr>
<th>F2A/F2B - Science &amp; Technology</th>
<th>4-6</th>
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<tr>
<th>F3 - Math &amp; Quantitative Reasoning</th>
<th>3-4</th>
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<table>
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<tr>
<th>F4 - Society &amp; Connections</th>
<th>3</th>
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<table>
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<tr>
<th>F5 - Human Inquiry &amp; the Past</th>
<th>3</th>
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<table>
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<tr>
<th>F6 - The Arts &amp; Creativity</th>
<th>3</th>
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</table>

<table>
<thead>
<tr>
<th>F7 - Global Studies &amp; Diversity</th>
<th>3</th>
</tr>
</thead>
</table>

| F8 - Focus (may be satisfied by completion of a minor, double major, or dual degree) | 9   |

Total Hours 31-37

Please note that not all of the GEF courses are offered at all campuses. Students should consult with their advisor or academic department regarding the GEF course offerings available at their campus.

**Degree Requirements**

The awarding of a doctor of pharmacy degree to a student is approved by the dean of the School of Pharmacy after receipt of recommendations from the Academic and Professional Standards Committee. Candidates must meet the following criteria:

1. Meet the academic and professional standards, criteria, and requirements outlined in The Policy on Academic and Professional Standards Governing the Doctor of Pharmacy Degree at West Virginia University School of Pharmacy, which is available at the School of Pharmacy Office of Student Services and on the school's website.

2. Satisfactorily complete all of the required coursework in a timely fashion, which may not exceed five years from the date of initial enrollment into the professional program.

3. Pay all fees.

4. Complete coursework as a cohort; students cannot progress to the next year's coursework without satisfactorily completing all previous year's academic requirements.
5. Satisfactorily complete the required number of experiential rotations and demonstrate the attainment of minimum competencies.
6. Complete 100 hours of volunteer community service.

### Curriculum Requirements

#### Biochemistry Requirement
Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGBI 410</td>
<td>Introductory Biochemistry</td>
</tr>
<tr>
<td>BIOC 339</td>
<td>Introduction to Biochemistry</td>
</tr>
</tbody>
</table>

#### Biology Requirement
Select one of the following BIOL 115 preferred - (May fulfill GEF 2):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 115</td>
<td>Principles of Biology</td>
</tr>
<tr>
<td>&amp; BIOL 116</td>
<td>and Principles of Biology Laboratory</td>
</tr>
<tr>
<td>BIOL 101</td>
<td>General Biology</td>
</tr>
<tr>
<td>&amp; BIOL 102</td>
<td>and General Biology</td>
</tr>
<tr>
<td>&amp; BIOL 103</td>
<td>and General Biology Laboratory</td>
</tr>
<tr>
<td>&amp; BIOL 104</td>
<td>and General Biology Laboratory</td>
</tr>
<tr>
<td>BIOL 117</td>
<td>Introductory Physiology</td>
</tr>
<tr>
<td>&amp; BIOL 118</td>
<td>and Introductory Physiology Laboratory (May fulfill GEF 8)</td>
</tr>
</tbody>
</table>

#### Chemistry Requirement

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>CHEM 115 &amp; 115L</td>
<td>Fundamentals of Chemistry and Fundamentals of Chemistry 1 - Laboratory (May fulfill GEF 8)</td>
</tr>
<tr>
<td>CHEM 116 &amp; 116L</td>
<td>Fundamentals of Chemistry and Fundamentals of Chemistry 2 - Laboratory (May fulfill GEF 8)</td>
</tr>
<tr>
<td>CHEM 233 &amp; CHEM 235</td>
<td>Organic Chemistry and Organic Chemistry Laboratory</td>
</tr>
<tr>
<td>CHEM 234 &amp; CHEM 236</td>
<td>Organic Chemistry and Organic Chemistry Laboratory</td>
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#### Economics Requirement

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<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ECON 201</td>
<td>Principles of Microeconomics (May fulfill GEF 4)</td>
</tr>
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#### English Requirement

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<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ENGL 101</td>
<td>Introduction to Composition and Rhetoric (May fulfill GEF 1)</td>
</tr>
<tr>
<td>ENGL 102</td>
<td>Composition, Rhetoric, and Research (May fulfill GEF 1)</td>
</tr>
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</table>

#### Math Requirement
Select one of the following (May fulfill GEF 3):

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

#### Microbiology Requirement
Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>AEM 341</td>
<td>General Microbiology</td>
</tr>
<tr>
<td>AEM 401</td>
<td>Environmental Microbiology</td>
</tr>
<tr>
<td>MICB 200</td>
<td>Medical Microbiology</td>
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</table>

#### Physiology Requirement

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>PSIO 241</td>
<td>Elementary Physiology</td>
</tr>
<tr>
<td>or BIOL 235</td>
<td>Human Physiology</td>
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#### Public Speaking Requirement

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>WVUE 270</td>
<td>Effective Public Speaking</td>
</tr>
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#### Statistics Requirement

<table>
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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>STAT 211</td>
<td>Elementary Statistical Inference</td>
</tr>
<tr>
<td>or ECON 225</td>
<td>Elementary Business and Economics Statistics</td>
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#### General University Orientation Requirement

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>PHAR 191</td>
<td>First-Year Seminar</td>
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#### General Education Foundations
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PALM 301</td>
<td>Principles of Human Anatomy</td>
<td>3</td>
</tr>
<tr>
<td>PSIO 541</td>
<td>Integrative Physiology</td>
<td>4</td>
</tr>
<tr>
<td>PHAR 800</td>
<td>Introduction to Pharmacy</td>
<td>4</td>
</tr>
<tr>
<td>PHAR 801</td>
<td>Drug Delivery</td>
<td>5</td>
</tr>
<tr>
<td>PHAR 802</td>
<td>Preparation of Pharmaceutical Products</td>
<td>1</td>
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<tr>
<td>PHAR 807</td>
<td>Pharmacy Calculations</td>
<td>1</td>
</tr>
<tr>
<td>PHAR 703</td>
<td>Pharmacy Practice Experience 1</td>
<td>1</td>
</tr>
<tr>
<td>PHAR 810</td>
<td>Community Pharmacy Practice</td>
<td>2</td>
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<tr>
<td>PHAR 811</td>
<td>Foundational Pharmacy Skills</td>
<td>1</td>
</tr>
<tr>
<td>PHAR 812</td>
<td>Drug Chemistry and Biotechnology</td>
<td>3</td>
</tr>
<tr>
<td>PHAR 813</td>
<td>Biopharmaceutics and Pharmacogenomics</td>
<td>4</td>
</tr>
<tr>
<td>PHAR 814</td>
<td>Biochemical Pharmacology</td>
<td>4</td>
</tr>
<tr>
<td>PHAR 815</td>
<td>Self-Care</td>
<td>3</td>
</tr>
<tr>
<td>PHAR 817</td>
<td>Principles of Immunology and Microbiology</td>
<td>2</td>
</tr>
<tr>
<td>PHAR 710</td>
<td>Pharmacy Practice Experience 2</td>
<td>1</td>
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<tr>
<td>PHAR 818</td>
<td>Intro Community Rotation</td>
<td></td>
</tr>
<tr>
<td>PHAR 820</td>
<td>Population Health and Policy</td>
<td>3</td>
</tr>
<tr>
<td>PHAR 821</td>
<td>Pain</td>
<td>1</td>
</tr>
<tr>
<td>PHAR 823</td>
<td>Pulmonology</td>
<td>3</td>
</tr>
<tr>
<td>PHAR 824</td>
<td>Cardiology</td>
<td>5</td>
</tr>
<tr>
<td>PHAR 826</td>
<td>Evidence-Based Practice</td>
<td>3</td>
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<tr>
<td>PHAR 825</td>
<td>Nephrology</td>
<td>2</td>
</tr>
<tr>
<td>PHAR 830</td>
<td>Health Systems Pharmacy Practice</td>
<td>2</td>
</tr>
<tr>
<td>PHAR 833</td>
<td>Endocrinology</td>
<td>3</td>
</tr>
<tr>
<td>PHAR 835</td>
<td>Autoimmune Diseases</td>
<td>2</td>
</tr>
<tr>
<td>PHAR 836</td>
<td>Research in the Pharmaceutical Sciences</td>
<td>2</td>
</tr>
<tr>
<td>PHAR 837</td>
<td>Quality and Outcomes in Pharmacy Practice</td>
<td>2</td>
</tr>
<tr>
<td>PHAR 838</td>
<td>Intro Institutional Rotation</td>
<td>2</td>
</tr>
<tr>
<td>PHAR 840</td>
<td>Pharmacy Practice Management</td>
<td>3</td>
</tr>
<tr>
<td>PHAR 843</td>
<td>Gastroenterology and Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>PHAR 844</td>
<td>Infectious Diseases</td>
<td>3</td>
</tr>
<tr>
<td>PHAR 845</td>
<td>Neurology and Psychiatry</td>
<td>4</td>
</tr>
<tr>
<td>PHAR 848</td>
<td>Acute Care Practice Experience</td>
<td>2</td>
</tr>
<tr>
<td>PHAR 849</td>
<td>Ambulatory Care Practice Experience</td>
<td>2</td>
</tr>
<tr>
<td>PHAR 853</td>
<td>Hematology/Oncology</td>
<td>3</td>
</tr>
<tr>
<td>PHAR 854</td>
<td>Special Populations</td>
<td>3</td>
</tr>
<tr>
<td>PHAR 858</td>
<td>Comprehensive Assessment of Practice</td>
<td>3</td>
</tr>
<tr>
<td>PHAR 859</td>
<td>Pharmacy Law and Ethics</td>
<td>3</td>
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<tr>
<td>Rotations</td>
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<tr>
<td>PHAR 760</td>
<td>Acute Care Rotation 1</td>
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<tr>
<td>PHAR 761</td>
<td>Acute Care Rotation 2</td>
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</tr>
<tr>
<td>PHAR 762</td>
<td>Ambulatory Care Rotation 1</td>
<td></td>
</tr>
<tr>
<td>PHAR 763</td>
<td>Ambulatory Care Rotation 2</td>
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</tbody>
</table>

* BIOL 101, 102, 103, and 104 are equivalent to BIOL 115.
### Current Topics Requirement

**2**

**PHAR 860: Current Topics in Pharmacy**

### Electives (only approved professionally related courses)

**8**

Selected from the following:

- ACCT
- BIOL
- BUSA
- C&I
- CHEM
- COUN
- CSAD
- COMM
- CHPR
- DISB
- ENGL
- ENTR
- EDP
- EPID
- FIN
- GEN
- GERO
- GRAD
- HIED
- HPML
- IDT
- HN&F
- LDR
- NSG
- OEHS
- PHAR
- PHIL
- POLS
- PUBA
- PUBH
- SHED
- SOCA
- STAT
- WGST

### Total Hours

152

## 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>
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<tr>
<td>PALM 301</td>
<td></td>
<td>3 PHAR 810</td>
<td></td>
<td>2 Intro Community Rotation</td>
<td>4</td>
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<tr>
<td>PSIO 541</td>
<td></td>
<td>4 PHAR 811</td>
<td></td>
<td>PHAR 818</td>
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<tr>
<td>PHAR 800</td>
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<td>4 PHAR 812</td>
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<td>PHAR 801</td>
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<td>5 PHAR 813</td>
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<td>4</td>
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<tr>
<td>PHAR 802</td>
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<td>1 PHAR 814</td>
<td></td>
<td>4</td>
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<td>1 PHAR 815</td>
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<td>3</td>
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<tr>
<td>PHAR 703</td>
<td></td>
<td>1 PHAR 817</td>
<td></td>
<td>2</td>
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<td></td>
<td>PHAR 710</td>
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19 20 4

### Second Year

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<th>Spring</th>
<th>Hours</th>
<th>Summer</th>
<th>Hours</th>
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<tbody>
<tr>
<td>PHAR 820</td>
<td></td>
<td>3 PHAR 830</td>
<td></td>
<td>2 Intro Institutional Rotation</td>
<td>2</td>
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<td>PHAR 821</td>
<td></td>
<td>1 PHAR 825</td>
<td></td>
<td>PHAR 838</td>
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<td>3 PHAR 833</td>
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<td>PHAR 824</td>
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<td>5 PHAR 835</td>
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17 15 2

### Third Year

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<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer</th>
<th>Hours</th>
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<td>PHAR 840</td>
<td></td>
<td>3 PHAR 859</td>
<td></td>
<td>3 Complete 2 rotations from the following:</td>
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<td>PHAR 843</td>
<td></td>
<td>3 Hematology/Oncology</td>
<td></td>
<td>PHAR 760</td>
<td>3</td>
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<td>PHAR 844</td>
<td></td>
<td>3 PHAR 854</td>
<td></td>
<td>PHAR 761</td>
<td>3</td>
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<tr>
<td>PHAR 845</td>
<td></td>
<td>4 PHAR 858</td>
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<td>PHAR 762</td>
<td>3</td>
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<tr>
<td>Select 1 of the following:</td>
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<td>2 Select course not yet completed:</td>
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<td>PHAR 763</td>
<td>2</td>
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<tr>
<td>PHAR 848</td>
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<td>PHAR 848</td>
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<td>PHAR 764</td>
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<td>PHAR 849</td>
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<td>PHAR 849</td>
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<td>PHAR 765</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>2 Elective</td>
<td></td>
<td>PHAR 766</td>
<td>2</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>PHAR 770</td>
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</tbody>
</table>
**Areas of Emphasis Offered:**

- Advanced Clinical Practice (p. 9)
- College Teaching in Pharmacy (p. 10)
- Geriatric Pharmacy (p. 11)
- Global Health (for Pharmacy) (p. 11)
- Translational Pharmacy Research (p. 12)

### Advanced Clinical Practice Area of Emphasis Requirements

#### Required Course:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHAR 776</td>
<td>Preparing Residency Applicants</td>
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</table>

#### Clinical Development Electives

Select two of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>PHAR 718</td>
<td>Pediatric Pharmacotherapy</td>
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<tr>
<td>PHAR 745</td>
<td>Critical Care Pharmacotherapy</td>
<td>1</td>
</tr>
<tr>
<td>PHAR 748</td>
<td>Acute Care Case Studies</td>
<td>1</td>
</tr>
<tr>
<td>PHAR 751</td>
<td>Geriatrics</td>
<td>1</td>
</tr>
<tr>
<td>PHAR 778</td>
<td>Travel Medicine and Global Pharmacy Practice</td>
<td>1</td>
</tr>
<tr>
<td>PHAR 707</td>
<td>Drug-Induced Diseases</td>
<td>1</td>
</tr>
<tr>
<td>PHAR 793</td>
<td>Special Topics (*Advanced Cardiology Pharmacotherapy)</td>
<td>1</td>
</tr>
<tr>
<td>PHAR 713</td>
<td>Oncology Pharmacotherapy</td>
<td>1</td>
</tr>
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Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHAR 743</td>
<td>Teach to Learn: Learn to Teach</td>
<td>2</td>
</tr>
<tr>
<td>PHAR 721</td>
<td>Advocacy and Leadership</td>
<td>1</td>
</tr>
<tr>
<td>PHAR 749</td>
<td>Pharmaceutical Investigation</td>
<td>1</td>
</tr>
</tbody>
</table>

* Prior to beginning the experiential rotations, each student enrolled in the School of Pharmacy professional program must complete a minimum of eight credit hours of school of pharmacy elective courses or courses from a list of approved professionally-related electives as part of the pharmacy curriculum. Electives must be completed during the first three years of the four-year professional program. No course taken prior to admission into the School of Pharmacy may be used nor repeated to meet the elective requirements of the professional curriculum, and no reduction in elective requirements will be allowed for courses completed or degrees earned prior to enrollment in the program.

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**Fourth Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
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<td>PHAR 860</td>
<td></td>
<td>1</td>
<td>PHAR 860</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Complete 3 rotations from the following</td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>of those not yet completed:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PHAR 760</td>
<td></td>
<td>PHAR 760</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PHAR 761</td>
<td></td>
<td>PHAR 761</td>
<td></td>
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<tr>
<td></td>
<td>PHAR 762</td>
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<td>PHAR 762</td>
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<td>PHAR 763</td>
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<td>PHAR 763</td>
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<td>PHAR 764</td>
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<td>PHAR 764</td>
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<td>PHAR 765</td>
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<td></td>
<td>PHAR 766</td>
<td></td>
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<td>PHAR 770</td>
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<tr>
<td></td>
<td>PHAR 772</td>
<td></td>
<td>PHAR 772</td>
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</tr>
</tbody>
</table>

Total credit hours: 152
Other courses may be added to the list as approved by the Curriculum Committee

Total Hours

* Any of the courses from the professional development list above OR the professional development electives below

**ADDITIONAL REQUIREMENTS**

**MENTORSHIP PROGRAM:**
- Each student will be assigned or will identify a faculty mentor to meet with regularly to discuss career goals, progression through the program, curriculum vitae development, and other issues that arise.
- In addition, the AoE coordinator(s) will meet with the students as a group at least twice a semester to discuss global issues and professional development topics.

**RESEARCH PROJECT:**
- Each student must complete some type of scholarly project that is presented for dissemination in some venue. This can be a research project presented as a poster at a national meeting, a review article published in a peer-reviewed journal, a patient case series presented at the local WVU HSC research day, or any number of other options. The mentors assigned to students as part of this AoE are not necessarily scholarship mentors.
- Students may ask their mentors if they are able to work with them on a scholarly project; however, the onus is on the student to find an appropriate mentor and project. Students are encouraged to talk to the AoE coordinator(s) if they need assistance with completing this requirement of the AoE.

**ADVANCED PHARMACY PRACTICE EXPERIENCES (APPE) ROTATIONS:**
- As part of the advanced pharmacy practice experiences (APPEs), students will be required to complete an approved plan of study, which will include at least four acute or ambulatory care rotations.
- All student APPE schedules must comply with Accreditation Council for Pharmacy Education (ACPE) Standards.

**APPLICATION PROCESS:**
- All PharmD students in good academic standing are eligible to apply for acceptance during the fall of their second professional year.
- Applications must include a cover letter, an essay describing the applicant's future career goals and what they expect to gain through completion of the area of emphasis, and a current curriculum vitae. Additionally, an unofficial transcript will be obtained through the Office of Admissions and Student Affairs. An interview may also be included for consideration in the admission process.

**College Teaching in Pharmacy Area of Emphasis**

The area of emphasis has three major requirements: a pharmacy-specific pedagogy course; elective course options from across the university; and a pharmacy teaching experience.

**Eligibility and Deadlines:**

Students must be currently enrolled in the Doctor of Pharmacy program and in good academic standing. Up to five students will be enrolled per year. Students will complete an application for admission to the area of emphasis program, including the following elements:

1) a cover letter or email with intent to enroll
2) an essay describing the applicant’s future career goals and what he or she expects to gain through completion of the Area of Emphasis
3) a current curriculum vitae
4) an unofficial transcript will be accessed through the School of Pharmacy, Office of Admissions and Student Affairs

**Required Course**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHAR 743</td>
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**Required Teaching Experience - Select one of the following:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHAR 764</td>
<td>Elective Rotation 1</td>
<td>1-5</td>
</tr>
<tr>
<td>PHAR 765</td>
<td>Elective Rotation 2</td>
<td></td>
</tr>
<tr>
<td>PHAR 790</td>
<td>Teaching Practicum</td>
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</table>

**Elective Course Options**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRAD 710</td>
<td>Scholarly Teaching</td>
<td>6</td>
</tr>
<tr>
<td>C&amp;I 789</td>
<td>Teaching in Higher Education</td>
<td></td>
</tr>
<tr>
<td>C&amp;I 689</td>
<td>Cultural Diversity in the Classroom</td>
<td></td>
</tr>
<tr>
<td>GRAD 680</td>
<td>Classroom Assessment Techniques</td>
<td></td>
</tr>
<tr>
<td>HIED 750</td>
<td>Diversity Issues in Higher Education</td>
<td></td>
</tr>
</tbody>
</table>
HIED 651  College Student Development  
WGST 593  Special Topics (Gender and Sexuality Theory)  
HIED 763  International Higher Education  
HIED 693  Special Topics (Women & Gender Issues in Higher Education)  
GRAD 793  Scholarship of Teaching and Learning  
GRAD 710  Scholarly Teaching  
GRAD 593  Special Topics (Accessible Teaching)  
GRAD 593  Special Topics (Readability in the Online Course)  
GRAD 593  Special Topics (Designing Scenarios to Engage Students)  
GRAD 693  Special Topics (Teaching Different Cultures)  
C&I 687  Advanced Teaching Strategies  
EDP 640  Instructional Design  
EDP 600  Educational Psychology  
EDP 700  Psychological Foundations of Learning  
C&I 643  Brain-Based Teaching and Learning  
HIED 760  Curriculum Development and Reform in Higher Education  
IDT 693  Special Topics (Online Teaching and Learning)  
IDT 655  Technology for Teachers  
Other courses may be added to the list as they become available.

**Total Hours** 9  

---  

**Geriatric Pharmacy Area of Emphasis**  

**Eligibility and Deadlines:**  
Students must be currently enrolled in the Doctor of Pharmacy program and in good academic standing. Students will complete an application for admission to the area of emphasis program, including the following elements:  
1) a cover letter  
2) an essay describing the applicant’s future career goals and what he or she expects to gain through completion of the Area of Emphasis  
3) a current Curriculum Vitae  
4) an unofficial transcript will be accessed through the Office of Student Services.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
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<tbody>
<tr>
<td>PHAR 751</td>
<td>Geriatrics</td>
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<tr>
<td>GERO 645</td>
<td>Fundamentals of Gerontology</td>
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<td>GERO 681</td>
<td>Rural Gerontology</td>
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<td><strong>Students must choose one additional course from the approved electives listed below.</strong></td>
<td>2</td>
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</tr>
<tr>
<td>PHAR 764</td>
<td>Elective Rotation 1 (Geriatrics or Long-Term Care)</td>
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</tr>
<tr>
<td>GERO 512</td>
<td>Public Policy of Aging</td>
<td></td>
</tr>
<tr>
<td>GERO 628</td>
<td>Aging Women &amp; Cultural Issues</td>
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</tr>
<tr>
<td>PHAR 749</td>
<td>Pharmaceutical Investigation</td>
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</tr>
<tr>
<td>COMM 693</td>
<td>Special Topics (Communication in Later Life)</td>
<td></td>
</tr>
</tbody>
</table>

**Total Hours** 10  

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**Global Health (for Pharmacy) Area of Emphasis Requirements**  

The area of emphasis program in global health trains students to be able to provide patient-centered care at home and abroad. Its focus is on providing both didactic and experiential education that will allow students to have an understanding and an appreciation for the global nature of healthcare and how pharmacy practice can impact individuals worldwide. More information can be found on the School’s webpage at [http://pharmacy.hsc.wvu.edu](http://pharmacy.hsc.wvu.edu/).

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
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<td>PHAR 778</td>
<td>Travel Medicine and Global Pharmacy Practice</td>
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**Total Hours** 7
Select one of the following*:

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<td>POLS 250</td>
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<tr>
<td>COMM 309</td>
<td>Health Communication</td>
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<td>COMM 316</td>
<td>Intercultural Communication</td>
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<tr>
<td>ASP 220</td>
<td>Introduction to Africana Studies</td>
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<td>WGST 345</td>
<td>Women in International Development</td>
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<tr>
<td>POLS 260</td>
<td>Introduction to International Relations</td>
</tr>
<tr>
<td>PUBH 605</td>
<td>Introduction to Global Public Health</td>
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<td>POLS 363</td>
<td>International Law</td>
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<tr>
<td>ANTH 350</td>
<td>Latin American Culture</td>
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<td>PUBH 201</td>
<td>Global Perspectives of Public Health</td>
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<td>SOC 417</td>
<td>Sociology of Globalization</td>
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<tr>
<td>SOC 499</td>
<td>Global Service Learning</td>
</tr>
<tr>
<td>RELG 231</td>
<td>Religions of China and Japan</td>
</tr>
</tbody>
</table>

* or course not on the list with pre-approval by the Global Health for Pharmacy advisors. Of note, students are responsible for checking on the semester-by-semester availability and any potential pre-requisites required for any of the following courses.

Total Hours 10

EXPERIENTIAL ROTATION REQUIREMENT

Students will complete one international rotation (PHAR 764 or 765). Currently available international rotations include South Africa, Oman, Brazil, and Thailand. Students in the AOE program will not be guaranteed an international rotation and must go through the standard application process for selection for these international rotations. If students are unable to successfully complete an international rotation, they will not meet the requirements for completion of the AOE.

ADDITIONAL REQUIREMENTS

1) Students will have to complete either: a) an advanced pharmacy practice experience (APPE) that takes place in an underserved community, such as a rotation in Anchorage or Nome, Alaska, one with the Indian Health Service, or one at a Federally Qualified Health Center (e.g., Cabin Creek, Camden-on-Gauley), or b) an approved summer internship or medical mission that contains a global health emphasis. The summer internship or medical mission must be focused on global health and be of a minimum duration of 2 weeks. The school will maintain a list of approved internships when possible. However the student may inquire about the acceptability of other programs which are not listed.

2) All students will serve as Global Health Ambassadors for international students visiting the West Virginia University School of Pharmacy when they are in Morgantown. The Ambassador’s role will require students to: a) organize and host social events outside of the School of Pharmacy attempting to incorporate the visiting students’ wishes into the planned activities, and b) organizing and participating as School of Pharmacy representatives during the HSC’s Global Health Week.

All students must remain in good academic standing in the Doctor of Pharmacy program to remain in the area of emphasis program. Students on probation in the Doctor of Pharmacy program will be evaluated by the Academic Standards committee and may be removed from the area of emphasis program.

Translational Pharmacy Research Area of Emphasis

Research is an integral component of the education and practice of pharmacy, enabling development of new information, technologies, and processes which are essential for improving patient care, therapeutics outcomes and growth of the profession. The importance of research in the profession of pharmacy is well established. The Area of Emphasis (AoE) in Translational Pharmacy Research will allow students to understand and recognize the importance of translational research (e.g., how basic sciences contributions are applied in improving the quality of patients’ health, how observations in the clinic direct new scientific hypotheses, and how health services and outcomes research impacts access, cost, quality and outcomes of health care).

COURSE REQUIREMENTS

Required research course:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHAR 749</td>
<td>Pharmaceutical Investigation</td>
</tr>
</tbody>
</table>

Electives

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>PHAR 764</td>
<td>Elective Rotation 1 (must be a research elective)</td>
</tr>
<tr>
<td>PHAR 765</td>
<td>Elective Rotation 2</td>
</tr>
<tr>
<td>PHAR 758</td>
<td>Ethical and Regulatory Aspects of Clinical Research</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
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<tr>
<td>------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>PHAR 779</td>
<td>Drug Discovery</td>
</tr>
<tr>
<td>PHAR 752</td>
<td>History of Drug Discovery</td>
</tr>
<tr>
<td>PHAR 781</td>
<td>Drug Metabolism</td>
</tr>
<tr>
<td>PHAR 788</td>
<td>Graduate Seminar in Health Outcomes Research</td>
</tr>
<tr>
<td>or PHAR 796</td>
<td>Graduate Seminar</td>
</tr>
<tr>
<td>PHAR 789</td>
<td>Seminar in Nanoscience</td>
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<tr>
<td>PHAR 784</td>
<td>Pharmacology Journal Club</td>
</tr>
<tr>
<td>CCB 705</td>
<td>Journal Club</td>
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<tr>
<td>PHAR 744</td>
<td>Education Journal Club</td>
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<tr>
<td>PHAR 755</td>
<td>Pharmacoeconomics</td>
</tr>
<tr>
<td>PHAR 753</td>
<td>Social and Behavioral Theory and Health Outcomes Research</td>
</tr>
<tr>
<td>PHAR 756</td>
<td>Health Survey Research Methods</td>
</tr>
<tr>
<td>PHAR 758</td>
<td>Ethical and Regulatory Aspects of Clinical Research</td>
</tr>
<tr>
<td>PHAR 786</td>
<td>Health Services Research and Secondary Database</td>
</tr>
<tr>
<td>PHAR 785</td>
<td>Pharmacoepidemiology</td>
</tr>
<tr>
<td>PHAR 769</td>
<td>Advanced Health Service Research Methods</td>
</tr>
<tr>
<td>PHAR 777</td>
<td>Health Outcomes Research Designs</td>
</tr>
<tr>
<td>PHAR 793</td>
<td>Special Topics (Health Outcomes Research Designs)</td>
</tr>
</tbody>
</table>

**Written Summary of Research**

- Oral Presentation to Participant's Research Committee
- Poster or Oral Presentation at Research Conference

**Total Hours**

* Students may complete 1-3 hours of research credit. Each credit hour equals 3 hours of laboratory or clinic based research per week.
** Students complete 8-9 hours from the list of electives. Electives may not be taught each year and may have capacity limits; thus, students are instructed to consult with the director of the Area of Emphasis prior to course selection.

**ADDITIONAL REQUIREMENTS**

- Students involved in clinical research must take the CITI training for Human Research offered through WVU and which must be kept current.
- Present his/her project as a poster or oral presentation at the Annual HSC Research Day or other equivalent research meeting.
- Complete an oral presentation of the work (which is open to the public). Students that are enrolled in the AoE must attend.
- Write a summary of his/her research and findings. This project will be distributed to the certification committee members at least three weeks prior to the oral presentation. The certification committee will be comprised of the research mentor, two additional faculty members selected by the research mentor, and the AoE program director. The research mentor or one committee member can be from outside of the School of Pharmacy with prior approval by the Area of Emphasis Director.
- All Pharm.D. students in good academic standing are eligible for participation. Acceptance and continuation in the program is contingent on each student identifying a research mentor and committee members, who will guide the research progress and completion.

**Major Learning Outcomes**

**DOCTOR OF PHARMACY (PHARM. D.)**

**Educational Outcomes**

Upon successful completion of the West Virginia University Doctor of Pharmacy degree program, the graduate will be able to accomplish the following educational outcomes (EOs):

**EO 1  Foundational Knowledge and Skills (Learner)** - Develop, integrate, and apply foundational knowledge (e.g., concepts, facts, principles) from biological, pharmaceutical, social, behavioral, administrative, and clinical sciences to evaluate the scientific literature, explain drug actions, solve therapeutic problems, and advance individual and population health.

- Acquire and demonstrate depth and breadth of knowledge of foundational scientific, clinical, socioeconomic, and humanistic concepts and skills.
- Explain how knowledge in the foundational sciences is integral to pharmacy practice.
- Integrate knowledge from foundational sciences to explain how specific drugs or drug classes work and evaluate their potential value in individuals and populations.
- Apply foundational concepts and skills to practice.
- Use scientific reasoning and critical thinking skills in practice to address problems, issues, or concerns.
• Develop and apply creative and innovative approaches to effectively resolve problems and improve patient outcomes.
• Apply an evidence-based approach to practice by identifying appropriate questions to address, using databases and other resources to retrieve information, critically analyzing and interpreting relevant scientific information and other evidence, formulating sound conclusions, and integrating the best published evidence with expertise and individual patient values/needs.
• Analyze and use epidemiologic, pharmacoeconomic, medication utilization, and quality improvement data when developing evidence-based programs and protocols.
• Apply knowledge of research methodology to design or conduct basic research, practice-based studies, or clinical trials.
• Use information technology where appropriate to enhance individual knowledge and skills.

EO 2 Communication Skills (Communicator, Educator) – Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization.

• Use appropriate verbal and nonverbal communication skills with individuals or groups, including patients, health professionals and others.
• Use effective written communication skills with patients, health professionals, and others, including the development of documents pertinent to professional or organizational needs (e.g., monographs, reports).
• Educate target audiences by using the most effective method to deliver information, in coordination with other health care professionals as appropriate.
• Use technology to facilitate or enhance professional communications and presentations.

EO 3 Professionalism, Advocacy, and Leadership (Professional, Leader, Advocate) - Exhibit behaviors and values consistent with the professional trust given by patients, healthcare providers, and society; assure that patients’ best interests are represented; and demonstrate responsibility for achieving shared goals regardless of position.

• Conduct pharmacy practice duties and patient care responsibilities in accordance with applicable federal, state, and local laws, statutes, and regulations, as well as professional guidelines and standards.
• Serve as an advocate, leader, and change agent for pharmacy and pharmacists’ professional roles and responsibilities by implementing or participating in new, evidence-based models for cost-effective pharmacist-delivered patient care.
• Serve as an advocate for community and patient health and medication therapy needs, including disadvantaged or underserved patients and those from diverse cultural and socioeconomic backgrounds, while honoring their autonomy and dignity.
• Serve as a positive role model in actions/communications for peers and other health care providers by maintaining a high standard for personal and professional demeanor and ethical conduct.
• Respect all points of view in professional interactions while placing patients’ needs and desires at the forefront.
• Demonstrate compassion, empathy, honesty, integrity, ethical behavior and altruism in all actions and communications with patients, families, and care providers.
• Develop professional competence through ongoing, active and self-directed pursuit of new knowledge and skills.
• Identify and analyze emerging health care and pharmacy issues and incorporate new roles, products and services into practice that can improve patient outcomes.
• Accept accountability and responsibility for one’s words and actions.

EO 4 Self-Awareness (Insightful) – Examine and assess personal knowledge, skills, abilities, attitudes, beliefs, motivation, and emotions and strive for continual improvement.

• Conduct self-assessments on a regular basis and create, implement, evaluate, and modify as needed plans for personal improvement and continuing professional development.
• Recognize personal strengths and limitations and seek assistance when needed.
• Approach tasks and situations with flexibility and a desire to learn.
• Accept constructive criticism and display a willingness to correct and learn from errors.

EO 5 Interprofessional Collaboration (Collaborator) – Actively participate as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs.

• Collaborate with health care professionals, patients, and/or caregivers to ensure that desired patient-specific or population-based health outcomes are achieved.
• Facilitate team building among health care professionals by developing and maintaining an atmosphere of mutual respect and shared values that place the patient at the forefront.
• Effectively utilize the knowledge, expertise, and unique roles of health care team providers and refer patients to others when indicated.
• Serve as the medication expert on a collaborative care team by managing the pharmacotherapy for patients’ medical conditions and by proactively providing drug product and other medication related information to team members.
• Accept responsibility for medication-related outcomes on the care team.
Doctor of Pharmacy (Pharm. D.)

EO 6 Patient Care (Provider) – Provide patient-centered care as the medication expert.

- Accurately interpret, prepare and/or compound, handle and dispense prescriptions for patients.
- Obtain necessary patient-specific data (e.g., consulting patient records, taking medication histories, performing basic physical assessments, ordering/interpreting lab tests), and evaluate and use these data when performing patient care related responsibilities.
- Evaluate pharmaceutical products, including information about the drug, dosage form, delivery system and cost/benefit, when conducting a medication review or preparing a care plan.
- Conduct comprehensive medication reviews and prepare individualized care plans to optimize patient outcomes, with emphasis on commonly encountered chronic or high risk conditions amenable to pharmacotherapy and patients at greater risk for adverse events.
- Work with patients, caregivers, and health care professionals to implement specific therapy plans.
- Educate and empower patients to take an active role in their health and incorporate recommendations for healthy living and self-care into care plans.
- Monitor and evaluate patients during therapy for drug product or pharmacotherapy problems, patient concerns, or adherence issues and recommend or implement solutions.
- Work with patients and other health care providers to ensure the continued success of individual care plans.
- Document patient-care services in charts/medical records and on forms needed for reimbursement.
- Counsel patients and/or caregivers about the following to help ensure a care plan’s success: i) medications, non-drug therapy, dietary supplements and natural products; ii) insurance and other options for obtaining necessary medications; iii) proper use of testing devices and medical goods and equipment; and iv) healthy lifestyle changes.

EO 7 Population-Based Care (Promoter, Provider) – Design and implement prevention, intervention, and educational strategies for communities to manage chronic disease and improve health and wellness.

- Develop, recommend, and provide preventive health services, such as administration of vaccines and screening tests.
- Develop and implement disease management programs based upon identified needs and priorities (e.g., cost, access, and patient satisfaction considerations; commonly encountered, chronic conditions managed by pharmacotherapy).
- Evaluate and adjust interventions as needed to maximize population health.
- Promote public awareness of health promotion and disease prevention strategies.
- Design, develop, and disseminate public health related educational materials or services in a culturally competent manner.
- Work with health care professionals and other personnel to identify and help resolve key public health issues and problems, and participate in policies or strategies to address them.

EO 8 Pharmacy and Medication Use Systems (Manager) – Manage patient healthcare needs using human, financial, technological, and physical resources to optimize the safety and efficacy of medication use systems.

- Demonstrate knowledge of pharmacy management including operations, human and fiscal resources, marketing, and leadership principles.
- Design, use, and manage systems to prepare, dispense, distribute and administer medications to optimally serve patient’s drug-related needs.
- Use knowledge of the organization and financing of the U.S. healthcare system to provide and effectively manage progressive pharmacy services.
- Develop a business plan for integrating clinical and distributive services that includes methods for supporting and obtaining reimbursement for clinical services provided to patients.
- Demonstrate and apply knowledge of national standards, guidelines, best practices, and established principles and processes for safe medication use to protect patient safety.
- Participate in quality improvement programs and employ performance indicators to enhance the quality of care and cost effectiveness of services provided and to optimize safe, appropriate medication use.
- Participate in developing and performing medication use evaluations to identify and resolve drug therapy problems or concerns.
- Reconcile a patient’s medications when transitioning from one care setting to another by communicating effectively with all involved health care professionals.
- Use current and emerging information and system technologies to enhance safe and effective medication use.
- Provide recommendations for developing and managing a formulary that incorporate pharmacoeconomic principles.
- Actively participate in, and contribute to the development of, strategies to minimize drug misuse/abuse.

COURSES

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

PHAR 693. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

PHAR 694. Seminar. 1-6 Hours.
Seminars arranged for advanced graduate students. Grading may be S/U.
PHAR 696. Graduate Seminar. 1-3 Hours.
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. 1-9 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 703. Pharmacy Practice Experience 1. 1 Hour.
PR: First professional year standing or consent. Introduces student to the practice of pharmacy with a focus on career exploration. Pharmacy Practice Experience (PPE) 1 is the first course in a sequence that introduces students to the roles of pharmacists in a variety of practice settings. Interprofessional education (IPE) is introduced and emphasized throughout the course.

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 705. Advanced Cardiology Pharmacotherapy. 2 Hours.
PR: PHAR 824. For students with an interest in cardiology pharmacotherapy and will be highly useful for prospective pharmacy residents. This course serves as a bridge between the cardiology system-based teaching course PHAR 824 and advanced pharmacy practice experiences rotations. This class will contain didactic lectures, small group discussions, pros and cons clinical controversy debate, and patient case-based applied therapeutics.

PHAR 706. Biopharmaceutics. 2 Hours.
Introduces the fundamental principles of biopharmaceutics. This area of knowledge deals with the drug performance at the delivery system – human body interface, and addresses how physico-chemical drug properties, delivery system characteristics, and physiological processes influence drug distribution and affect the body, as well as drug bioavailability.

PHAR 707. Drug-Induced Diseases. 2 Hours.
Focused study of adverse effects of prescription and non-prescription medications designed for practical application across multiple disease states.

PHAR 710. Pharmacy Practice Experience 2. 1 Hour.
PR: PHAR 703 or consent. Introduces student to the practice of pharmacy with a focus on career exploration. Pharmacy Practice Experience (PPE) 2 is the second course in a sequence that introduces students to the roles of pharmacists in a variety of practice settings. Interprofessional education (IPE) is introduced and emphasized throughout the course.

PHAR 713. Oncology Pharmacotherapy. 2 Hours.
PR or CONC: PHAR 853. Provides practical aspects to oncology pharmacy practice including clinical decision making and more in-depth review of specialty areas of practice within hematology/oncology.

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 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. Weapons of Mass Destruction 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 743. Teach to Learn: Learn to Teach. 2 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 744. Education Journal Club. 1 Hour.
PR: PHAR 743 or Consent. Evaluate educational research articles from pharmacy education and other healthcare disciplines. Students will present and critically analyze educational literature and develop presentation skills.

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 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 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 Pharmacy. 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 751. Geriatrics. 2 Hours.
PR: Second or third year pharmacy students. A review of common pharmacotherapeutic 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. Social and Behavioral Theory and Health Outcomes Research. 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 in 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 graduate-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 757. Patient Reported Outcomes. 3 Hours.
Provides a foundation in health outcomes research with an emphasis on patient reported outcomes in health service research.

PHAR 758. Ethical and Regulatory Aspects of Clinical Research. 2 Hours.
Provides overview of ethical and regulatory aspects of clinical research.

PHAR 759. Clinical and Population Practicum. 1 Hour.
Expose 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. Selective Rotations. 5 Hours.
PR: Fourth year professional standing or consent. Five-week experience in a pharmacy practice setting, selected from a list and includes: pharmacy administration, discharge counseling, drug information, informatics, long term care, managed care, medication reconciliation, medication safety, nuclear pharmacy, clinical toxicology, and quality outcomes.

PHAR 767. Scientific Writing: Health Services and Outcomes Research. 3 Hours.
Students will be trained in effective written communication skills by developing scientific journal articles in health services and outcomes research.

PHAR 768. HEOR/HSOR Internship. 1-6 Hours.
Strengthen practical knowledge and hands-on experience in the areas of Health Services and Outcomes Research/Health Economics and Outcomes Research by working with pharmaceutical companies, clinical research organizations, federal, state, and local governments, policy think tanks, or health care systems.

PHAR 769. Advanced Health Service Research 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 datasets or those that 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 776. Preparing Residency Applicants. 2 Hours.
Increase knowledge and skills needed to pursue postgraduate residency training in pharmacy, and implement measures to increase pharmacy residency competitiveness.

PHAR 777. Health Outcomes Research Designs. 2 Hours.
Focuses on the skills required to design, conduct, and analyze research topics in health outcomes research. Includes a study of statistics, analysis of research design and methodology, use of library resources, and evaluation of current literature.

PHAR 778. Travel Medicine and Global Pharmacy Practice. 2 Hours.
Identifies and explores major issues in global health with a specific focus on global pharmacy practice and medication therapy. Students will also learn fundamentals in travel medicine so they can assist international travelers in preventing and treating travel-related maladies.

PHAR 779. Drug Discovery. 3 Hours.
PR: Graduate Standing or permission of instructor. Instruction in the process of drug discovery to the development of new forms for therapeutic use. Topics covered included drug design/discovery, target identification and development, lead optimization, and pre-clinical and clinical development.

PHAR 780. Introduction to 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 782. Tumors of the Central Nervous System Journal Club. 1 Hour.
(May be repeated for a maximum of 15 credit hours.) Fundamental and advanced topics focused on drug distribution into normal brain, brain pathology and brain cancers. Other areas of focus include, advanced drug delivery methods, pharmacokinetics, experimental design and statistical analysis. Students will present and critically analyze scientific literature and develop presentation skills.

PHAR 783. Pharmacy 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 Services Research and Secondary Database. 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 and 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. Graduate Seminar in Health Outcomes Research. 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.
(May be repeated for a maximum of 4 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 791. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

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

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

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

PHAR 800. Introduction to Pharmacy. 4 Hours.
PR: First professional year standing or consent. Introduces students to the profession and practice of pharmacy. Students will gain an understanding of the history of pharmacy, the role of pharmacists in the US healthcare system, and the foundations of pharmacy law. Students develop hands-on skills in patient communication and drug information retrieval.

PHAR 801. Drug Delivery. 5 Hours.
An introduction to the concepts and techniques involved in the design and evaluation of pharmaceutical dosage forms, principles of physical pharmacy and drug delivery, and their applications in patient care.

PHAR 802. Preparation of Pharmaceutical Products. 1 Hour.
Preparation of sterile and non-sterile dosage forms. Students will apply the principles of pharmaceutics to the preparation of pharmaceutical products.

PHAR 803. Physical Pharmacy. 2 Hours.
Provides an overview of the principles of physical pharmacy and their application in drug formulation and administration. Topics include: drug dissolution, acid-base chemistry, drug solubility, diffusion, distribution, and drug stability.

PHAR 804. Drug Delivery Systems. 3 Hours.
Introduces the students to the principles and technologies involved in the preparation and evaluation of pharmaceutical dosage forms and drug delivery systems. Students will develop skills in dosage form design and evaluation, as well as their applications in patient care. The course integrates and applies basic physicochemical and biological principles to solve problems in drug delivery in pharmacy practice.

PHAR 805. Drug Chemistry. 2 Hours.
Introduces principles of chemical stability and chemical properties as they relate to drugs and to the basic metabolic processes observed for drug molecules. Topics include functional group analysis, solubility, oil/water partitioning, organic acids/bases, drug decomposition, basic metabolic processes including oxidation, reduction, hydrolysis, and conjugation.

PHAR 806. Pharmaceutical Biotechnology. 1 Hour.
Basic principles of biotechnology with an emphasis on pharmaceutical applications is addressed. Knowledge from cell and molecular biology will be applied to solve biomedical problems and to make useful products for diagnostic and therapeutic purposes. Key processes used in the making, analysis, and application of biopharmaceuticals, such as proteins and nucleic acids as well as their stability, delivery, and handling.
PHAR 807. Pharmacy Calculations. 1 Hour.
Gain experience in pharmaceutical calculations that reflect activities in a variety of practice settings.

PHAR 808. Pharmacogenomics. 2 Hours.
Introduces the fundamental principles of pharmacogenomics and individualized medicine. It provides a basis for understanding how an individual's genetic background affects their response to a specific drug or class of drugs. Pharmacogenomic principles include pharmacogenetic characteristics of drug metabolizing enzymes, drug transporter activity, and receptor sensitivity. Other basic concepts of genetic counseling, personalized medicine, ethics and costs will be discussed.

PHAR 809. Principles of Drug Action. 2 Hours.
Provides a basis for understanding the biochemical and molecular mechanisms by which drugs and the body interact. This course will use drug classes to introduce foundational concepts of drug action and the application of pharmacological tools to better understand how drugs work in the body.

PHAR 810. Community Pharmacy Practice. 2 Hours.
PR: First professional year standing or consent. Focuses on the various roles of a pharmacist including the prescription dispensing and medication management processes in the community pharmacy setting. Legal aspects of community pharmacy practice are also discussed.

PHAR 811. Foundational Pharmacy Skills. 1 Hour.
PR: First professional year standing or consent. Provides students with foundational skills necessary for the provision of patient care including physical assessment, point of care testing, and oral and written communication. Many skills learned during this course will be further strengthened throughout pharmacy school.

PHAR 812. Drug Chemistry and Biotechnology. 3 Hours.
PR: First professional year standing or consent. Introduces principles of chemical stability and chemical properties as they relate to drugs and to the basic metabolic processes observed for drug molecules. Biotechnology will focus on pharmaceutical applications of cell and molecular biotechnology.

PHAR 813. Biopharmaceutics and Pharmacogenomics. 4 Hours.
PR: First professional year standing or consent. Develops an understanding of fundamental principles of biopharmaceutics and pharmacogenomics.

PHAR 814. Biochemical Pharmacology. 4 Hours.
PR: First professional year standing or consent. Provides a basis for understanding the biochemical and molecular mechanisms by which drugs and the body interact. This course will use drug classes to introduce foundational concepts of drug action and the application of pharmacological tools to better understand how drugs work in the body.

PHAR 815. Self-Care. 3 Hours.
PR: First professional year standing or consent. Provides an introduction to nonprescription medications and the application to patient care. Learners will assess the patient, make appropriate recommendations, and educate the patient on self-care treatment options for commonly encountered disease states and patient complaints.

PHAR 816. Pharmacokinetics. 2 Hours.
Introduces fundamental principles of the pharmacokinetic and biological processes that the drug undergoes once it enters the body. The students will be exposed to various pharmacokinetics techniques and problem-solving methods, which should prepare them to design and refine drug therapeutic regimens.

PHAR 817. Principles of Immunology and Microbiology. 2 Hours.
PR: First professional year standing or consent. Introduces scientific principles of immunology as well as introduces students to the pharmacist's role as vaccination advocate, and provides the knowledge and skills required to safely administer vaccines. Lastly, it provides an introduction to microbiology and mechanisms of action of antibiotics.

PHAR 818. Intro Community Rotation. 1-4 Hours.
PR: PHAR 800 and PR or CONC: PHAR 810. Introductory pharmacy practice experience in a community pharmacy setting.

PHAR 820. Population Health and Policy. 3 Hours.
PR: Second professional year standing or consent. Introduces the role of the pharmacist in population-based care and promoting preventative health services. Includes epidemiology and public policy in the healthcare system, and integrates content with interprofessional service outreach projects.

PHAR 821. Pain. 1 Hour.
PR: Second professional year standing or consent. A course in the systems-based therapy series with a focus on pain management and treatment of associated disorders, including addiction therapy. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with pain-associated disorders.

PHAR 822. Service Learning Practice Experience 1. 1 Hour.
PR: Second professional year standing or consent. The first course in a 2-semester series that introduces students to the basic principles of service learning through on-site healthcare-related service projects. Interprofessional education is a component of the course.

PHAR 823. Pulmonology. 3 Hours.
PR: Second professional year standing or consent. First course in the systems-based therapy series with a focus on pulmonology. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with pulmonary diseases.

PHAR 824. Cardiology. 5 Hours.
PR: Second professional year standing or consent. Second course in the systems-based therapy series with a focus on cardiology. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with cardiovascular diseases.
PHAR 825. Nephrology. 2 Hours.
PR: Second professional year standing or consent. Third course in the systems-based therapy series with a focus on nephrology. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with kidney diseases.

PHAR 826. Evidence-Based Practice. 3 Hours.
PR: Second professional year standing or consent. The components of evidence-based practice are reviewed. Emphasis is placed on the appropriate use of information resources in practice and the critical analysis and evaluation of primary literature and other types of information.

PHAR 830. Health Systems Pharmacy Practice. 2 Hours.
PR: Second professional year standing or consent. Introduces and reinforces the distributive, clinical, and administrative roles of pharmacists with a focus on health-systems pharmacy practice and management.

PHAR 832. Service Learning Practice Experience 2. 1 Hour.
PR: PHAR 822. The second course in a 2-semester series that introduces students to the basic principles of service learning through on-site healthcare-related service projects.

PHAR 833. Endocrinology. 3 Hours.
Fourth course in the systems-based therapy series with a focus on endocrinology. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with endocrine diseases.

PHAR 834. Immunology. 3 Hours.
Fifth course in the systems-based therapy series with a focus on immunology. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with immunological diseases and hypersensitivities.

PHAR 835. Autoimmune Diseases. 2 Hours.
A course in the systems-based therapy series with a focus on management of autoimmune diseases. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with these diseases.

PHAR 836. Research in the Pharmaceutical Sciences. 2 Hours.
An overview of the process of conducting health-related research focusing on concepts, principles and methodology involved with the research process. Students gain experience in research proposal development and practice writing skills. Student learning is facilitated by didactic lectures, active learning and independent small group sessions.

PHAR 837. Quality and Outcomes in Pharmacy Practice. 2 Hours.
PR: Second professional year standing or consent. Emphasizes the implementation of quality improvement in pharmacy practice, monitoring outcomes of drug therapy to ensure optimal patient care, and implementation of systems to prevent and minimize patient risk. Application of pharmacoeconomic principles to daily pharmacy practice are discussed.

PHAR 838. Intro Institutional Rotation. 1-2 Hours.
PR or CONC: PHAR 830. Gain experience in an institutional pharmacy setting.

PHAR 840. Pharmacy Practice Management. 3 Hours.
PR: Third professional year standing or consent. Focuses on pharmacy management related to financial and operational management of pharmacies, marketing of pharmacy services, and human resources management.

PHAR 843. Gastroenterology and Nutrition. 3 Hours.
Seventh course in the systems-based therapy series with a focus on gastroenterology and nutrition. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with gastrointestinal diseases and nutrition support.

PHAR 844. Infectious Diseases. 3 Hours.
Eighth course in the systems-based therapy series with a focus on infectious diseases. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with infectious diseases.

PHAR 845. Neurology and Psychiatry. 4 Hours.
Ninth course in the systems-based therapy sequence with a focus on neurology and psychiatry. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with neurologic and psychiatric diseases.

PHAR 848. Acute Care Practice Experience. 2 Hours.
Gain knowledge as well as hands-on experience in the acute care setting. Students will learn the key components of acute care practice, perform activities that would be expected to be completed in acute care experiential rotations (such as medication reconciliation and formulary monographs), and simulate rounding experiences in an interprofessional environment. Interprofessional education is a component of this course.

PHAR 849. Ambulatory Care Practice Experience. 2 Hours.
Gain knowledge as well as hands-on experience in the ambulatory care setting. Activities will include ambulatory patient assessment, medication regimen evaluation, patient presentations, direct patient education, and targeted group education. Interprofessional education is a component of this course.

PHAR 853. Hematology/Oncology. 3 Hours.
PR: Third professional year standing or consent. A course in the systems-based therapy series with a focus on hematology-oncology. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems in patients with hematological diseases and cancer.
PHAR 854. Special Populations. 3 Hours.
The final course in the systems-based therapy series that addresses special populations such as geriatrics, pediatrics and women’s health (pregnancy, lactation, menopause) as well as disease processes that involve multiple body systems. Integrates scientific principles with clinical practice to enable students to prevent, identify, and resolve drug therapy problems.

PHAR 858. Comprehensive Assessment of Practice. 3 Hours.
Assess students’ readiness for successful completion of the upcoming advanced pharmacy practice experiences curriculum. Provides focused reinforcement of essential material relative to ensuring a student is practice ready, as well as reviewing difficult material from throughout the curriculum. Students complete a final objective structured clinical examination, which requires the demonstration of specific skills, including communication.

PHAR 859. Pharmacy Law and Ethics. 3 Hours.
PR: Third 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 860. Current Topics in Pharmacy. 1 Hour.
PR: Fourth professional year standing or consent. Discussion of current topics in pharmacy practice. Core components of giving a seminar and journal club will be practiced.