

Pharmacological Sciences, Ph.D.

UC Irvine's PhD in Pharmacological Sciences program provides a unique opportunity for those interested in any scientific discipline represented by the Pharmaceutical Sciences faculty to have a year of broad, interdisciplinary training and extensive lab rotations followed by focused doctoral research in the Pharmaceutical Sciences research group of their choice.

Students can choose from one of three tracks within the program: Pharmaceutical Sciences, Pharmacology or Medicinal Chemistry.

The current areas of study in the Pharmaceutical Sciences Department include:

- Structural and chemical biology
- Medicinal chemistry
- Structure-based drug design
- Molecular neuropharmacology
- Pharmacology of aging
- Molecular evolution
- Synthetic biology
- Natural product biosynthesis and synthase engineering
- Cancer prevention and therapy
- Gene regulation and intercellular signaling
- Computational biology and bioinformatics
- Nanomedicine for targeted drug and gene delivery

Prerequisites

- An M.S. degree is not required for consideration. However, research experience (laboratory or fieldwork) is a **primary criterion** for acceptance into our 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
- No GRE required.

Application Instructions

Complete the online application (<https://apply.grad.uci.edu/apply/>), which is submitted to the UCI Graduate Division. When completing the "Degree Program" section of the online application, please make the following selections:

- School/Department: Pharmaceutical Sciences
- Major/Degree: Pharmacological Sciences-PhD

Students are admitted to the Pharmacological Sciences PhD program on an annual basis in the fall quarter only. The admissions committee screens application immediately after the priority application deadline. First round applicants selected to interview will be notified by early January. Admitted applicants can expect to receive an offer of admission in late January through mid-March.

Submit applications by December 1 for full consideration.

The online application and supporting materials should be received by December 1 for full consideration, but submissions received up until January 5 may be considered.

Applicants are required to submit

- An official online application (<https://apply.grad.uci.edu/apply/>) including the application fee.
- For application review purposes only, scan and upload copies of transcripts for all institutions attended since high school. In the online application, you will be prompted to upload your scanned documents. Please upload both the front and back sides of the transcript. Uploaded transcripts should be recent and include the following: your name, dates of attendance, grades/marks received, credits and grading legend. Official transcripts will be requested by the Graduate Division if and when you are admitted and decide to attend UCI. Do not send official transcripts until this time.
- A Statement of Purpose – must include your specific research interest(s) and three possible research advisors you would be interested in working with. You can describe your research interests, career goals, and other related information.

- A Personal History Statement – this can discuss how your personal background– including any relevant educational, familial, cultural, economic, or social experiences, challenges or opportunities– informs your decision to pursue a PhD in Pharmacological Sciences. If you have overcome socioeconomic or educational challenges, please indicate that you are a diversity candidate and describe your experience in detail.
- Three letters of recommendation – uploaded to the online application by your recommender.
- UCI no longer requires the GRE.
- International students are also required to submit TOEFL scores (Code: 4859)

Applicants are encouraged to upload the following in their application:

- Current curriculum vitae or resume
- List of publications

All graduate applicants are required to demonstrate English proficiency for admissions consideration. Applicants are waived from the English Language Proficiency requirement if they have earned an undergraduate degree from an institution at which English was the sole language of instruction according to the World Higher Education Database (WHED) (<http://whed.net/home.php>). For more information, please visit the Graduate Division's site on the minimum requirements for admission (<https://grad.uci.edu/admissions/applying-to-uci/>).

Additional information about admissions to the Pharmacological Sciences PhD program can be found on the School website (<https://pharmsci.uci.edu/pharmacological-sciences-phd-program/>).

International Applicants

All graduate applicants are required to demonstrate English proficiency for admissions consideration. Applicants are waived from the English Language Proficiency requirement if they have earned an undergraduate degree from an institution at which English was the sole language of instruction according to the World Higher Education Database (WHED) (<http://whed.net/home.php>). Please see WHED's instructions (<https://www.whed.net/Contact.html>) on how to search for your institution. If English is not the sole language of instruction listed or if no language is listed at all, the waiver does not apply and the applicant is required to take and pass an approved English proficiency test. Approved tests and minimum scores are outlined in the next section.

Please note: Test results that are two years old or older are not acceptable.

IMPORTANT NOTE: If a student will be supported as a Teaching Assistant (TA), please read the English proficiency requirement policy for Teaching Assistantships (<https://grad.uci.edu/funding/employment/englishproficiencyteaching.php>). Students who have not earned an undergraduate degree from an institution at which English was the sole language of instruction according to WHED are required to demonstrate English language proficiency to serve as a TA when they apply to the program.

TOEFL (<http://www.ets.org/toefl/>)

The TOEFL is administered by the Educational Testing Service (ETS).

- Please select institution code 4859 to have your official score sent to UCI. No department code is needed.
- We only accept scores submitted electronically by ETS.
- Test results that are two years old or older are not acceptable.
- We do not accept *MyBest* scores; you must submit all individual test scores.
- Results of institutional (non-ETS) administrations of the TOEFL are not acceptable.
- We will accept the TOEFL iBT Special Home Edition test. The same minimum score applies.
- We do NOT accept the TOEFL ITP Plus test for China or the TOEFL Essentials test.
- For more information, please visit their website at www.ets.org/toefl (<https://www.ets.org/toefl/test-takers/ibt/scores/>)

TOEFL Score Requirements for Admission Consideration:

- **An overall minimum score of 80**

IELTS (<http://www.ielts.org/>)

As an alternative to the TOEFL, you may submit scores from the Academic Modules of the International English Language Testing System (IELTS).

- We only accept scores submitted electronically by the IELTS test center. No paper Test Report Forms will be accepted.
- Test results that are two years old or older are not acceptable.
- We will accept the IELTS Indicator test. The same minimum score applies.
- An institutional code is NOT required. Please contact the test center directly where you took the IELTS test and request that your test scores be sent electronically using the IELTS system. All IELTS test centers worldwide are able to send scores electronically to our institution.
- For more information, please visit their website at www.ielts.org (<http://www.ielts.org/>)

IELTS Score Requirements for Admission Consideration:

- An overall minimum score of 7 for admission, with a score of no less than 6 on any individual module.

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:	
PHRMSCI 241	Advanced Topics in Pharmacology
PHRMSCI 251	Experimental Pharmacology
PHRMSCI 254	Introduction to Pharmacology
PHRMSCI 255	Neuropharmacology
PHRMSCI 256	Experimental Design for Pharmacologists
PHRMSCI 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
PHRMSCI 254	Introduction to Pharmacology
or PHRMSCI 270	Advanced Pharmacology
PHRMSCI 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 279	Emerging Technologies in Pharmaceutical Sciences and Medicine

First-year coursework must include training in the ethical conduct of research (e.g., PHRMSCI 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
PHRMSCI 254	Introduction to Pharmacology
PHRMSCI 277	Medicinal Chemistry ¹
PHRMSCI 250A	Current Topics in Pharmaceutical Sciences

¹ Students who completed PHRMSCI 177 as undergraduate students at UCI may waive PHRMSCI 277 if the undergraduate course was completed within 5 years prior and a grade of B or better was received. Students who completed a similar course on campuses other than UCI may not waive

this course. Eligible students must obtain formal approval for the waiver from the Graduate Advisor and must replace the units with an approved course substitution.

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	Structural Biology
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 279	Emerging Technologies in Pharmaceutical Sciences and Medicine
PHRMSCI 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 three- or four-member Advancement Committee, students must provide the Graduate Advisor with a proposed committee for review, potential amendment, and approval. 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.