Department of Pharmaceutical Sciences

A. Richard Chamberlin, Department Chair
209 Steinhaus Hall
949-824-1991
http://www.pharmsci.uci.edu

Overview
The Department of Pharmaceutical Sciences offers a curriculum focusing on the preparation of students for professional positions in the pharmaceutical production, control, and development sectors of the pharmaceutical and biotechnology industry or for graduate studies in pharmaceutics, medicinal chemistry, pharmacology, analytical chemistry, medicine, and pharmacy. Collaborative interdisciplinary research will be supported by joint faculty appointments shared with other UCI departments.

Degrees

<table>
<thead>
<tr>
<th>Program</th>
<th>Degree</th>
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<tbody>
<tr>
<td>Pharmaceutical Sciences</td>
<td>B.S.</td>
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<tr>
<td>Pharmacological Sciences</td>
<td>M.S., Ph.D.</td>
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</table>

* Offered in conjunction with the Department of Pharmacology.

In addition, the Gateway Program in Medicinal Chemistry and Pharmacology (MCP), established through the joint efforts of the Departments of Chemistry, Pharmacology, Molecular Biology and Biochemistry, and Pharmaceutical Sciences, offers a graduate program of study.

Undergraduate Program

The B.S. program in Pharmaceutical Sciences trains students in a multidisciplinary approach so that they can contribute to the advancement of new pharmaceutical technologies such as accelerated chemical synthesis, molecular-based assays using cloned enzymes and cloned metabolizing enzymes, combinatorial chemistry, in vitro biopharmaceutical techniques, and gene therapies. Pharmaceutical scientists are rapidly changing the field of drug discovery and development. The graduates of this program may seek employment in public and private sectors or choose to pursue graduate degrees such as a Ph.D., M.D., or Pharm.D.

Undergraduate Honors. Honors at graduation, e.g., cum laude, magna cum laude, summa cum laude, are awarded to approximately the top 16 percent of the graduating seniors. To be eligible for honors, a general criterion is that students must have completed at least 72 units in residence at a University of California campus. Other important factors are considered visit at Honors Recognition.

Admission to the Major

Students may be admitted to the Pharmaceutical Sciences major upon entering the University as freshmen, via change of major, or as transfer students from other colleges and universities.

Information about change-of-major policies is available in the Department of Pharmaceutical Sciences office and at the UCI Change of Major Criteria website (http://www.changeofmajor.uci.edu).

Transfer Students: All applicants must have completed the following required courses with a grade of B- or better in all courses: one year of general chemistry courses with laboratory courses equivalent to UCI's CHEM 1A-CHEM 1B-CHEM 1C and CHEM 1LC-CHEM 1LD and one year of biology courses equivalent to UCI's BIO SCI 93 and BIO SCI 94. In addition, all applicants must have a cumulative GPA of 3.0 or better. Additional courses that are recommended, but not required: one year of calculus, one year of calculus-based physics with laboratory, one year of organic chemistry with laboratory, and additional articulated lower-division biology requirements.

Requirements for the B.S. in Pharmaceutical Sciences
All students must meet the University Requirements.

Major Requirements

A. Lower-Division Requirements:

1. Select one of the following sequences:

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 1A-1B-1C</td>
<td>General Chemistry and General Chemistry and General Chemistry</td>
</tr>
<tr>
<td>CHEM H2A-H2B-H2C</td>
<td>Honors General Chemistry and Honors General Chemistry and Honors General Chemistry</td>
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</tbody>
</table>

and select one of the following lab sequences:
Select one of the following organic chemistry sequences and accompanying labs:

- CHEM 51A- 51B- 51C
- CHEM 51LB- 51LC
- CHEM H52A- H52B- H52C
- CHEM H52LA- H52LB- H52LC

2. Complete:
- MATH 2A- 2B

and select one of the following:

- MATH 2D
- MATH 3A
- STATS 7
- STATS 8

3. Select one of the following physics sequences and accompanying labs:

- PHYSICS 3A- 3B- 3C
- PHYSICS 3LB- 3LC
- PHYSICS 7C- 7D- 7E
- PHYSICS 7LC- 7LD

4. Complete:
- BIO SCI 93
- BIO SCI 94
- BIO SCI 97
- BIO SCI 98
- BIO SCI 99

5. Complete:
- PHRMSCI 1
- PHRMSCI 42
- PHRMSCI 76

B. Upper-Division Requirements:

Complete:
- BIO SCI 100
- BIO SCI 194S
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>PHRMSCI 120-120L</td>
<td>Human Physiology and Human Physiology Lab</td>
</tr>
<tr>
<td>PHRMSCI 170A-170B</td>
<td>Molecular Pharmacology I and Molecular Pharmacology II</td>
</tr>
<tr>
<td>PHRMSCI 171</td>
<td>Physical Biochemistry</td>
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<tr>
<td>PHRMSCI 172</td>
<td>Topics in Pharmaceutical Sciences</td>
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<tr>
<td>PHRMSCI 173</td>
<td>Pharmacotherapy</td>
</tr>
<tr>
<td>PHRMSCI 174-174L</td>
<td>Biopharmaceutics and Nanomedicine and Biopharmaceutics and Nanomedicine Lab</td>
</tr>
<tr>
<td>PHRMSCI 177-177L</td>
<td>Medicinal Chemistry and Medicinal Chemistry Laboratory</td>
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### C. Upper-Division Electives (8 units):

The upper-division electives may be selected from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>BIO SCI D103</td>
<td>Cell Biology</td>
</tr>
<tr>
<td>BIO SCI D104</td>
<td>Developmental Biology</td>
</tr>
<tr>
<td>BIO SCI D111L</td>
<td>Developmental and Cell Biology Laboratory</td>
</tr>
<tr>
<td>BIO SCI D129</td>
<td>Biotechnology and Plant Breeding</td>
</tr>
<tr>
<td>BIO SCI D136</td>
<td>Human Anatomy</td>
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<tr>
<td>BIO SCI D137</td>
<td>Eukaryotic and Human Genetics</td>
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<tr>
<td>BIO SCI D140</td>
<td>How to Read a Science Paper</td>
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<tr>
<td>BIO SCI D145</td>
<td>Genomics, Development, and Medicine</td>
</tr>
<tr>
<td>BIO SCI D148</td>
<td>Development and Disease</td>
</tr>
<tr>
<td>BIO SCI D153</td>
<td>Molecular and Cellular Basis of Disease</td>
</tr>
<tr>
<td>BIO SCI D170</td>
<td>Applied Human Anatomy</td>
</tr>
<tr>
<td>BIO SCI E136</td>
<td>The Physiology of Human Nutrition</td>
</tr>
<tr>
<td>BIO SCI E142W</td>
<td>Writing/Philosophy of Biology</td>
</tr>
<tr>
<td>BIO SCI E189</td>
<td>Environmental Ethics</td>
</tr>
<tr>
<td>BIO SCI M114</td>
<td>Advanced Biochemistry</td>
</tr>
<tr>
<td>BIO SCI M114L</td>
<td>Biochemistry Laboratory</td>
</tr>
<tr>
<td>BIO SCI M116L</td>
<td>Molecular Biology Laboratory</td>
</tr>
<tr>
<td>BIO SCI M118L</td>
<td>Experimental Microbiology Laboratory</td>
</tr>
<tr>
<td>BIO SCI M120</td>
<td>Signal Transduction in Mammalian Cells</td>
</tr>
<tr>
<td>BIO SCI M121</td>
<td>Immunology with Hematology</td>
</tr>
<tr>
<td>BIO SCI M122</td>
<td>General Microbiology</td>
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<tr>
<td>BIO SCI M123</td>
<td>Introduction to Computational Biology</td>
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<tr>
<td>BIO SCI M124A</td>
<td>Virology</td>
</tr>
<tr>
<td>BIO SCI M124B</td>
<td>Viral Pathogenesis and Immunity</td>
</tr>
<tr>
<td>BIO SCI M125</td>
<td>Molecular Biology of Cancer</td>
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<tr>
<td>BIO SCI M137</td>
<td>Microbial Genetics</td>
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<tr>
<td>BIO SCI M143</td>
<td>Human Parasitology</td>
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<tr>
<td>BIO SCI M144</td>
<td>Cell Organelles and Membranes</td>
</tr>
<tr>
<td>BIO SCI N110</td>
<td>Neurobiology and Behavior</td>
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<tr>
<td>BIO SCI N113L</td>
<td>Neurobiology Laboratory</td>
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<tr>
<td>BIO SCI N153</td>
<td>Neuropharmacology</td>
</tr>
<tr>
<td>BIO SCI N154</td>
<td>Molecular Neurobiology</td>
</tr>
<tr>
<td>CHEM 107</td>
<td>Inorganic Chemistry</td>
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<tr>
<td>CHEM 107L</td>
<td>Inorganic Chemistry Laboratory</td>
</tr>
<tr>
<td>CHEM 125</td>
<td>Advanced Organic Chemistry</td>
</tr>
<tr>
<td>CHEM 128</td>
<td>Introduction to Chemical Biology</td>
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<tr>
<td>CHEM 128L</td>
<td>Introduction to Chemical Biology Laboratory Techniques</td>
</tr>
<tr>
<td>CHEM 138</td>
<td>Introduction to Computational Organic Chemistry</td>
</tr>
<tr>
<td>CHEM 156</td>
<td>Advanced Laboratory in Chemistry and Synthesis of Materials</td>
</tr>
<tr>
<td>CHEM 160</td>
<td>Organic Synthesis Laboratory</td>
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</table>
Department of Pharmaceutical Sciences

CHEM 170 Radioisotope Techniques
PUBHLTH 121 Introduction to Complementary and Alternative Medicine

1 Course may not be used to satisfy more than one requirement.

Upper-Division Writing Requirement: Pharmaceutical Sciences majors satisfy the upper-division writing requirement by completing BIO SCI 100 with a grade of C or better, followed by the completion of PHRMSCI 174L and PHRMSCI 177L. Students must earn a grade of C or better in each of these laboratory courses.

NOTE: Double majors with Pharmaceutical Sciences, Public Health Sciences, Nursing Science, Biomedical Engineering: Premedical, or with any of the School of Biological Sciences majors are not permitted.

Sample Program — Pharmaceutical Sciences

Freshman

Fall
BIO SCI 93
CHEM 1A
WRITING 39B or HUMAN 1A
PHRMSCI 1

Winter
BIO SCI 94
CHEM 1B
WRITING 39C or HUMAN 1B
General Education

Spring
CHM 1C - 1LC
MATH 2A
HUMAN 1C (or General Education)
General Education

Sophomore

Fall
BIO SCI 97
CHEM 51A - 1LD
MATH 2B
BIO SCI 194S

Winter
BIO SCI 98
CHEM 51B - 51LB
STATS 7, 8, MATH 2D, or MATH 3A
PHRMSCI 42

Spring
BIO SCI 99
MATH 51C - 51LC
General Education
General Education

Junior

Fall
PHRMSCI 120 - 120L
BIO SCI 100
PHYSICS 3A, 7C, or 7LD

Winter
PHRMSCI 170A
PHRMSCI 170B
PHYSICS 3B, 7D, or 7LD
Elective

Spring
PHRMSCI 170B
Elective
PHYSICS 3C or 7E

Senior

Fall
PHRMSCI 171
PHRMSCI 174 - 174L
General Education
PHRMSCI 172

Winter
PHRMSCI 177 - 177L
General Education
Elective

Spring
General Education
Elective
PHRMSCI 173
PHRMSCI 76

Graduate Programs

David Mobley, Graduate Program Advisor

Graduate Student Affairs: 949-824-1991

The Department of Pharmacology and Pharmaceutical Sciences join forces to offer an interdisciplinary program leading to the Ph.D. in Pharmacological Sciences with a concentration in Pharmacology or in Pharmaceutical Sciences. For complete program information, see the Interdisciplinary Studies section of the Catalogue.

The Department also admits students through the Graduate Gateway Program in Medicinal Chemistry and Pharmacology (MCP). The one-year graduate MCP Gateway Program is designed to function in concert with selected department programs, including the Ph.D. in Pharmacological Sciences. Upon successful completion of the MCP curriculum at the end of their first year, students choose a faculty advisor who is affiliated with one of the participating departments, and transition into their “home” department to complete the remaining degree requirements. They will receive their Ph.D. from the department of their chosen advisor. Detailed information is available at Department of Pharmaceutical Sciences website (http://www.pharmsci.uci.edu/graduate).

Faculty

Claudia Benavente, Ph.D. University of Arizona, Assistant Professor of Pharmaceutical Sciences; Developmental and Cell Biology (genetics, epigenetics, cancer, pediatric cancer, retinoblastoma, osteosarcoma)
Bruce Blumberg, Ph.D. University of California, Los Angeles, Professor of Developmental and Cell Biology; Biomedical Engineering; Environmental Health Sciences; Pharmaceutical Sciences (gene regulation by nuclear hormone receptors in vertebrate development physiology, endocrine disruption)

A. Richard Chamberlin, Ph.D. University of California, San Diego, Department Chair and Professor of Pharmaceutical Sciences; Chemistry; Pharmacology (chemical biology, organic and synthetic)

John Charles Chaput, Ph.D. University of California, Riverside, Professor of Pharmaceutical Sciences

Olivier Civelli, Ph.D. Swiss Federal Institute of Technology in Zurich, Department Chair and Eric L. and Lila D. Nelson Chair in Neuropharmacology and Professor of Pharmacology; Developmental and Cell Biology; Pharmaceutical Sciences (novel neuroactive molecules)

Melanie Cocco, Ph.D. Pennsylvania State University, Associate Professor of Molecular Biology and Biochemistry; Pharmaceutical Sciences

John P. Fruehauf, M.D. Rush University, Professor of Medicine; Biomedical Engineering; Pharmaceutical Sciences (in-vitro cancer models using 3-D tissue systems to predict drug response)

Daniel W. Gil, Ph.D. University of Pennsylvania, Associate Adjunct Professor of Pharmaceutical Sciences

Celia Goulding, Ph.D. King's College London, Professor of Molecular Biology and Biochemistry; Pharmaceutical Sciences

Stephen Hanessian, Ph.D. Ohio State University, Director of Medicinal Chemistry and Pharmacology Graduate Program and Professor of Pharmaceutical Sciences; Chemistry; Pharmacology (organic chemistry)

Mahtab F. Jafari, Ph.D. University of California, San Francisco, Vice Chair and Professor of Pharmaceutical Sciences; Ecology and Evolutionary Biology; Pharmacology

Young Jik Kwon, Ph.D. University of Southern California, Professor of Pharmaceutical Sciences; Biomedical Engineering; Chemical Engineering and Materials Science; Molecular Biology and Biochemistry (gene therapy, drug delivery, cancer-targeted therapeutics, combined molecular imaging and therapy, cancer vaccine)

Anthony D. Long, Ph.D. McMaster University, Professor of Ecology and Evolutionary Biology; Pharmaceutical Sciences

Andrej Luptak, Ph.D. Yale University, Associate Professor of Pharmaceutical Sciences; Chemistry; Molecular Biology and Biochemistry (chemical biology)

David L. Mobley, Ph.D. University of California, Davis, Associate Professor of Pharmaceutical Sciences; Chemistry (chemical biology, physical chemistry and chemical physics, theoretical and computational)

Lawrence Plon, Pharm.D. M.A. University of Southern California, Assistant Adjunct Professor of Pharmaceutical Sciences

Thomas L. Poulos, Ph.D. University of California, San Diego, UCI Chancellor's Professor of Molecular Biology and Biochemistry; Chemistry; Pharmaceutical Sciences; Physiology and Biophysics (chemical biology)

Jennifer A. Prescher, Ph.D. University of California, Berkeley, Associate Professor of Chemistry; Molecular Biology and Biochemistry; Pharmaceutical Sciences (chemical biology, organic and synthetic)

Paolo Sassone-Corsi, Ph.D. University of Naples Federico II, Donald Bren Professor and Professor of Biological Chemistry; Microbiology and Molecular Genetics; Pharmaceutical Sciences

Samuel E. Schriner, Ph.D. University of Washington, Lecturer with Potential Security of Employment of Pharmaceutical Sciences

Robert Spitale, Ph.D. University of Rochester, Assistant Professor of Pharmaceutical Sciences

Shiou-Chuan (Sheryl) Tsai, Ph.D. University of California, Berkeley, Professor of Molecular Biology and Biochemistry; Chemistry; Pharmaceutical Sciences

Weian Zhao, Ph.D. McMaster University, Associate Professor of Pharmaceutical Sciences; Biomedical Engineering (stem cell therapy, diagnostics, biosensors, nano- and microtechnology, aptamers)