

CHEMISTRY (CHEM)

See Course Description Symbols and Terms (<https://catalog.csuchico.edu/academic-standards-policies/course-description-symbols-terms/>) for an explanation of course description terminology and symbols, the course numbering system, and course credit units.

CHEM 100 Chemistry and Current Issues 3 Units GE

Typically Offered: Fall and spring

Designed for non-science majors, this course will introduce students to some of the fundamental concepts of chemistry and illustrates how they apply to important contemporary issues, including nuclear power, water purification, alternative energy, climate change, and foods and drugs. 2 hours activity, 2 hours lecture. (001819)

General Education: Laboratory Activity (B3); Physical Science (B1)

Grade Basis: Graded

Repeatability: You may take this course for a maximum of 3 units

Course Attributes: Lower Division

CHEM 107 General Chemistry for Applied Sciences 4 Units GE

Prerequisite: GE Mathematics/Quantitative Reasoning Ready, Intermediate Algebra.

Typically Offered: Fall and spring

A survey of the principles of chemistry, primarily for students in agriculture, industry and technology, and pre-nursing. 3 hours laboratory, 3 hours lecture. (001826)

General Education: Laboratory Activity (B3); Physical Science (B1)

Grade Basis: Graded

Repeatability: You may take this course for a maximum of 4 units

Course Attributes: Lower Division

CHEM 108 Organic Chemistry for Applied Sciences 4 Units GE

Prerequisite: CHEM 107 or CHEM 111 or equivalent.

Typically Offered: Fall and spring

A survey of organic chemistry emphasizing the structure, properties, and reactions of all major functional groups of organic molecules. Not applicable towards a degree in chemistry or biochemistry. 3 hours laboratory, 3 hours lecture. (001828)

General Education: Laboratory Activity (B3); Physical Science (B1)

Grade Basis: Graded

Repeatability: You may take this course for a maximum of 4 units

Course Attributes: Lower Division

CHEM 111 General Chemistry I 4 Units GE

Prerequisite: GE Mathematics/Quantitative Reasoning Ready; second-year high school algebra; one year high school chemistry. (One year of high school physics and one year of high school mathematics past Algebra II are recommended.)

Typically Offered: Fall and spring

Principles of chemistry for students in science and engineering programs. Topics include atoms, molecules and ions, reactions, stoichiometry, the periodic table, bonding, chemical energy, gases, and solution chemistry. The laboratory sequence supports the above topics including both qualitative and quantitative experiments, analysis of data, and error propagation. 3 hours laboratory, 3 hours lecture. (001816)

General Education: Laboratory Activity (B3); Physical Science (B1)

Grade Basis: Graded

Repeatability: You may take this course for a maximum of 4 units

Course Attributes: Lower Division

CHEM 111X General Chemistry Fundamentals 1 Unit

Typically Offered: Fall and spring

Designed to give students a fundamental knowledge of chemistry to supplement prior chemistry knowledge in preparation for or in conjunction with CHEM 111. Provides students with the opportunity for additional assistance in developing chemistry knowledge and problem-solving abilities. 2 hours activity. (001830)

Grade Basis: Credit/No Credit

Repeatability: You may take this course for a maximum of 2 units

Course Attributes: Lower Division

CHEM 112 General Chemistry II 4 Units

Prerequisite: CHEM 111 with a grade of C- or higher.

Typically Offered: Fall and spring

A continuation of CHEM 111. Topics include kinetics, equilibrium, acid-base chemistry, electrochemistry, chemical thermodynamics, coordination chemistry, and nuclear chemistry. The laboratory sequence supports the above topics including both qualitative and quantitative experiments, analysis of data, and error propagation. 3 hours laboratory, 3 hours lecture. (001817)

Grade Basis: Graded

Repeatability: You may take this course for a maximum of 4 units

Course Attributes: Lower Division

CHEM 189 Internship in Chemistry 1-3 Units

Typically Offered: Fall and spring

9 hours supervision. (001844)

Grade Basis: Credit/No Credit

Repeatability: You may take this course for a maximum of 15 units

Course Attributes: Lower Division

CHEM 198 Special Topics 1-3 Units

Prerequisite: Department permission.

Typically Offered: Fall and spring

This course is for special topics offered for 1.0-3.0 units. Typically the topic is offered on a one-time-only basis and may vary from term to term and be different for different sections. See the Class Schedule for the specific topic being offered. 3 hours lecture. (001846)

Grade Basis: Graded

Repeatability: You may take this course more than once

Course Attributes: Lower Division

CHEM 270 Organic Chemistry I 4 Units

Prerequisite: CHEM 112.

Typically Offered: Fall and spring

A study of the fundamental principles of organic chemistry: the chemistry of carbon compounds. Lecture topics include structure, bonding, nomenclature, physical properties of organic compounds, stereochemistry, basic spectroscopy, and basic chemical reactions and their mechanisms. Laboratory topics include the discussion and application of organic laboratory techniques, reactions, and an introduction to organic synthesis. 3 hours laboratory, 3 hours lecture. (001840)

Grade Basis: Graded

Repeatability: You may take this course for a maximum of 4 units

Course Attributes: Lower Division

<p>CHEM 320 Quantitative Analysis 4 Units Prerequisite: CHEM 112 with a grade of C- or higher. Typically Offered: Fall and spring Precision and accuracy in measurements, interpretation of data by statistical analysis, and development of good quantitative techniques. Analysis by gravimetry, titrimetry, potentiometry, chromatography, and spectrometry. 2 hours discussion, 6 hours laboratory. (001847) Grade Basis: Graded Repeatability: You may take this course for a maximum of 4 units Course Attributes: Upper Division</p>	<p>CHEM 370 Organic Chemistry II 3 Units Prerequisite: CHEM 270 with a grade of C- or higher. Typically Offered: Fall and spring A continuation of CHEM 270. Topics include properties and reactions of ethers, conjugated systems, aromatic compounds, aldehydes and ketones, amines, carboxylic acids and derivatives, and biologically relevant molecules. 3 hours discussion. (001852) Grade Basis: Graded Repeatability: You may take this course for a maximum of 3 units Course Attributes: Upper Division</p>
<p>CHEM 331 Physical Chemistry I 3 Units Prerequisite: CHEM 370M, MATH 220; PHYS 202A and PHYS 202B or PHYS 204A, PHYS 204B, and PHYS 204C. Typically Offered: Fall only Overview of fundamental principles of time-independent quantum mechanics and spectroscopy, statistical thermodynamics, and chemical kinetics. 3 hours discussion. (001882) Grade Basis: Graded Repeatability: You may take this course for a maximum of 3 units Course Attributes: Upper Division</p>	<p>CHEM 370L Organic Chemistry Laboratory 1 Unit Prerequisite: CHEM 370 (may be taken concurrently). Typically Offered: Fall and spring Laboratory continuation of CHEM 270. Laboratory experiments in organic chemistry focused on topics discussed in CHEM 370. Not applicable towards a degree in chemistry or biochemistry. 3 hours laboratory. (001856) Grade Basis: Graded Repeatability: You may take this course for a maximum of 1 unit Course Attributes: Upper Division</p>
<p>CHEM 332 Physical Chemistry II 3 Units Prerequisite: CHEM 331 with a grade C- or higher. Typically Offered: Spring only In-depth exploration of quantum mechanics and spectroscopy, classical thermodynamics, and chemical and phase equilibria. 3 hours discussion. (001883) Grade Basis: Graded Repeatability: You may take this course for a maximum of 3 units Course Attributes: Upper Division</p>	<p>CHEM 370M Organic Chemistry Laboratory 2 Units Prerequisite: CHEM 370 (may be taken concurrently). Typically Offered: Fall and spring An in-depth laboratory experience in organic chemistry for chemistry and biochemistry majors. Students are introduced to and become competent in modern laboratory techniques, including handling air-sensitive reagents and column chromatography. Students also get hands-on experience with advanced instrumentation. Completes the two-semester organic lab sequence for chemistry majors. 6 hours laboratory. (001853) Grade Basis: Graded Repeatability: You may take this course for a maximum of 2 units Course Attributes: Upper Division</p>
<p>CHEM 350 Introductory Biochemistry 3 Units Prerequisite: CHEM 108 or CHEM 270. Typically Offered: Fall and spring A survey of biochemistry, principally for nutrition and exercise physiology majors. 3 hours discussion. (001849) Grade Basis: Graded Repeatability: You may take this course for a maximum of 3 units Course Attributes: Upper Division</p>	<p>CHEM 381 Integrated Chemistry Laboratory I 2 Units Prerequisite: CHEM 331 (may be taken concurrently), CHEM 361 (may be taken concurrently), CHEM 370M. Typically Offered: Fall and spring Integrated application of concepts and techniques in analytical, inorganic, and physical chemistry with supervised studies in individual literature searches, including the use of Chemical Abstracts, Patent Indexes, and other reference compilations. 6 hours laboratory. (001885) Grade Basis: Graded Repeatability: You may take this course for a maximum of 2 units Course Attributes: Upper Division</p>
<p>CHEM 350L Introductory Biochemistry Laboratory 1 Unit Prerequisite: CHEM 350 (may be taken concurrently). Typically Offered: Fall and spring Fundamental laboratory studies and examination of the major classes of biological compounds. Principally for agriculture, child development, and nursing students. Normally not open to chemistry or biological sciences majors. 3 hours laboratory. (001850) Grade Basis: Graded Repeatability: You may take this course for a maximum of 1 unit Course Attributes: Upper Division</p>	<p>CHEM 382 Integrated Chemistry Laboratory II 2 Units Prerequisite: CHEM 331, CHEM 361, CHEM 381. Typically Offered: Fall only A continuation of CHEM 381. 6 hours laboratory. (001886) Grade Basis: Graded Repeatability: You may take this course for a maximum of 2 units Course Attributes: Upper Division</p>
<p>CHEM 361 Inorganic Chemistry 3 Units Prerequisite: CHEM 112; MATH 220; PHYS 202A and PHYS 202B or PHYS 204A, PHYS 204B, and PHYS 204C. Typically Offered: Spring only Emphasis on description and theory of inorganic substances: atomic structure; ionic and covalent bonding; acid-base concepts of inorganic substances; structure, bonding, thermodynamics, and reaction mechanisms of transition metal complexes; organometallic chemistry and catalysis; and bioinorganic chemistry. 3 hours lecture. (001887) Grade Basis: Graded Repeatability: You may take this course for a maximum of 3 units Course Attributes: Upper Division</p>	<p>CHEM 389 Internship in Chemistry 1-3 Units Typically Offered: Fall and spring 9 hours supervision. (001865) Grade Basis: Credit/No Credit Repeatability: You may take this course for a maximum of 15 units Course Attributes: Upper Division</p>

<p>CHEM 398 Special Topics 1-3 Units Typically Offered: Fall and spring This course is for special topics offered for 1.0-3.0 units. Typically the topic is offered on a one-time-only basis and may vary from term to term and be different for different sections. See the Class Schedule for the specific topic being offered. 0 hours lecture. (001872) Grade Basis: Graded Repeatability: You may take this course more than once Course Attributes: Upper Division</p>	<p>CHEM 452 Biochemistry II 3 Units Prerequisite: CHEM 451. Typically Offered: Spring only Advanced topics in biochemistry. Biosynthesis of lipids, steroids, amino acids, and nucleotides. Comprehensive study of the chemical role of DNA and RNA in replication, transcription, protein synthesis, and viral activity. 3 hours discussion. (001901) Grade Basis: Graded Repeatability: You may take this course for a maximum of 3 units Course Attributes: Upper Division</p>
<p>CHEM 399 Special Problems 1-3 Units Prerequisite: CHEM 112, faculty permission. Typically Offered: Fall and spring This course is an independent study of special problems and is offered for 1.0-3.0 units. You must register directly with a supervising faculty member. 9 hours supervision. (001873) Grade Basis: Credit/No Credit Repeatability: You may take this course for a maximum of 6 units Course Attributes: Upper Division</p>	<p>CHEM 453L Biochemistry Laboratory 1 Unit Prerequisite: CHEM 451 (may be taken concurrently). Recommended: CHEM 370L or CHEM 370M. Typically Offered: Fall and spring Separation, identification, and/or analysis of biological materials by modern procedures, such as spectrophotometry, chromatography (gas, TLC, column, ion exchange), electrophoresis, enzymology, fluorimetry, and high-speed centrifugation. Fulfills laboratory requirement for certain biological science majors. Does not fulfill requirement for biochemistry major. 3 hours laboratory. (021067) Grade Basis: Graded Repeatability: You may take this course for a maximum of 1 unit Course Attributes: Upper Division</p>
<p>CHEM 401W Communicating Chemistry (W) 3 Units W, GW Prerequisite: GE Written Communication (A2) requirement, CHEM 320, CHEM 370; either CHEM 331, CHEM 361, or CHEM 451. Typically Offered: Fall only This course helps students improve their skills in written communication and oral communication of chemical and biochemical information. The course centers on one particular topic within chemistry and biochemistry (chosen by the instructor) and students are asked to prepare short papers, long papers, and oral presentations focused on that topic. 2 hours activity, 2 hours discussion. (021609) Grade Basis: Graded Repeatability: You may take this course for a maximum of 3 units Course Attributes: Upper Division; Writing Course; Graduation Writing Assessment</p>	<p>CHEM 453MW Biochemistry Laboratory (W) 3 Units W Prerequisite: CHEM 370M. Corequisites: CHEM 451. Typically Offered: Fall and spring Separation, identification, and/or analysis of biological materials by modern procedures, such as spectrophotometry, chromatography (gas, TLC, column, ion exchange), electrophoresis, enzymology, fluorimetry, and high-speed centrifugation. This course fulfills laboratory requirements for biochemistry majors. 6 hours laboratory, 1 hour lecture. (021068) Grade Basis: Graded Repeatability: You may take this course for a maximum of 3 units Course Attributes: Upper Division; Writing Course</p>
<p>CHEM 420 Instrumental Analysis 3 Units Prerequisite: CHEM 332. Typically Offered: Fall only Theory and procedures used in separations and instrumental analysis. Emphasis on rational design of instrumental conditions based on experiment goals. Topics include atomic and molecular spectroscopies, separation methods, and electroanalytical chemistry. 3 hours discussion. (001892) Grade Basis: Graded Repeatability: You may take this course for a maximum of 3 units Course Attributes: Upper Division</p>	<p>CHEM 477 Seminar in Organic Spectroscopy 1 Unit Prerequisite: Concurrent enrollment in or prior completion of CHEM 370. Typically Offered: Fall and spring A course whose objectives is to help students become experts at the structural determination of organic compounds using modern spectroscopic methods, including IR, UV-Vis, mass spectra, and 1D and 2D NMR techniques. 1 hour seminar. (001905) Grade Basis: Graded Repeatability: You may take this course for a maximum of 1 unit Course Attributes: Upper Division</p>
<p>CHEM 451 Biochemistry I 3 Units Prerequisite: CHEM 370 with a grade of C- or higher. Typically Offered: Fall and spring A general study of the chemistry of biomolecules. Conformation and function of enzymes and other proteins; metabolism, energy generation, and storage; brief discussion of important physiological processes. 3 hours discussion. (001900) Grade Basis: Graded Repeatability: You may take this course for a maximum of 3 units Course Attributes: Upper Division</p>	<p>CHEM 483W Integrated Chemistry Laboratory III (W) 2 Units W Prerequisite: CHEM 381, CHEM 382, CHEM 420. Typically Offered: Spring only A continuation of CHEM 382, with a specific emphasis on independent experimental design and use of instruments. Students design, carry out, and orally present their findings for 2-3 major projects. 6 hours laboratory. (001889) Grade Basis: Graded Repeatability: You may take this course for a maximum of 2 units Course Attributes: Upper Division; Writing Course</p>

CHEM 489 Internship in Chemistry 1-3 Units**Typically Offered:** Fall and spring

9 hours supervision. (001923)

Grade Basis: Credit/No Credit**Repeatability:** You may take this course for a maximum of 15 units**Course Attributes:** Upper Division**CHEM 490 Research in Chemistry 1-2 Units****Prerequisite:** CHEM 332.**Typically Offered:** Fall and spring

This course is an independent study offered for 1.0-2.0 units. You must register directly with a supervising faculty member. Original laboratory or library investigation under individual faculty supervision. 6 hours supervision. (001875)

Grade Basis: Graded**Repeatability:** You may take this course for a maximum of 4 units**Course Attributes:** Upper Division**CHEM 491 Research Project 3 Units****Prerequisite:** Open by invitation to chemistry majors with a GPA of 3.0 or higher; faculty permission.**Typically Offered:** Fall and spring

A research project within chemistry or an interdisciplinary project which involves chemistry. Students will be involved with design, library, laboratory, and data analysis aspects of a research problem. 9 hours supervision. (001921)

Grade Basis: Graded**Repeatability:** You may take this course for a maximum of 6 units**Course Attributes:** Upper Division**CHEM 498 Special Topics 1-3 Units****Prerequisite:** Department permission.**Typically Offered:** Fall and spring

This course is for special topics offered for 1.0-3.0 units. Typically the topic is offered on a one-time-only basis and may vary from term to term and be different for different sections. See the Class Schedule for the specific topic being offered. 3 hours lecture. (001925)

Grade Basis: Graded**Repeatability:** You may take this course more than once**Course Attributes:** Upper Division**CHEM 499 Special Problems 1-3 Units****Prerequisite:** Faculty permission.**Typically Offered:** Fall and spring

This course is an independent study of special problems offered for 1.0-3.0 units. You must register directly with a supervising faculty member. 3 hours supervision. (001926)

Grade Basis: Credit/No Credit**Repeatability:** You may take this course for a maximum of 6 units**Course Attributes:** Upper Division**CHEM 499HW Honors Research Project (W) 3 Units W, GW****Prerequisite:** GE Written Communication (A2) requirement, CHEM 320, CHEM 331, CHEM 332, CHEM 370M, MATH 220, PHYS 204A, PHYS 204B, PHYS 204C; faculty permission.**Typically Offered:** Fall and spring

Open by invitation to chemistry majors who have a GPA of 3.5 or higher. Not open to students who have credit for CHEM 491 or CHEM 492. This is an "Honors in the Major" course. 9 hours supervision. (001927)

Grade Basis: ABC/No Credit**Repeatability:** You may take this course for a maximum of 6 units**Course Attributes:** Upper Division; Writing Course; Graduation Writing Assessment