

# PhD in Pharmaceutical Sciences

## Admission Requirements

In addition to the Graduate College minimum requirements, applicants must meet the following program requirements:

- **Baccalaureate Field** Pharmacy, chemistry, biological sciences, or a related biomedical science area
- **Grade Point Average** At least 3.00/4.00 for the final 60 semester (90 quarter) hours of undergraduate study
- **Tests Required** None
- **Minimum English Competency Test Score**
  - **TOEFL** 80, with subscores of Reading 19, Listening 17, Speaking 20, and Writing 21 (iBT Test); 60, with subscores of Reading 19, Listening 17, Writing 21 (revised Paper-Delivered Test), **OR**,
  - **IELTS** 6.5, with subscores of 6.0 for all four categories, **OR**,
  - **PTE-Academic** 54, with subscores of Reading 51, Listening 47, Speaking 53, and Writing 56
- **Letters of Recommendation** Three required from individuals who are familiar with the applicant's training, ability, character, and potential for successful completion of the program.
- **Personal Statement** Required. Applicants are encouraged to state their specific interest in the program.

## Degree Requirements—PhD in Pharmaceutical Sciences

- **Minimum Semester Hours Required** 96 from the baccalaureate, 64 from the master's.
- **Course Work** At least 20 hours must be in 400- to 500-level didactic courses.

Code	Title	Hours
<b>Required Core Courses</b>		
GC 501	Scientific Integrity and Responsible Research	
PSCI 501	Drug Discovery, Design, and Development	
PSCI 502	Training in Research Presentation (or equivalent)	
Biostatistics (any graduate-level course, 1-hour minimum)		

Students must select one of five concentrations:

- Pharmaceutics and Drug Delivery
- Pharmacognosy
- Chemistry in Drug Discovery
- Molecular Mechanisms and Therapeutics
- Forensics

## Pharmaceutics and Drug Delivery Concentration

Code	Title	Hours
<b>Required Concentration Courses</b>		
BSTT 400	Biostatistics I (or equivalent) <sup>a</sup>	

GC 470	Essentials for Animal Research
GC 471	Experimental Animal Techniques
PSCI 510	Principles of Pharmaceutics and Drug Delivery

### Electives

At least 9 hours must be in 400- to 500-level didactic courses and selected in consultation with the student's research advisor

- a *This 4-hour course will count 1 hour toward the program core statistics requirement and 3 hours toward the Pharmaceutics and Drug Delivery concentration requirements. Students will not receive credit for two introductory statistics courses.*

## Pharmacognosy Concentration

Code	Title	Hours
<b>Required Concentration Courses</b>		
<b>Electives</b>		
PSCI 520	Research Techniques in Pharmacognosy (or equivalent)	
PSCI 521	Structure Elucidation of Natural Products (or equivalent)	
PSCI 522	Advanced Pharmacognosy (or equivalent)	
At least 9 hours must be in 400- to 500-level didactic courses and selected in consultation with the student's research advisor		

## Chemistry in Drug Discovery Concentration

Code	Title	Hours
<b>Required Concentration Courses</b>		
PSCI 530	Principles of Medicinal Chemistry (or equivalent)	
PHAR 422	Fundamentals of Drug Action (or equivalent)	

### Electives

At least 9 hours must be in 400- to 500-level didactic courses and selected in consultation with the student's research advisor

## Molecular Mechanisms and Therapeutics Concentration

Code	Title	Hours
<b>Required Concentration Courses</b>		
Biochemistry (e.g., GEMS 501 or equivalent graduate-level biochemistry course)		
Molecular Biology (e.g., GEMS 502 or equivalent molecular biology course)		
A minimum of 3 hours in the following courses:		
BSTT 400	Biostatistics I	
GEMS 511	Molecular Genetics	
GEMS 515	Receptor Pharmacology and Cell Signaling	
MIM 560	Microbial Pathogenesis	
PSCI 540	Cancer Biology and Therapeutics	

**Electives**

At least 9 hours must be in 400- to 500-level didactic courses and selected in consultation with the student's research advisor

**Forensics Concentration**

Code	Title	Hours
<b>Required Concentration Courses</b>		
BPS 580	Forensic Science: Survey and Foundations	
BPS 581	Forensic Analysis of Biological Evidence	
BPS 582	Forensic Chemistry and Trace Evidence Analysis	
BPS 583	Physical Pattern Evidence Analysis	
BPS 584	Forensic Drug Analysis and Toxicology	
BPS 587	Forensic Science Seminar (at least two semesters)	
BPS 588	Expert Witness Testimony and Courtroom Demeanor	

**Electives**

At least 9 hours must be in 400- to 500-level didactic courses and selected in consultation with the student's research advisor

**Other Requirements**

- **Examinations**
  - *Departmental Qualifying Examination*: Not required.
  - *Preliminary Examination*: Required; written and oral.
- **Dissertation** Required; including oral defense.
- **Other Requirements** Students are required to complete research rotations during their first year of study (up to 4 semester hours of PSCI 592).

**Degree Requirements—MS in Pharmaceutical Sciences**

- **Minimum Semester Hours Required** 32
- **Course Work**

Code	Title	Hours
<b>Required Core Courses</b>		
GC 501	Scientific Integrity and Responsible Research	
PSCI 501	Drug Discovery, Design, and Development	
PSCI 502	Training in Research Presentation	
	Biostatistics (any graduate-level course, 1-hour minimum)	

Students must select one of four concentrations:

- Pharmaceuticals and Drug Delivery
- Pharmacognosy
- Chemistry in Drug Discovery
- Molecular Mechanisms and Therapeutics

**Pharmaceuticals and Drug Delivery Concentration (MS)**

Code	Title	Hours
<b>Required Concentration Courses</b>		
BSTT 400	Biostatistics I (or equivalent) <sup>a</sup>	
GC 470	Essentials for Animal Research	
GC 471	Experimental Animal Techniques	
PSCI 510	Principles of Pharmaceuticals and Drug Delivery	

<sup>a</sup> This 4-hour course will count 1 hour toward the program core statistics requirement and 3 hours toward the Pharmaceuticals and Drug Delivery concentration requirements. Students will not get credit for two introductory biostatistics courses.

**Pharmacognosy Concentration (MS)**

Code	Title	Hours
<b>Required Concentration Courses</b>		
PSCI 520	Research Techniques in Pharmacognosy (or equivalent)	
PSCI 521	Structure Elucidation of Natural Products (or equivalent)	
PSCI 522	Advanced Pharmacognosy (or equivalent)	

**Chemistry in Drug Discovery Concentration (MS)**

Code	Title	Hours
<b>Required Concentration Courses</b>		
PSCI 530	Principles of Medicinal Chemistry (or equivalent)	
PHAR 422	Fundamentals of Drug Action (or equivalent)	

**Molecular Mechanisms and Therapeutics Concentration (MS)**

Code	Title	Hours
<b>Required Concentration Courses</b>		
	Biochemistry (e.g., GEMS 501 or equivalent graduate-level biochemistry course)	
	Molecular Biology (e.g., GEMS 502 or equivalent molecular biology course)	
A minimum of 3 hours in the following courses:		
BSTT 400	Biostatistics I	
GEMS 515	Receptor Pharmacology and Cell Signaling	
GEMS 511	Molecular Genetics	
PSCI 540	Cancer Biology and Therapeutics	
MIM 554	Molecular Aspects of Microbiology	

## Other Requirements

- **Comprehensive Examination** None.
- **Thesis, Project, or Course-Work-Only Options** Thesis required.  
Students must earn at least 6 hours in PSCI 598.