CHEMISTRY (CHEM)

CHEM 1A • GENERAL CHEMISTRY

Units: 5
Hours: 3 lecture, 6 laboratory per week (108 total per quarter)
Prerequisite: Satisfactory score on the chemistry placement test or CHEM 25; Intermediate Algebra or equivalent.
Advisory: MATH 48A or equivalent Precalculus I course; not open to students with credit in CHEM 1AH.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Area III: Natural Sciences
Transferable: CSU/UC
Grade Type: Letter Grade (Request for Pass/No Pass)
Repeatability: Not Repeatable

Fundamental chemical principles with an emphasis on physical and chemical properties, stoichiometry, chemical reaction types, thermochemistry, modern atomic theory and atomic structure, chemical bonding and bonding theory, and molecular shapes. Laboratory component parallels lecture topics and also includes chemical nomenclature, basic chemical equations, stoichiometry, unknown analysis, and fundamentals of oxidation and reduction.

CHEM 1B • GENERAL CHEMISTRY

Units: 5
Hours: 3 lecture, 6 laboratory per week (108 total per quarter)
Prerequisite: CHEM 1A.
Advisory: MATH 48B or equivalent Precalculus II course; not open to students with credit in CHEM 1BH.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Non-GE
Transferable: CSU/UC
Grade Type: Letter Grade (Request for Pass/No Pass)
Repeatability: Not Repeatable

Kinetic molecular theory and gas laws, intermolecular forces, chemical kinetics, equilibria, behavior of acids and bases, acid/base equilibrium, and classical thermodynamics. Laboratory parallels lecture topics and includes computer graphing techniques, chemical kinetics, equilibrium measurements, heat transfer experiments, thermodynamics of an equilibrium system, vapor pressure of liquids.

CHEM 1C • GENERAL CHEMISTRY & QUALITATIVE ANALYSIS

Units: 5
Hours: 3 lecture, 6 laboratory per week (108 total per quarter)
Prerequisite: CHEM 1B.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Non-GE
Transferable: CSU/UC
Grade Type: Letter Grade (Request for Pass/No Pass)
Repeatability: Not Repeatable

Aqueous ionic equilibria of buffers, solubility product constants and formation constants; properties of solutions, including factors affecting solubility, energy changes in the solution process and colligative properties; electrochemistry, including the thermodynamics of voltaic cells; introduction to coordination chemistry and bonding theory; nuclear chemistry with emphasis on applications; and, time permitting, an introduction to modern materials. Laboratory parallels lecture topics with an introduction to qualitative inorganic analysis.

CHEM 12A • ORGANIC CHEMISTRY

Units: 4
Hours: 4 lecture per week (48 total per quarter)
Prerequisite: CHEM 1C.
Advisory: Concurrent enrollment in CHEM 12AL recommended, as CHEM 12A and 12AL are required for progression to CHEM 12B.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Non-GE
Transferable: CSU/UC
Grade Type: Letter Grade (Request for Pass/No Pass)
Repeatability: Not Repeatable

This course is the first of a three quarter course describing the chemistry of organic (carbon containing) compounds. Emphasis on structure-reactivity relationships and mechanisms of functional group transformations. For science majors and students pursuing professional careers in dentistry, medicine, pharmacy, or veterinary medicine. Generally not appropriate for nursing majors (see CHEM 30B).

CHEM 12AL • ORGANIC CHEMISTRY LABORATORY

Units: 2
Hours: 6 laboratory per week (72 total per quarter)
Corequisite: Completion of or concurrent enrollment in CHEM 12A.
Advisory: Not open to students with credit in CHEM 13AH.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Non-GE
Transferable: CSU/UC
Grade Type: Letter Grade Only
Repeatability: Not Repeatable

Laboratory course to accompany CHEM 12A. Intended to introduce students to laboratory techniques common in modern synthetic organic chemistry. Students will work on both standard preparative scale and microscale to synthesize, isolate, purify and characterize organic compounds.

CHEM 12B • ORGANIC CHEMISTRY

Units: 4
Hours: 4 lecture per week (48 total per quarter)
Prerequisite: CHEM 12A and CHEM 12AL.
Advisory: Concurrent enrollment in CHEM 12BL recommended, as CHEM 12B and 12BL are required for progression to CHEM 12C.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Non-GE
Transferable: CSU/UC
Grade Type: Letter Grade (Request for Pass/No Pass)
Repeatability: Not Repeatable

This course is the continuation of CHEM 12A. Emphasis is on structure-reactivity relationships of organic compounds, mechanisms of functional group transformations, and synthesis of organic target compounds from simple precursors. For chemistry, biological science, environmental science majors, and for pre-professional students in dentistry, medicine, pharmacy, veterinary medicine or any other interested students who have mastered the prerequisites.

CHEM 12BL • ORGANIC CHEMISTRY LABORATORY

Units: 2
Hours: 6 laboratory per week (72 total per quarter)
Prerequisite: CHEM 12AL.
Corequisite: Completion of or concurrent enrollment in CHEM 12B.
Advisory: Not open to students with credit in CHEM 13BH.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Non-GE
Transferable: CSU/UC
Grade Type: Letter Grade Only
Repeatability: Not Repeatable

Laboratory course to accompany CHEM 12B. Emphasis is on spectroscopic methods for the structure elucidation of organic compounds. Provides extensive practice in the synthesis, purification, isolation and characterization of organic target molecules. For chemistry and other STEM majors, and for pre-professional students in dentistry, medicine, pharmacy, veterinary medicine or any other interested students that have mastered the prerequisites.

CHEM 12C • ORGANIC CHEMISTRY

Units: 4
Hours: 4 lecture per week (48 total per quarter)
Prerequisite: CHEM 12B and CHEM 12BL.
Advisory: Concurrent enrollment in CHEM 12CL recommended, as CHEM 12CL is major transfer requirement - please consult a counselor.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Non-GE
Transferable: CSU/UC
Grade Type: Letter Grade (Request for Pass/No Pass)
Repeatability: Not Repeatable

The third and final quarter of organic chemistry expands the study of functional groups to include ketones, aldehydes, carboxylic acids and its derivatives, and amines. Also introduces the chemistry of polyfunctional, biologically active molecules such as proteins and carbohydrates. Continued emphasis on structure-reactivity relationships, mechanisms of reaction and multi-step syntheses. For chemistry and other STEM majors as well as any pre-professional students studying for careers in dentistry, medicine, pharmacy, veterinary medicine and for any other interested students who have mastered the prerequisites.

CHEM 12CL • ORGANIC CHEMISTRY LABORATORY

Units: 2
Hours: 6 laboratory per week (72 total per quarter)
Prerequisite: CHEM 12BL.
Corequisite: Completion of or concurrent enrollment in CHEM 12C.
Advisory: Not open to students with credit in CHEM 13CH.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Non-GE
Transferable: CSU/UC
Grade Type: Letter Grade Only
Repeatability: Not Repeatable

Laboratory course to accompany CHEM 12C. Intended to strengthen skill in application of laboratory techniques, and to encourage independent work. Emphasis is on chemical reactions relevant to CHEM 12C, multi-step syntheses, and identification of unknowns.

CHEM 25 • FUNDAMENTALS OF CHEMISTRY

Units: 5
Hours: 4 lecture, 3 laboratory per week (84 total per quarter)
Prerequisite: Intermediate Algebra or equivalent.
Advisory: UC will grant transfer credit for a maximum of one course from the following: CHEM 25, 30A or 30B.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Area III: Natural Sciences
Transferable: CSU/UC
Grade Type: Letter Grade (Request for Pass/No Pass)
Repeatability: Not Repeatable

The course includes basic chemical laboratory techniques and methods, a survey of important chemical principles with emphasis on problem solving, and a description of the elements and their compounds. Intended for students who wish to meet general education requirements in physical science or need background preparation for CHEM 1A.

CHEM 30A • SURVEY OF INORGANIC & ORGANIC CHEMISTRY

Units: 5
Hours: 4 lecture, 3 laboratory per week (84 total per quarter)
Prerequisite: Elementary Algebra or equivalent.
Advisory: UC will grant transfer credit for a maximum of one course from the following: CHEM 25, 30A or 30B.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Area III: Natural Sciences
Transferable: CSU/UC
Grade Type: Letter Grade (Request for Pass/No Pass)
Repeatability: Not Repeatable

An introductory course covering basic principles of chemistry more descriptive than quantitative in emphasis. Topics include atomic structure, the periodic table, the three states of matter, energy, chemical bonding in ionic and molecular compounds, nomenclature, measurement and the metric system, chemical reactions and equations, solutions, acids, bases, salts and electrolyte systems. Primarily intended for students entering the allied health field, including: nursing, veterinary technology, dental assistant, dental hygiene, biotechnology, primary care associate, radiation therapy technology, radiologic technology, respiratory therapy, and pharmaceutical technology.

CHEM 30B • SURVEY OF ORGANIC & BIOCHEMISTRY

Units: 5
Hours: 4 lecture, 3 laboratory per week (84 total per quarter)
Prerequisite: CHEM 30A.
Advisory: UC will grant transfer credit for a maximum of one course from the following: CHEM 25, 30A or 30B.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Non-GE
Transferable: CSU/UC
Grade Type: Letter Grade (Request for Pass/No Pass)
Repeatability: Not Repeatable

Basic principles of organic chemistry and biological chemistry. Topics include organic chemistry nomenclature, functional groups, and an introduction to structure and properties of carbohydrates, lipids, nucleic acids, proteins and enzymes. An overview of metabolism will also be given. Primarily intended for students entering the allied health field, including: nursing, dental hygiene, and biotechnology.

CHEM 70R • INDEPENDENT STUDY IN CHEMISTRY

Units: 1
Hours: 3 laboratory per week (36 total per quarter)
Advisory: Recommended preparation will be determined by instructor after interviewing the student pre-contract.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Non-GE
Transferable: CSU
Grade Type: Letter Grade (Request for Pass/No Pass)
Repeatability: Not Repeatable

Provides an opportunity for the student to expand their studies in chemistry by completing a project or an assignment arranged by agreement between the student and instructor. The student is required to contract with the instructor to determine the scope of the assignment and the unit value assigned for successful completion. Students may take a maximum of 6 units of independent study coursework per department.

CHEM 71R • INDEPENDENT STUDY IN CHEMISTRY

Units: 2
Hours: 6 laboratory per week (72 total per quarter)
Advisory: Recommended preparation will be determined by instructor after interviewing the student pre-contract.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Non-GE
Transferable: CSU
Grade Type: Letter Grade (Request for Pass/No Pass)
Repeatability: Not Repeatable

Provides an opportunity for the student to expand their studies in chemistry by completing a project or an assignment arranged by agreement between the student and instructor. The student is required to contract with the instructor to determine the scope of the assignment and the unit value assigned for successful completion. Students may take a maximum of 6 units of independent study coursework per department.

CHEM 72R • INDEPENDENT STUDY IN CHEMISTRY

Units: 3
Hours: 9 laboratory per week (108 total per quarter)
Advisory: Recommended preparation will be determined by instructor after interviewing the student pre-contract.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Non-GE
Transferable: CSU
Grade Type: Letter Grade (Request for Pass/No Pass)
Repeatability: Not Repeatable

Provides an opportunity for the student to expand their studies in chemistry by completing a project or an assignment arranged by agreement between the student and instructor. The student is required to contract with the instructor to determine the scope of the assignment and the unit value assigned for successful completion. Students may take a maximum of 6 units of independent study coursework per department.

CHEM 73R • INDEPENDENT STUDY IN CHEMISTRY

Units: 4
Hours: 12 laboratory per week (144 total per quarter)
Advisory: Recommended preparation will be determined by instructor after interviewing the student pre-contract.
Degree and Credit Status: Degree-Applicable Credit Course
Foothill GE: Non-GE
Transferable: CSU
Grade Type: Letter Grade (Request for Pass/No Pass)
Repeatability: Not Repeatable

Provides an opportunity for the student to expand their studies in chemistry by completing a project or an assignment arranged by agreement between the student and instructor. The student is required to contract with the instructor to determine the scope of the assignment and the unit value assigned for successful completion. Students may take a maximum of 6 units of independent study coursework per department.

CHEM 81 • LEARNERS ENGAGED IN ADVOCATING FOR DIVERSITY IN STEM

Units:	4
Hours:	4 lecture per week (48 total per quarter)
Advisory:	BIOL 1A, 40A, 41, or equivalent; ENGL 1A or 1AH or ESLL 26 or equivalent; not open to students with credit in BIOL 81, C S 81, or MATH 83.
Degree and Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Area VII: Lifelong Learning
Transferable:	CSU
Grade Type:	Letter Grade Only
Repeatability:	Not Repeatable
Cross-Listed:	BIOL 81 C S 81 MATH 83

This course is intended for students interested in equity, diversity, and inclusion in the sciences. Students will explore research on inclusion and diversity in STEM and health science, as well as research on interventions to enhance inclusion and diversity in those fields in higher education contexts. Students will reflect on how their own identities have impacted their experiences in science and develop strategies to promote equity in their future STEM or health science careers. Through service learning, students will co-author culturally relevant curricular materials that will expand faculty capacity to connect students' personal lives to course content. Materials developed by students will be used and assessed in STEM and/or health science courses at Foothill College, local middle schools, and/or local high schools, and will be made available for a nationwide audience of teachers and professors.