

Chemistry

Science, Mathematics & Engineering

Dean
Robert Montañez
Phone
(916) 691-7204
Area Office
LRC 121

Counseling
(916) 691-7316
Cooperative Work Experience
(916) 691-7372

DEGREE

A.S. — Chemistry

Program Description

The Chemistry Program at CRC consists of:

- A series of chemistry courses designed to meet transfer requirements for chemical, physical and biological science majors
- A series of courses intended for students majoring in fields other than chemistry, biology, or physical science
- A course designed specifically for students who require preparation or review of the more basic chemical concepts

All chemistry courses at CRC include a practical component where students conduct hands-on chemical experimentation in a modern, well-equipped laboratory.

Career Opportunities

Biochemist	Chemist
Pharmacist	Chemical Engineer
Chemical Technology	Physician
Dentist	Veterinarian
Allied Health Professional	Biologist
Physicist	Geologist
Geochemist	Oceanographer

Some Career Opportunities require more than two years of college study. Classes beyond the associate degree may be required to fully prepare students for transfer to a university program.

Highlights

- An outstanding chemistry faculty striving to maintain an excellent and well-respected chemistry program
- Ample contact with the instructor and the relaxed atmosphere that only a limited class size can offer
- A Mathematics, Engineering and Science Achievement (MESA) program

NOTE TO TRANSFER STUDENTS:

If you are interested in transferring to a four-year college or university to pursue a bachelor's degree in this major, it is critical that you meet with a CRC counselor to select and plan the courses for your major. Schools vary widely in terms of the required preparation. The courses that CRC requires for an associate's degree in this major may be different from the requirements needed for the bachelor's degree.

For information about the student learning outcomes for this program, see <http://www.crc.losrios.edu/pslo>

A locker deposit is required to participate in all chemistry classes that include laboratory. The deposit is payable at the Business Office prior to the first laboratory class meeting. The deposit is refundable if the locker is checked in at the end of the semester.

DEGREE

A.S. — Chemistry

CODE #1402

This degree is designed to meet common lower division requirements for a major in chemistry.

REQUIRED PROGRAM.....		Units
CHEM 400	General Chemistry	5
CHEM 401	General Chemistry	5
CHEM 420	Organic Chemistry	5
CHEM 421	Organic Chemistry	5
MATH 400	Calculus I.....	5
MATH 401	Calculus II.....	5
MATH 402	Calculus III.....	5
PHYS 411	Mechanics of Solids and Fluids	4
PHYS 421	Electricity and Magnetism.....	4
PHYS 431	Heat, Waves, Light and Modern Physics.....	4
TOTAL UNITS REQUIRED		47

G.E. Graduation Requirements for this degree - see pages 20-21

CHEMISTRY (CHEM)

CHEM 300

Beginning Chemistry

4 Units

Prerequisite: MATH 100 or MATH 102 or equivalent with a grade of "C" or better

Advisory: Completion of or concurrent enrollment in MATH 120

Course Transferable to UC/CSU

See UC Limitations & Counselor

Hours: 54 hours LEC ; 54 hours LAB

This course covers an introduction to fundamental chemical concepts, problem-solving and laboratory skills. It is designed for students needing a comprehensive review of or intensive preparation in chemistry. This course is primarily intended to prepare students for CHEM 400.

CHEM 305

Introduction to Chemistry

5 Units

Prerequisite: MATH 100 or 102 with a grade of "C" or better

General Education: AA/AS Area IV; CSU Area B1; CSU Area B3; IGETC Area 5A

Course Transferable to UC/CSU

See UC Limitations & Counselor

Hours: 72 hours LEC ; 54 hours LAB

This is a general chemistry course intended for students majoring in the allied health fields, such as nursing, physical therapy, dental hygiene, veterinary technology, and environmental technology. This course emphasizes the fundamental principles of chemistry: types of matter, physical and chemical processes, atomic and molecular structure, stoichiometry, properties and theories of gases, properties of solutions, acids and bases, equilibria, oxidation-reduction and an introduction to organic functional groups as they pertain to medicine or biological systems.

CHEM 306

Introduction to Chemistry

5 Units

Prerequisite: CHEM 305 with a grade of "C" or better

General Education: AA/AS Area IV; CSU Area B1; CSU Area B3; IGETC Area 5A

Course Transferable to UC/CSU

See UC Limitations & Counselor

Hours: 72 hours LEC ; 54 hours LAB

The organic chemistry portion of this course emphasizes the major classes of organic compounds: their structure, physical and chemical properties related to biological systems, and nomenclature. Some clinical and pharmacological aspects are also discussed. The biochemistry portion of this course emphasizes the structure and function of carbohydrates, proteins, and lipids in biological systems. Special topics include enzymes and enzyme regulation, drugs their bioavailability and metabolism.

CHEM 307

Introduction to Chemistry

4 Units

Prerequisite: MATH 100 or MATH 102 with a grade of "C" or better; or equivalent

General Education: AA/AS Area IV; CSU Area B1; CSU Area B3; IGETC Area 5A

Course Transferable to UC/CSU

See UC Limitations & Counselor

Hours: 54 hours LEC ; 54 hours LAB

This is a general chemistry course intended for students majoring in the allied health fields, such as nursing, physical therapy, dental hygiene, veterinary technology, and environmental technology. This course emphasizes the fundamental principles of chemistry: types of matter, physical and chemical processes, atomic and molecular structure, stoichiometry, properties and theories of gases, properties of solutions, acids and bases, equilibria, and an introduction to organic functional groups as they pertain to medicine or biological systems.

CHEM 308

Introduction to Chemistry

4 Units

Prerequisite: CHEM 307 with a grade of "C" or better

General Education: CSU Area B1; CSU Area B3; IGETC Area 5A

Course Transferable to UC/CSU

See UC Limitations & Counselor

Hours: 54 hours LEC ; 54 hours LAB

The organic chemistry portion of this course emphasizes the major classes of organic compounds: their structure, physical and chemical properties related to biological systems, and nomenclature. Some clinical and pharmacological aspects are also discussed. The biochemistry portion of this course emphasizes the structure and function of carbohydrates, proteins, and lipids in biological systems. Special topics include enzymes and enzyme regulation, drugs their bioavailability and metabolism.

CHEM 321

Environmental Chemistry

3 Units

Prerequisite: None

General Education: AA/AS Area IV; CSU Area B1; IGETC Area 5A

Course Transferable to UC/CSU

Hours: 54 hours LEC

This course explores the interrelationship of human beings and the surrounding environment with regard to the chemical substances that are encountered in everyday life. The role of chemistry in both creating environmental problems as well as providing solutions to environmental problems will be examined. Students will learn how chemicals released to the environment can have adverse effects on ecosystems and human health. Chemical and physical methods of controlling and remediating air, water, and soil pollutants will be covered. The role of environmental regulations in preventing and mitigating environmental degradation will also be covered. By the completion of this course, students will have acquired skills and techniques that can be utilized to examine environmental problems and their proposed solutions.

CHEM 322

Environmental Chemistry Laboratory

1 Unit

Prerequisite: None

Corequisite: CHEM 321 (may be taken previously)

General Education: CSU Area B3; IGETC Area 5A

Course Transferable to UC/CSU

Hours: 54 hours LAB

This course provides "hands-on" opportunities for students to collect and analyze data about chemicals found in the environment. Students will learn how to collect and analyze soil, water and air samples for environmental quality parameters and the presence of pollutants. Analysis of samples will involve the use of readily available field test equipment. Field trips for sample collection will take place during laboratory periods or at arranged times. There may also be field trips to environmental analytical laboratories.

CHEM 332

The Chemistry of Natural Products

4 Units

Prerequisite: None

General Education: AA/AS Area IV

Course Transferable to CSU

Hours: 54 hours LEC ; 54 hours LAB

This course covers an examination of economically important chemicals obtained from natural sources, with special emphasis on the essential oils of aromatic plants. Topics include the basic principles of organic chemistry; the structural classification of natural products; the stereochemical perception of aroma and flavor; the extraction, chemistry, and quality control of botanical essential oils; and the active-component phytochemicals of selected medicinal plants. Practical laboratory exercises (including essential oil distillation, phytochemical extraction and preparation of herbal balms, creams, soaps, and personal fragrances) will support the lecture portion of the course.

CHEM 400**General Chemistry****5 Units**

Prerequisite: CHEM 300 OR one year high school chemistry lecture and laboratory AND MATH 120 or the equivalent with a grade of "C" or better

General Education: AA/AS Area IV; CSU Area B1; CSU Area B3; IGETC Area 5A

Course Transferable to UC/CSU

See UC Limitations & Counselor

Hours: 54 hours LEC ; 108 hours LAB

This is a general college chemistry course intended for students majoring in the scientific disciplines including chemistry, biology, physics, geology and engineering. This course emphasizes the fundamental principles of chemistry. Topics include chemical measurement, physical and chemical processes, nomenclature, atomic structure, quantum theory, stoichiometry, molecular structure, bonding theory, physical properties of gases, thermochemistry, modern materials, and properties of solutions.

CHEM 401**General Chemistry****5 Units**

Prerequisite: CHEM 400 with a grade of "C" or better

General Education: CSU Area B1; CSU Area B3; IGETC Area 5A

Course Transferable to UC/CSU

See UC Limitations & Counselor

Hours: 54 hours LEC ; 108 hours LAB

This course is a continuation of the two-semester series in general college chemistry. Topics presented in the course include kinetics, equilibrium, acid/base chemistry, thermodynamics, electrochemistry, radiochemistry, coordination chemistry, and an introduction to organic chemistry. Laboratory exercises include qualitative and quantitative analysis techniques.

CHEM 410**Quantitative Analysis****5 Units**

Prerequisite: CHEM 401 with a grade of "C" or better

General Education: AA/AS Area IV; CSU Area B1; CSU Area B3

Course Transferable to UC/CSU

Hours: 54 hours LEC ; 108 hours LAB

This course focuses on the principles and techniques involved in fundamental gravimetric and volumetric analyses and separation techniques including methods of data analysis, precipitation, acid/base neutralization, complex formation, oxidation-reduction, spectroscopy and chromatography. Also included is an introduction to modern instrumental analytical procedures with emphasis on optical, electrochemical and chromatographic techniques. Emphasis throughout the course will be on sampling, calibration and method validation procedures.

CHEM 420**Organic Chemistry****5 Units**

Prerequisite: CHEM 401 with a grade of "C" or better

General Education: CSU Area B1; CSU Area B3; IGETC Area 5A

Course Transferable to UC/CSU

Hours: 54 hours LEC ; 108 hours LAB

This course surveys the principles of organic chemistry intended for chemistry and biological science majors or those students interested in the medical and related professions. Units covered include an in-depth study of the physical and chemical properties of organic compounds with emphasis on molecular structure, reactivity, and organic synthesis.

CHEM 421**Organic Chemistry****5 Units**

Prerequisite: CHEM 420 with a grade of "C" or better

General Education: CSU Area B1; CSU Area B3; IGETC Area 5A

Course Transferable to UC/CSU

Hours: 54 hours LEC ; 108 hours LAB

This course is a continuation of CHEM 420. Units covered include an in-depth study of the physical and chemical properties of aromatic compounds, aldehydes, ketones, amines, carboxylic acids and its derivatives. A special emphasis is placed on structural analysis/elucidation of these compounds by the various spectroscopic techniques. In addition, an introduction to pericyclic reactions and biomolecules is presented.

CHEM 495**Independent Studies in Chemistry****1-3 Units**

Prerequisite: None

Course Transferable to CSU

See UC Limitations & Counselor

Hours: 18 hours LEC ; 54 hours LAB

CHEM 498**Work Experience in Chemistry****1-4 Units**

Prerequisite: None

Course Transferable to CSU

Hours: 300 hours LAB

This course provides students with opportunities to develop marketable skills in preparation for employment or advancement within their current job. Course content will include understanding the application of education to the workforce; completion of required forms, which document the student's progress and hours spent at the work site; and developing workplace skills and competencies. During the course of the semester, the student is required to fulfill an 18 hour orientation and 75 hours of related paid work experience, or 60 hours of unpaid work experience for one unit. An additional 75 or 60 hours of related work experience is required for each additional unit. The course may be taken again when there is new or expanded learning on the job for a maximum of 16 units.

CHEM 499**Experimental Offering in Chemistry****.5-4 Units**

Prerequisite: None

Course Transferable to CSU

See UC Limitations & Counselor

Hours: 18 hours LEC ; 54 hours LAB