Pharmaceutical Chemistry
B.S. Major Requirements

Preparatory Subject Matter ........................................48-55
Chemistry 2A-2B-2C or 2AH-2BH-2CH ...............15
Physics 7A, 7B, 7C or 9A, 9B, 9C .................12-15
Mathematics 16A-16B-16C or 17A-17B-17C or
21A-21B-21C ..................................................9-12
Biological Sciences 2A, and 2B or 2C ..........9
Statistics 13 or 32 or 100 ....................................3-4

Depth Subject Matter ..............................................48-64
Chemistry 107A-107B or 110A-110B-110C,
118A-118B-118C or 128A-128B-128C-129A
129B-129C, 124A, 130A, 130B, 135, 150 ....33-42
Biological Sciences 102 or
Chemistry 131 .....................................................3
At least four additional courses (not used to satisfy
the above requirements) from: Biological Sciences
102, 103; Biotechnology 171 or Veterinary Medicine
170; Chemistry 131, (199 or 194H for 3 units),
Environmental Toxicology 103A; Microbiology 102
(MIC 104 accepted as replacement for 102);
Neurobiology, Physiology, and Behavior 100, 101;
Plant Biology 126, ............................................12-19

Total Units for the Major ......................................96-119

Sample Schedule for Required Courses
(Electives in Italics)

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CHE =  Chemistry  
MAT = Mathematics  
PHY = Physics  
STA = Statistics  
ETX = Environmental Toxicology  
BIT = Biotechnology  
NPB = Neurobio., Physiology, and Behavior  
PLB = Plant Biology  
PLP = Plant Pathology

Units

About UC Davis:
For over 100 years, UC Davis has engaged in teaching,
research and outreach that matters to California and
transforms the world. With over $684M in annual research
funding, UC Davis ranks 8th among US universities based
on contributions to society (Washington Monthly).

The mission of the Chemistry Program at UC Davis is
to conduct preeminent research, provide forward-looking
instruction in the chemical sciences, and perform service
activities that will positively impact our campus, society,
and the world. Through these integrated efforts, we
advance and disseminate knowledge, educate students,
catalyze economic development, and provide scientific
leadership in the chemical sciences. Our Department has
a strong focus on interdisciplinary research and teaching,
with diverse classes, advanced facilities, state-of-the-art
instrumentation, collaborative research opportunities, and
award-winning faculty. Faculty and students in the
Department have received numerous prestigious research
awards and fellowships, as well as awards for teaching
and mentorship. Many faculty have been selected as
Fellows of the American Chemical Society, the American
Association for the Advancement of Science, the
American Physical Society, the Alfred P. Sloan Founda-
tion, and members of the National Academy of Science.

American Civil Liberties Union for the Advancement of Science,
Women in Chemistry award, Beckman Young Investigator
Award, Alexander von Humboldt Senior Research award,
NSF CAREER award, Presidential award for Excellence in Mentoring,
Dreyfus Teacher Scholar award, UC Davis Distinguished Teaching award,
and the Chancellor’s award for Excellence in Mentoring Undergraduate Research.

For more information contact:
Department of Chemistry
University of California
One Shields Avenue, Davis, CA 95616
(530) 752-3204 ~ info@chem.ucdavis.edu
http://www.chem.ucdavis.edu

Penicillin G
Pharmaceutical Chemistry

The B.S. in Pharmaceutical Chemistry provides students with an in-depth understanding of the experimental and computational processes and societal issues that surround the discovery and design of modern pharmaceuticals. Important relevant topics include potential drug targets, physical principles of drug action, drug synthesis and screening, rational drug design, drug delivery, and ethical concerns.

Atorvastatin, a member of the drug class known as statins, is used for lowering cholesterol and thereby reducing cardiovascular disease. With 2004 sales of US$10.9 billion under the brand name Lipitor (Ca^{2+}-salt of atorvastatin), it is the largest selling drug in the world.

Career Alternatives

Students with a bachelor’s degree in pharmaceutical chemistry are employed in all aspects of the pharmaceutical and other health-related industries. Students are also well prepared for graduate study in a range of areas, including chemistry, medicinal chemistry, biochemistry, and pharmacology, and for professional schools in pharmacy, dentistry and medicine. 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 provides challenging targets for novel therapeutics.

Program of Study

Students in the Pharmaceutical Chemistry major program require and receive a strong background in chemistry, physics, mathematics, and biology. However, the principal foci of the emphasis are the design principles and experimental methods used in pharmaceutical and medicinal chemistry.

Ibuprofen is a non-steroidal anti-inflammatory drug (NSAID) widely marketed under various trademarks. It is used for relief of symptoms of arthritis, primary dysmenorrhoea, fever, and as an analgesic, especially where there is an inflammatory component.

For example, case studies of various drugs (e.g., aspirin, botox, thalidomide, taxol) are used to discuss and present various computational methods that are important and widely used in the modern drug design/discovery process.

Atorvastatin

Students learn about the rational design of drugs, their multi-step synthesis, purification and characterization, and the determination of their physical properties and biological activity.

Fluorouracil

Fluorouracil is a chemotherapy drug for the treatment of various types of cancer. One of its potential side effects is loss of hair.