Pharmacological Sciences, Ph.D.

The Pharmacological Sciences Ph.D. program provides a unique opportunity for students interested in any scientific discipline represented by the Department of Pharmaceutical Sciences faculty to have a year of broad, interdisciplinary training followed by focused doctoral research in the Pharmaceutical Sciences research group of their choice. Students in the program choose one of three tracks in Pharmaceutical Sciences, Pharmacology, or Medicinal Chemistry at the start of their first year. At the end of their first year of interdisciplinary training, they transition into a research group to begin their more focused doctoral research under the guidance of a Pharmaceutical Sciences faculty member. The Ph.D. program prepares students for careers in academic research institutions, in the biotechnology and pharmaceutical industry, in federal and state agencies, and in private research institutions by providing a research-intensive approach to the study of pharmaceutical sciences.

Faculty research programs in the Pharmacological Sciences Ph.D. program include molecular and cellular pharmacology, circadian rhythms, epigenetic modifications, neuropharmacology, psychopharmacology, cardiovascular pharmacology, the pharmacology of aging, structure-based drug design, screening-based drug discovery, medicinal chemistry, structural biology, natural product biosynthesis, synthase engineering, cancer detection, prevention and therapy, gene regulation and intercellular signaling, computational biology and bioinformatics, and nanomedicine for targeted drug and gene delivery testing.

Prerequisites

- An M.S. degree is not required for consideration. However, research experience (laboratory or fieldwork) is a primary criterion for acceptance into your graduate programs.
- Some biology and chemistry courses are required. However, because we are an interdisciplinary program, we admit students from various academic backgrounds, so there are no specific course requirements. Applicants recently admitted to our program have undergraduate degrees in a wide range of disciplines, including molecular biology, psychology, and chemical engineering, as well as chemistry and biology.
- Minimum cumulative undergraduate GPA of 3.0

Application Instructions

The online application (https://apply.grad.uci.edu/apply/) and supporting materials should be received by December 1 for full consideration, but submissions received up until January 5 may be considered.

In addition to the online application and all supporting materials required by the UCI Graduate Admissions Office, applicants should include specific research interests and three possible research advisors in their personal statement.

International Applicants

- TOEFL scores are required for all international applicants
- However, if your undergraduate degree was obtained in a country where English was the primary language, the TOEFL exam is not required. For more information regarding admissions requirements for international students, visit the Academic Qualifications (https://grad.uci.edu/admissions/applying-to-uci/international-qualifications.php) webpage.
- Teaching Assistant (TA) Eligibility
  - A score of 26 or higher on the speaking component of the TOEFL IBT;
  - A score of 8 or higher on the speaking module of the IELTS; or
  - A score of 50 or higher on the TSE.
- For more information about the English language requirements for TAs, please visit the English Language Proficiency Requirements for TAs webpage (https://grad.uci.edu/admissions/applying-to-uci/english-proficiency.php).
- Information regarding visas, student employment, and any other services to help international students transition into life at UCI is overseen by the UCI International Center (https://ic.uci.edu/).

Course Requirements

The primary difference between the three tracks are the first-year course requirements, where the Pharmacology Track focuses on mainline pharmacology topics, while the Pharmaceutical Sciences and Medicinal Chemistry Tracks encompass a broad range of allied fields. Students will choose a track during orientation before the start of their first quarter.

Coursework Requirements - Pharmacology Track

New students who select the Pharmacology Track are subject to the coursework requirement as listed below.

Required Courses:	
PHARM 241	Advanced Topics in Pharmacology
PHARM 251	Experimental Pharmacology
PHARM 254	Introduction to Pharmacology
PHARM 255	Neuropharmacology

PHARM 256	Experimental Design for Pharmacologists
PHARM 257	Ethics in Research
PHARM 298	Seminar
PHARM 299	Research

Courses from the Pharmaceutical Sciences Track required course list below may be substituted for some of the Pharmacology Track required courses with the consent of the Track or Graduate Advisor, in alignment with the student's research interests.

Coursework Requirements - Pharmaceutical Sciences Track

New students who select the Pharmaceutical Sciences Track are subject to the first year coursework requirements listed below.

Choose three of the following plus three electives:	
PHRMSCI 223	Biological Macromolecules
PHARM 254	Introduction to Pharmacology
or PHRMSCI 270	Advanced Pharmacology
PHARM 255	Neuropharmacology
PHRMSCI 263	Pharmacogenomics and Epigenetics
PHRMSCI 264	The RNA World: From Discovery to Mechanism
PHRMSCI 265	New Frontiers in Chemical and Synthetic Biology
PHRMSCI 272	Special Topics in Pharmaceutical Sciences
PHRMSCI 275	Drug Discovery Computing Techniques
PHRMSCI 277	Medicinal Chemistry
PHRMSCI 278	Stem Cell Therapy
PHRMSCI 279	Emerging Technologies in Pharmaceutical Sciences and Medicine

First-year coursework must include training in the ethical conduct of research (e.g., PHARM 257 or equivalent), three courses from the required list above, and three electives chosen from 1) the same list; 2) from the Pharmacology Track required courses above; 3) from the Medicinal Chemistry Track elective list below; or 4) any UCI four-unit letter-graded graduate course approved as an elective by the Pharmaceutical Sciences Track Advisor.

Coursework Requirements - Medicinal Chemistry Track

New students who select the Medicinal Chemistry Track are subject to the first year coursework requirements listed below

PHRMSCI 223	Biological Macromolecules
PHARM 254	Introduction to Pharmacology
PHRMSCI 277	Medicinal Chemistry
PHRMSCI 250A	Current Topics in Pharmaceutical Sciences

In addition to the above required courses, Medicinal Chemistry Track students must take at least two elective courses from the Medicinal Chemistry elective list below or any UCI four-unit letter-graded graduate course approved as an elective by the Graduate Advisor by the end of Year 1.

Medicinal Chemistry Elective Course List

Chemistry Department	
CHEM 201	Organic Reaction Mechanisms I
CHEM 202	Organic Reaction Mechanisms II
CHEM 203	Organic Spectroscopy
CHEM 204	Organic Synthesis I
CHEM 205	Organic Synthesis II
CHEM 218	Metallobiochemistry
CHEM 219	Chemical and Structural Biology
CHEM 221A	Fundamentals of Molecular Biophysics
Molecular Biology and Biochemistry Department	
MOL BIO 203	Nucleic Acid Structure and Function
MOL BIO 204	Protein Structure and Function
MOL BIO 211	High-Resolution Structures: NMR and X-ray
Pharmaceutical Sciences Department	
PHRMSCI 263	Pharmacogenomics and Epigenetics

PHRMSCI 264	The RNA World: From Discovery to Mechanism
PHRMSCI 265	New Frontiers in Chemical and Synthetic Biology
PHRMSCI 270	Advanced Pharmacology
PHRMSCI 275	Drug Discovery Computing Techniques
PHRMSCI 278	Stem Cell Therapy
PHRMSCI 279	Emerging Technologies in Pharmaceutical Sciences and Medicine
PHARM 255	Neuropharmacology

Comprehensive Exam

After completion of first year courses, each student must pass a Comprehensive Exam or equivalent covering first year coursework subjects. For Pharmacology Track students, it will be offered once per year during the summer and will normally be taken prior to the second year. It may be deferred to the following year only under unusual circumstances and with the prior approval of the Graduate Advisor. There will be a single Comprehensive Exam offered, covering subjects appropriate for students in any concentration. Each candidate for the Ph.D. must pass the Comprehensive Exam or equivalent no later than the end of their second year.

Advancement to Candidacy

Each student must complete an advancement examination, consisting of a written document and an oral presentation, for their Advancement Committee in accordance with Graduate Council and Department of Pharmaceutical Sciences procedures. To form the five-member Advancement Committee, students must provide the Graduate Advisor with two faculty names and the Graduate Advisor selects three additional faculty. The Advancement Exam will normally take place no earlier than the sixth quarter or no later than the ninth quarter; exceptions must be approved in advance by the Graduate Advisor. After all members of the Advancement Committee vote to pass a student at the time of their oral exam, the student will officially advance to candidacy.

Dissertation

A three-member Doctoral Committee formed from the Advancement Committee will meet with the candidate annually to assess and guide the student's progress toward completion of the dissertation. When the student's research advisor and Doctoral Committee members determine that a sufficient body of original research has been completed, the student will prepare the dissertation for a public defense before the Doctoral Committee.

Final Examination

Upon completion of the dissertation the student will take a public oral examination on the content of his or her dissertation or related topics. The examination will be conducted by all members of the student's Doctoral Committee.