MEDICINAL CHEMISTRY & DRUG DESIGN, BACHELOR OF SCIENCE

College of Letters & Science

Formerly Pharmaceutical Chemistry.

Chemistry is the study of the composition of matter, its structure, and the means by which it is converted from one form to another.

The Program

We offer several degree programs leading to the Bachelor of Arts (A.B.) and the Bachelor of Science (B.S.). To meet and discuss these programs with our staff advisors; see Academic Advising (https://chemistry.ucdavis.edu/undergraduate/academic-advising/).

The B.S. in Pharmaceutical Chemistry is strongly focused on basic science while providing students with a greater understanding of the experimental and computational processes and societal issues that surround the synthesis, discovery, and design of modern pharmaceuticals. Important relevant topics include potential drug targets, physical principles of drug action, drug synthesis & screening, computational drug design, drug delivery, and ethical concerns. The demand for pharmaceutical chemists is high and anticipated to grow, as modern chemistry allows a wide range of choices for drug synthesis and our growing knowledge of biological processes presents challenging targets for novel therapeutics.

Career Alternatives

Graduates in Pharmaceutical Chemistry will be able to successfully pursue their career objectives in advanced education in professional and/or graduate schools and in a range of scientific careers in academia, government, or industry including the pharmaceutical, medicinal & biological sciences, medicine, pharmacy, pharmacology, and biotechnology.

Major Advisor

To contact a major advisor in the Department of Chemistry; see Academic Advising (https://chemistry.ucdavis.edu/undergraduate/academic-advising/).

Honors & Honors Program

The student must take courses CHE 194HA, CHE 194HB, and CHE 194HC, and complete a capstone research project (typically a written honors thesis). For more information, see Undergraduate Research (https://chemistry.ucdavis.edu/undergraduate/undergraduate-research/) on the department's website.

Graduate Study

The Department of Chemistry offers programs of study and research leading to M.S. and Ph.D. degrees in Chemistry. Detailed information regarding graduate study may be obtained by contacting the Graduate Advisor, Department of Chemistry; see also Graduate Studies (http://gradstudies.ucdavis.edu/).

The major requirements below are in addition to meeting University Degree Requirements (https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/) & College Degree Requirements (https://catalog.ucdavis.edu/undergraduate-education/college-degree-requirements/); unless otherwise noted. The minimum number of units required for the Medicinal Chemistry & Drug Design Bachelor of Science is 97.

Code	Title	Units
Preparatory Subject Matter		
Chemistry		
Choose a series:		15
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
Physics		
Choose a series:		12-15
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	
PHY 009A & PHY 009B & PHY 009C	Classical Physics and Classical Physics and Classical Physics	
Mathematics		
Choose a series:		9-12
MAT 016A & MAT 016B DISCO & MAT 016C DISCO	and and (Discontinued)	
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus	
Biological Science		
BIS 002A	Introduction to Biology: Essentials of Life on Earth	5
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	5
or BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	
Statistics		
Choose one:		4
STA 013	Elementary Statistics	
or STA 013Y	Elementary Statistics	
STA 032	Gateway to Statistical Data Science	
STA 100	Applied Statistics for Biological Sciences	
Preparatory Subject Matter Subtotal		50-56
Depth Subject Matter		
Chemistry		
CHE 124A	Inorganic Chemistry: Fundamentals	3
CHE 130A	Principles of Medicinal Chemistry	3
CHE 130B	Computational Drug Design	3

CHE 135	Drug Development Laboratory	3
Choose a series:		6-12
CHE 107A & CHE 107B	Physical Chemistry for the Life Sciences and Physical Chemistry for the Life Sciences	
CHE 110A & CHE 110B & CHE 110C	Physical Chemistry: Introduction to Quantum Mechanics and Physical Chemistry: Properties of Atoms & Molecules and Physical Chemistry: Thermodynamics, Equilibria & Kinetics	
Choose 118 series or 128 & 129 series:		12-15
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
OR		
CHE 128A & CHE 128B & CHE 128C	Organic Chemistry and Organic Chemistry and Organic Chemistry	
CHE 129A & CHE 129B & CHE 129C	Organic Chemistry Laboratory and Organic Chemistry Laboratory and Organic Chemistry Laboratory	
Choose two:		6
BIS 102	Structure & Function of Biomolecules	
CHE 131	Modern Methods of Organic Synthesis	
CHE 150	Chemistry of Natural Products	
Choose at least four; not used to satisfy the above requirements:		11-17
ANS 170	Ethics of Animal Use	
BIS 102	Structure & Function of Biomolecules	
BIS 103	Bioenergetics & Metabolism	
BIT 171	Professionalism & Ethics in Genomics & Biotechnology	
CHE 131	Modern Methods of Organic Synthesis	
CHE 150	Chemistry of Natural Products	
CHE 199	Special Study for Advanced Undergraduates (For a minimum 3 units.)	
or CHE 194HA	Undergraduate Honors Research	
ETX 103A	Biological Effects of Toxicants	
MCB 123	Behavior & Analysis of Enzyme & Receptor Systems	
MCB 124	Macromolecular Structure & Function	
MCB/PLB 126	Plant Biochemistry	
MIC 102	Introductory Microbiology	
NPB 100	Neurobiology	
NPB 101	Systemic Physiology	
NPB 168	Neurobiology of Addictive Drugs	
PLB/MCB 126	Plant Biochemistry	
VMB 101Y	Principles of Pharmacology & Toxicology	
or VMB 101V	Principles of Pharmacology & Toxicology	
Depth Subject Matter Subtotal		47-62
Total Units		**97-118**