

CHEMISTRY

College of Natural and Behavioral Sciences

Department of Chemistry and Biochemistry (<https://www.csudh.edu/chemistry/>)

Department Mission Statement

California State University Dominguez Hills (CSUDH) Department of Chemistry provides world-class academic excellence – across the chemical society – by engaging a diverse student body and faculty in a dynamic learning environment. Our department provides cutting-edge research and is shaping the next generation of critical thinkers, scientists, and industry leaders.

Program Description

The Department of Chemistry and Biochemistry offers majors leading to a Bachelor of Science or a Bachelor of Arts Degree. The B.A. degree also has a Biochemistry Option. The Bachelor of Science in Chemistry is designed primarily for students who plan to enter graduate programs in chemistry or other closely related sciences. This program is approved by the American Chemical Society, meeting its guidelines and standards for undergraduate chemistry education. Students graduating with this degree will receive a certificate from the American Chemical Society. The Bachelor of Arts in Chemistry fulfills the need of those students who are pursuing pre-medical or pre-dental programs as well as those who plan to enter fields such as business, environmental or patent law, where a background in chemistry can be of great utility. Our department webpage link is <https://www.csudh.edu/chemistry/>

Features

The department is housed in well-equipped offices and laboratories on the third floor of the Science and Innovation Building. The faculty consists of full-time members who represent all the major areas of chemistry. Students generally benefit from the smaller class sizes and the individualized attention, which is seldom available at large universities. Students are introduced to modern instrumental techniques and are given many "hands-on" experience opportunities.

Academic Advising

Students who are majoring in chemistry should be advised once each semester, prior to registration. For a list of advisors in the department of chemistry and biochemistry, please visit our website <https://www.csudh.edu/chemistry/>

Preparation

High school students should include two years of algebra, one year of geometry and a one-year course in chemistry in their high school preparation. A course in high school physics also is recommended. Students who enter without this preparation must expect to delay their graduation beyond the minimum time-period of four years. Either student take our introduction to chemistry of CHE108 and earn Credit or take the Chemistry placement exam and pass to be placed in the CHE110 General Chemistry I.

Community college transfers should have completed one year of general chemistry, one year of calculus and one year of physics. They MUST transfer their entire sequence to earn transfer credit/be articulated for our CHE110 and CHE112 general chemistry series in our department.

Please refer to www.assist.org (<http://www.assist.org/>) for all agreed and approved articulation requests from Community Colleges, CSUs, and UCs.

Pre-Medical Professions Training in Biochemistry

Students who wish to apply to professional schools of medicine, dentistry, veterinary medicine, or other medical areas following graduation should consider completing the requirement for a B.S. degree in Chemistry in Biochemistry. In addition, students should complete the elective course that was not selected to fulfill the degree requirements. The following courses are not usually required for admission to medical school, but it is recommended that students consider them when planning their academic program. Many former students have found them to be a valuable introduction to courses that must be taken in many professional programs. Please note: BIO220 Molecular Biology is a pre-requisite for BIO320 and BIO340. Biochemistry students do not need to take BIO124 & BIO125. 6 Units in the C Elective area is required for BS Biochemistry majors listed below.

Code	Title	Hours
BIO 314	Developmental Biology	3
BIO 315	Developmental Biology Lab	1
BIO 320	Cell Biology	3
BIO 340	Genetics	3

Student Organizations

Membership in the Chemistry & Biochemistry Club of CSU Dominguez Hills is open to all students (https://torolink.csudh.edu/organization/chem_biochem (https://torolink.csudh.edu/organization/chem_biochem/)). CSUDH Chemistry & Biochemistry Club

The purpose of this organization is to expand the perception and appreciation of Chemistry & Biochemistry. The mission of the club serves as a valuable medium for information, opportunities, and networking that would assist the academic and professional career goals of students and faculty. All CSUDH students, faculty, and alumni who are interested in chemistry and biochemistry are welcome to join the CSUDH Chemistry & Biochemistry Club.

Graduation With Honors

An undergraduate student may be a candidate for graduation with Honors in Chemistry provided he or she meets the following criteria:

1. A minimum of 36 units in residence at CSU Dominguez Hills;
2. A minimum grade point average of at least 3.5 in all courses used to satisfy the upper-division requirements in the major;

Career Possibilities

A Major in Chemistry either as a B.A. or B.S. will prepare students for graduate work in chemistry or biochemistry; teaching chemistry in secondary schools; employment with industry or government; entry into professional schools such as medicine or dentistry; or entry into law school with a view toward specialization in patent or environmental law.

Students may prepare for a career in teaching science at the secondary level (junior high or high school) by completing an approved "Subject Matter Preparation Program." Completion of such a program is the first step in meeting the state requirements for a teaching credential. As the program requirements for the "Subject Matter Preparation Program" in

science have changed recently, interested students should consult the departmentally designated advisor for current information.

Undergraduate Programs

Bachelors

- Chemistry, Bachelor of Arts (<https://catalog.csudh.edu/academics/chemistry/chemistry-ba/>)
- Chemistry, Bachelor of Science (<https://catalog.csudh.edu/academics/chemistry/chemistry-bs/>)

Minor

- Organic/Biochemistry, Minor (<https://catalog.csudh.edu/academics/chemistry/organic-biochemistry-minor/>)

Graduate Programs

Subject Matter Authorization

- Chemistry, Subject Matter Authorization (<https://catalog.csudh.edu/academics/chemistry/chemistry-subject-matter-authorization/>)

Faculty

Arumugam Thangavel, Department Chair
H. Leonardo Martinez, Noel Sturm, Lihung Pu, Tieli Wang, Kenneth R. Rodriguez, Kari Pederson, Erin McCauley, Barbara Belmont, and Lida Latifzadeh

Staff

Laboratory Technicians: Anthony Diaz (Led Lab Technician), Justin Hathaway, and Amber M. Rivas
Department Office: SCI 324, (310) 243-3376

Emeriti Faculty

Ulrich de la Camp, L. Danette Dobyns, Eugene N. Garcia, James Lyle, Sofia Papatheodorou, Oliver Seely, William Wilk, George Wiger

Courses

CHE 102. Chemistry For The Global Citizen. (3 Units)

A non-mathematical treatment of the basic principles of chemistry and their application to various facets of life in a highly technological society. Offered Fall, Spring, All terms

CHE 103. Chemistry Lab for the Global Citizen. (1 Units)

Recommended general education course for students interested in the chemistry of everyday life. Includes determining the composition of foods and drugs, measurements, unit conversions, scientific notation, chemical representations, mole concept, structure of atoms and molecules. Three hours of laboratory per week. Offered Fall, Spring

CHE 108. Introduction to College Chemistry. (5 Units)

Measurements, units, unit conversion, scientific notation, chemical stoichiometry, mole concept, structure of atoms and molecules. CR/NC grading. Three hours of lecture and six hours of laboratory per week. Offered Fall, Spring, All terms

CHE 110. General Chemistry I. (5 Units)

Prerequisites: CHE 108 or high school chemistry and satisfactory performance on the General Chemistry Placement test. Chemical stoichiometry, atomic structure, periodic table, quantum theory, gases, thermochemistry, ionic bonding, Lewis formulas, liquids, solids, solutions. Four hours of lecture and three hours of laboratory per week. Offered Fall, Spring, All terms

CHE 112. General Chemistry II. (5 Units)

Prerequisite: CHE 110. Chemical kinetics, equilibria, thermodynamics, acids and bases, solubility, electrochemistry, covalent bonding, transition metal complexes. Four hours of lecture and three hours of laboratory per week. Offered Fall, Spring, All terms

CHE 230. Quantitative Analysis. (4 Units)

Prerequisite: CHE 112. Introduction to the techniques and theory of gravimetric and volumetric analyses, colorimetry, flame photometry and electroanalytical procedures. Two hours of lecture and six hours of laboratory per week. Laboratory fee required. Offered Fall, Spring

CHE 300. Organic Chemistry I. (3 Units)

Prerequisite: CHE 112 or 1 year of general chemistry. A detailed study of organic molecular structure, reaction mechanisms stereochemistry, and synthesis with emphasis on a aliphatic and aromatic systems. Offered Summer

CHE 301. Organic Chemistry Lab I. (1 Units)

Prerequisites: CHE 112 or 1 year of general chemistry; concurrent enrollment in CHE 300. Basic experimental techniques of organic chemistry. Three hours of laboratory per week. Offered Summer

CHE 302. Organic Chemistry II. (3 Units)

Prerequisites: CHE 300 and CHE 301. Concurrent enrollment in CHE 303. Continuation of CHE 300 with emphasis on the chemistry of organic compounds containing oxygen and nitrogen. Offered Summer

CHE 303. Organic Chemistry Lab II. (1 Units)

Prerequisites: CHE 112 or 1 year of general chemistry; concurrent enrollment in CHE 302. Preparation of organic compounds and qualitative organic analysis. Three hours of laboratory per week. Offered Summer

CHE 310. Organic Chemistry I. (4 Units)

Prerequisites: CHE 112; concurrent enrollment in CHE 311. Systematic study of organic compounds, with emphasis on molecular structure and reaction mechanisms; stereochemistry; aliphatic compounds. Offered Fall, Spring

CHE 311. Organic Chemistry Lab I. (1 Units)

Prerequisite: Concurrent enrollment in CHE 310. Techniques of separation and purification of organic compounds. Introduction to organic synthesis. Three hours of laboratory per week. Fee required. Offered Fall, Spring

CHE 312. Organic Chemistry II. (3 Units)

Prerequisites: CHE 310, CHE 311; concurrent enrollment in CHE 313. A continuation of CHE 310 with emphasis on aromatic systems. Introduction to spectroscopy. Structures and reactions of organic compounds containing oxygen and nitrogen. Offered Fall, Spring

CHE 313. Organic Chemistry Laboratory II. (2 Units)

Prerequisites: CHE 310, CHE 311; concurrent enrollment in CHE 312. Organic synthesis, introduction to spectroscopy. Qualitative organic analysis. Six hours of laboratory per week. Fee required. Offered Fall, Spring

CHE 316. Survey of Organic Chemistry. (3 Units)

Prerequisite: CHE 112 and concurrent enrollment in CHE 317. Structure and properties of aliphatic and aromatic compounds. Stereochemistry and functional group chemistry. Oriented toward life sciences and related areas. Offered Fall, Spring

CHE 317. Survey of Organic Chemistry Laboratory. (1 Units)

Co-requisite: CHE 316. Basic purification processes and techniques of separation of mixtures. Preparation of organic compounds. Introduction to qualitative and quantitative analytical methods, including chemical, chromatographic, and spectroscopic procedures. Three hours of laboratory per week. Fee required. Offered Fall, Spring

CHE 320. Physical Chemistry I. (5 Units)

Prerequisites: CHE 112 and CHE 230; MAT 193; PHY 132. PHY 122 may be substituted for PHY 132 by students in the biochemistry option and by non-chemistry majors, with consent of instructor. Principles and applications of classical thermodynamics and chemical kinetics. Introduction to computer based techniques of treating scientific data. Offered Fall

CHE 322. Physical Chemistry II. (3 Units)

Prerequisite: CHE 320. Introduction to group theory, quantum chemistry, spectroscopy and statistical thermodynamics. Offered Spring

CHE 360. Writing in Chemical Sciences. (2 Units)

Prerequisites: CHE 310 or concurrent enrollment required. Extensive practice in written chemistry communication, emphasizing effective communication of scientific data to a wide variety of audiences. Extensive practice in writing chemistry reports and summaries, preparing career related documents, searching and evaluating chemical literature. A grade of C or better in this course fulfills the GWAR requirement for all Chemistry and Biochemistry majors. Offered Fall, Spring

CHE 393. Supervised Projects. (1-3 Units)

Prerequisites: CHE 112 and consent of instructor. Laboratory projects to be carried out under the supervision of a chemistry faculty member. Designed for students of sophomore and junior standing. A-C/NC grading. Repeatable course. Three to nine hours of laboratory per week. Offered Fall, Spring

CHE 420. Advanced Applic for Chemistry. (2 Units)

Prerequisite: CHE 320. Advanced applications for chemistry including computational techniques, molecular modeling, combinatorial approaches to synthesis, data acquisition and analysis, and use of computers to simulate spectral data. One hour of lecture and two hours of activity per week. Offered Spring

CHE 431. Adv Integrated Lab I Lec. (3 Units)

Prerequisites: CHE 230 and CHE 320. Experimental work involving instrumental analytical techniques, inorganic syntheses, physical measurements on chemical systems. Analysis of experimental data, including the use of computer techniques. One hour of lecture and six hours of laboratory per week. Offered Fall

CHE 433. Adv Integrated Lab II Lec. (3 Units)

Prerequisites: CHE 431 and CHE 322. A continuation of CHE 431. One hour of lecture and six hours of laboratory per week. Offered Spring

CHE 440. Inorganic Chemistry. (4 Units)

Prerequisite: CHE 322. Structural inorganic chemistry, coordination compounds, mechanisms of inorganic reactions, inorganic synthetic methods. Organometallic chemistry, catalysis. Offered Spring

CHE 450. Biochemistry I. (4 Units)

Prerequisites: CHE 230, CHE 312 and CHE 313, or CHE 316 and CHE 317, and concurrent enrollment in CHE 451. The chemistry of amino acids and proteins; the chemistry and metabolism of carbohydrates and lipids; energetics in living systems. Consent required. Offered Fall, Spring

CHE 451. Biochemistry I Lab. (1 Units)

Prerequisites: CHE 230, CHE 312, and CHE 313, or CHE 316 and CHE 317, and concurrent enrollment in CHE 450. Biochemistry laboratory experiments using advanced techniques for separation and analysis of biologically active compounds. Three hours of laboratory per week. Fee required. Consent required. Offered Fall, Spring

CHE 452. Biochemistry II. (4 Units)

Prerequisite: CHE 450. Metabolism of nitrogenous compounds, discussion of nucleic acid structure/function and metabolic control. Offered Spring

CHE 453. Biochemistry II Lab. (2 Units)

Prerequisites: CHE 451 and concurrent enrollment in CHE 452. Biochemistry experiments using advanced techniques for the isolation and purification of macromolecules, and for determination of their activity or function. Six hours of laboratory per week. Offered Spring

CHE 456. Clinical Chemistry. (3 Units)

Prerequisites: CHE 450 and CHE 451. Methods of analysis of body fluids and tissues. Relation of analytical results to interpretation of metabolism and diagnosis of disease. Three hours of lecture and three hours of laboratory per week. Laboratory fee required. Offered Fall, Spring

CHE 458. Toxicology. (3 Units)

Prerequisites: CHE 450 is required; CHE 452 is recommended. Discussion of methods of introduction of toxic substances into the body, their metabolic transformations, and their biochemical and physiological effects. Examples drawn from forensic, clinical, occupational, and environmental sources. Offered Infrequent

CHE 460. Chemical Literature. (2 Units)

Prerequisites: CHE 312 and CHE 320. Chemical literature, including the nature, content, and accessibility. Modern electronic search and retrieval techniques. CR/NC grading. Offered Spring

CHE 474. Geochemistry. (3 Units)

Prerequisites: CHE 112 is required; EAR 356 is recommended. Factors controlling the distribution of the chemical elements in the earth, atmosphere and oceans. Methods in the analysis of minerals. Special consideration of economically important metals. Applications in earth sciences, chemistry, and environmental studies. Two hours of lecture and three hours of laboratory per week. Offered Infrequent

CHE 495. Selected Topics in Chemistry. (1-3 Units)

Prerequisite: Consent of instructor. Lectures on a specific area of current interest in chemistry, or advanced discussion of a selected topic in a limited field of chemistry. Repeatable course. One to three hours of lecture per week.

Offered Fall, Spring

CHE 497. Directed Research. (1-3 Units)

Prerequisites: Senior standing and consent of instructor. Advanced laboratory work, with each student undertaking an independent and original investigation. A-C/NC grading. Repeatable course. Three or nine hours of laboratory per week.

Offered Fall, Spring