Biomedical Science, PhD

Pharmacology

The Doctor of Philosophy in biomedical science with a pharmacology subprogram requires a minimum of 72 s.h. of graduate credit. Students must maintain a cumulative grade-point average of at least 3.00 to earn the degree.

Qualified students who are interested in earning the Doctor of Medicine along with the PhD may apply to the Medical Scientist Training Program in a combined MD/PhD program. Students have the opportunity to tailor their curriculum with courses that enhance their educational goals. They take a combination of graduate courses that include seminar courses.

The PhD in biomedical science with a pharmacology subprogram requires the following coursework.

### Core Pharmacology Curriculum

<table>
<thead>
<tr>
<th>Course #</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BMED:5207</td>
<td>Principles of Molecular and Cellular Biology</td>
<td>3</td>
</tr>
<tr>
<td>BMED:7270</td>
<td>Scholarly Integrity/ Responsible Conduct of Research I</td>
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</tr>
<tr>
<td>BMED:7271</td>
<td>Scholarly Integrity/ Responsible Conduct of Research II</td>
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<tr>
<td>MPB:5153</td>
<td>Graduate Physiology</td>
<td>4</td>
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<td>PCOL:5130</td>
<td>Fundamentals of Pharmacology</td>
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<tr>
<td>PCOL:5204</td>
<td>Basic Biostatistics and Experimental Design</td>
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<tr>
<td>PCOL:6203</td>
<td>Pharmacology for Graduate Students</td>
<td>5</td>
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<tr>
<td>PCOL:6210</td>
<td>Receptors and Cell Signaling</td>
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<tr>
<td>PCOL:6250</td>
<td>Advanced Problem Solving in Pharmacological Sciences</td>
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</table>

### Typical Curriculum

#### First Year, Fall

<table>
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<tr>
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<tr>
<td>BMED:5207</td>
<td>Principles of Molecular and Cellular Biology</td>
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<td>PATH:5270/ IGPI:5270/ MME:5270</td>
<td>Pathogenesis of Major Human Diseases</td>
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<td>PHAR:6504</td>
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<tr>
<td>PCOL:6015</td>
<td>Topics in Pharmacology and Neuroscience</td>
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### Second Year, Spring

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### Additional Requirements

#### Laboratory Rotations

Newly admitted students complete three 12-week laboratory rotations by the end of the second semester.

#### Seminar and Journal Clubs

In subsequent semesters, students enroll in PCOL:6015 Topics in Pharmacology and Neuroscience and PCOL:6080 Pharmacology Seminar.

#### Comprehensive Examination

The comprehensive examination process normally begins during the spring of the student's second year in the program and is completed during the subsequent summer.

The exam consists of writing and defending a related-but-distinct proposal or, if desired, an off-topic proposal. A related but distinct proposal is one based on the research program of the student's mentor(s) that is not the student's dissertation study.
project or any other project being conducted in the laboratory. An off-topic proposal is one based on a subject completely unrelated to the student's dissertation research.

During the oral defense, the comprehensive exam committee may pose questions related to the written proposal and may also ask questions to determine whether the student has broad knowledge of the pharmacological sciences.

Publication
A first-authored manuscript derived from a student's thesis research must be accepted for publication before the PhD is granted.

Final Examination
The final oral examination is a defense of the thesis and is conducted by the thesis committee, typically immediately after a thesis seminar.

Combined Programs
PhD/MD
Students may work toward the Doctor of Medicine degree and a PhD in biomedical science (pharmacology subprogram) in a combined degree program offered by the Graduate College and the Carver College of Medicine. Applicants must be admitted to both programs before they may be admitted to the combined degree program. See the Medical Scientist Training Program (Carver College of Medicine) in the catalog.