

# CHEMISTRY (CHM)

## CHM 1000 Preparation for General Chemistry (2 Credits)

CHM 1000 aims for students to learn algebra applied to the natural laws of general chemistry, numerical literacy, significant figures, precision of instruments, properly recording instrumental uncertainties, propagating uncertainties, converting units, stoichiometry, scientific notation, metric prefixes, labelling units, dimensional analysis, math involving logarithmic natural laws, and interpreting and using information embedded in the periodic table of elements. This course is intended to prepare students for CHM 1211 if the student did not pass the Chemistry Placement Exam or if the student chooses not to take CHM 1310. Typically offered: Autumn.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201000>)

## CHM 1100 Introduction to Chemistry (5 Credits)

Prerequisites: One and a half years of high school mathematics (including algebra) and completion of the Chemistry Placement Test. This course is not recommended for students who have completed one year of high school chemistry. Examines the structure of matter and the tools and methods used by the chemist. Simple reactions and some current applications are studied. Can be used as preparation for CHM 1211. Includes laboratory.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201100>)

## CHM 1100L Introduction to Chemistry Lab (0 Credit)

Lab Component of CHM 1100.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201100L>)

## CHM 1110 Introduction to the Nature of Science (5 Credits)

Provides a lecture, discussion and student participation course in the physical sciences with a chemistry emphasis. Examines basic revolutions in the development of scientific views and their relationships to religious faith and human values. Also examines selected scientific concepts and theories. Provides preparation for informed decision making on some current and future societal issues.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201110>)

## CHM 1211 General Chemistry I (5 Credits)

Introduces properties of matter, stoichiometry, chemical reactions, properties of gases, thermochemistry, states of matter, chemical bonding, and atomic and molecular structure. Includes laboratory.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201211>)

## CHM 1211L General Chemistry I Lab (0 Credit)

Lab component of CHM 1211.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201211L>)

## CHM 1212 General Chemistry II (5 Credits)

The second in a series of three general chemistry courses that cumulatively include properties of matter; atomic, molecular, and electronic structure; chemical bonding; chemical reactions and stoichiometry; thermochemistry; states of matter and properties of solids, liquids, solutions, and gases; chemical equilibrium; acids and bases; kinetics; nuclear chemistry; and electrochemistry. Includes lab.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201212>)

## CHM 1212L General Chemistry II Lab (0 Credit)

Lab Component of CHM 1212.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201212L>)

## CHM 1213 General Chemistry III (3 Credits)

The culmination of a series of three general chemistry courses that cumulatively include properties of matter; atomic, molecular, and electronic structure; chemical bonding; chemical reactions and stoichiometry; thermochemistry; states of matter and properties of solids, liquids, solutions, and gases; chemical equilibrium; acids and bases; kinetics; nuclear chemistry; and electrochemistry.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201213>)

## CHM 1310 Survey of General Chemistry (5 Credits)

Survey of topics from general chemistry, including atoms and molecules, bonding, types of chemical reactions, energy, solutions, equilibrium, and acids and bases. Includes laboratory.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201310>)

## CHM 1310L Survey of General Chemistry Lab (0 Credit)

Lab Component of CHM 1310.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201310L>)

## CHM 1330 Survey of Organic Chemistry (5 Credits)

Studies simpler laws of organic chemistry, nomenclature, classification, and reactivity of various functional groups, including simple carbohydrates. Includes laboratory.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201330>)

## CHM 1330L Survey of Organic Chemistry Lab (0 Credit)

Lab Component of CHM 1330.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201330L>)

## CHM 1360 Survey of Biological Chemistry (5 Credits)

Covers the structures and functions of biological molecules, cell structure, bioenergetics, metabolic pathways, and molecular genetics. Includes laboratory.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201360>)

## CHM 1360L Survey of Biological Chemistry Lab (0 Credit)

Lab Component of CHM 1360.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%201360L>)

## CHM 2213 Inorganic Qualitative Analysis (2 Credits)

Laboratory-oriented course with experiments in qualitative analysis of aqueous inorganic ions, electrochemistry, and synthesis and characterization of main group and transition metal compounds.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%202213>)

## CHM 2213L Inorganic Qualitative Analysis Lab (0 Credit)

Lab Component of CHM 2213.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%202213L>)

**CHM 2410 Environmental Chemistry and Sustainability (5 Credits)**

This course is a study tour of New Zealand. Topics covered include atmospheric chemistry, air pollution, climate change and energy, and agricultural influences on the environment. The class is interdisciplinary in nature, with a strong emphasis on the relationship between chemical and financial sustainability. Interplay between Maori culture and issues of sustainability are also explored.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%202410>)

**CHM 2930 Chemistry Practicum (1-3 Credit)**

CHM 2930 Chemistry Practicum (1-3) Registration approval: Instructor. Selected students are assigned teaching, grading, laboratory preparation, and/or tutoring responsibilities. Typically offered: Autumn, Winter, Spring.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%202930>)

**CHM 2960 Introduction to Research Methods (1 Credit)**

Designed for chemistry and biochemistry majors as an introduction to the skills and methods used for research in the chemical sciences.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%202960>)

**CHM 3225 Quantitative Analysis and Equilibrium (5 Credits)**

Laboratory-oriented course dealing with chemical equilibria in solution and their applications to quantitative analysis. Some types of reactions to be studied are precipitation, acid-base, complex formation, and oxidation-reduction. Traditional wet chemical and instrumental methods will be used.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203225>)

**CHM 3225L Quantitative Analysis and Equilibrium Lab (0 Credit)**

Lab Component of CHM 3225.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203225L>)

**CHM 3226 Quantitative and Instrumental Analysis (5 Credits)**

Prerequisite: CHM 3225. Laboratory oriented course, dealing with the theory and practice of quantitative analytical chemistry with emphasis on instrumental techniques. Instrumental analysis will include a variety of separation, spectroscopic and electrochemical methods, possibly including engineering and clinical applications. Typically offered: Spring.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203226>)

**CHM 3226L Quantitative and Instrumental Analysis Lab (0 Credit)**

Lab component of CHM 3226 Typically offered: Spring.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203226L>)

**CHM 3227 Separation Science (2 Credits)**

Laboratory-oriented course dealing with the theory and practice of separation science (e.g., solvent extraction and chromatography). The laboratory will emphasize techniques of quantitative and instrumental analytical chromatography.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203227>)

**CHM 3228 Electroanalytical Chemistry (2 Credits)**

Laboratory-oriented course dealing with the theory and practice of electroanalytical chemistry. The laboratory exercises will be selected from quantitative analytical techniques of conductometry, potentiometry, coulometry, electrogravimetry, amperometry, and voltammetry.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203228>)

**CHM 3229 Analytical Spectroscopy (2 Credits)**

Laboratory-oriented course dealing with the theory and practice of atomic and molecular spectroscopy, especially as applied to quantitative analytical chemistry and molecular biology. The lectures and labs will include various topics of absorption, emission, and scattering techniques.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203229>)

**CHM 3371 Organic Chemistry I (5 Credits)**

This is the introductory course in organic chemistry. It reviews topics such as stoichiometry, acids and bases, structure and bonding theory, nomenclature, synthesis, thermodynamics, functional groups, and reaction mechanisms as applied to organic chemistry. Laboratory work will emphasize basic methods of separation and purification representative substances.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203371>)

**CHM 3371L Organic Chemistry I Lab (0 Credit)**

Lab Component of CHM 3371.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203371L>)

**CHM 3372 Organic Chemistry II (5 Credits)**

A continuation of CHM 3371. Continues studies of principles of nomenclature, synthesis, thermodynamics, structure, and reaction mechanisms to a broadening collection of organic functional groups. Introduces spectroscopic methods. Laboratory work will emphasize basic methods of synthesis of representative compounds, and obtaining their spectra and other properties.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203372>)

**CHM 3372L Organic Chemistry II Lab (0 Credit)**

Lab Component of CHM 3372.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203372L>)

**CHM 3373 Organic Chemistry III (5 Credits)**

A continuation of CHM 3372. Completes a survey of the properties of common organic functional groups and introduces topics of bio-organic chemistry. Laboratory includes some qualitative identification of unknown organic compounds using chemical, physical, and instrumental techniques.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203373>)

**CHM 3373L Organic Chemistry III Lab (0 Credit)**

Lab Component of CHM 3373.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203373L>)

**CHM 3410 Survey of Physical Chemistry (5 Credits)**

A survey of physical chemistry topics, such as thermodynamics, kinetics, quantum chemistry and spectroscopy, including life science applications. Includes laboratory.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203410>)

**CHM 3410L Survey of Physical Chemistry Lab (0 Credit)**

Lab Component of CHM 3410.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203410L>)

**CHM 3421 Quantum Mechanics (4 Credits)**

This course provides the underlying framework for a molecules-first approach to physical chemistry. Topics covered include the fundamentals of quantum chemistry and their application to bonding, spectroscopy, and computational chemistry.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203421>)

**CHM 3422 Statistical Thermodynamics (4 Credits)**

Studies thermodynamics, emphasis is placed on insight into the microscopic interactions responsible for bulk thermodynamic properties.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203422>)

**CHM 3423 Molecular Dynamics (2 Credits)**

Studies dynamic processes in chemical systems. Topics covered include kinetics of molecular motion and reaction in the gas and condensed phases. The structure of solids and heterogeneous reactions on surfaces are also considered.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203423>)

**CHM 3461 Physical Chemistry Laboratory I (2 Credits)**

Provides opportunity for several experiments with an extensive written report for each experiment. Considerable emphasis will be on data, precision, and error analysis. May include computer applications.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203461>)

**CHM 3462 Physical Chemistry Laboratory II (2 Credits)**

Continuation of CHM 3461. Provides opportunity for several experiments with an extensive written report for each experiment. Considerable emphasis will be on data, precision, and error analysis. May include computer applications.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203462>)

**CHM 3540 Introductory Inorganic Chemistry (5 Credits)**

A systematic study of chemical principles as applied to inorganic systems. It may include inorganic nomenclature, solid state structure, thermodynamics and bonding, general bonding theory, acid-base theory, coordination chemistry, and descriptive inorganic chemistry. Includes laboratory.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203540>)

**CHM 3540L Introductory Inorganic Chemistry Lab (0 Credit)**

Laboratory Component of CHM 3540

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%203540L>)

**CHM 4361 Biochemistry (5 Credits)**

Studies chemical properties of biological compounds (carbohydrates, lipids, amino acids and proteins, and nucleic acids); metabolism (biochemical energetics, enzymes, electron transport, and oxidative phosphorylation), and integration of metabolism (biochemical genetics and metabolic regulation). Includes laboratory.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204361>)

**CHM 4361L Biochemistry Lab (0 Credit)**

Lab Component of CHM 4361.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204361L>)

**CHM 4362 Biochemistry (5 Credits)**

Continuation of CHM 4361. Studies chemical properties of biological compounds (carbohydrates, lipids, amino acids and proteins, and nucleic acids); metabolism (biochemical energetics, enzymes, electron transport, and oxidative phosphorylation), and integration of metabolism (biochemical genetics and metabolic regulation). Includes laboratory.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204362>)

**CHM 4362L Biochemistry Lab (0 Credit)**

Lab Component of CHM 4362.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204362L>)

**CHM 4363 Biochemistry (3 Credits)**

Explores selected topics such as immunoglobulins and the immune system; bacterial cell walls; membrane transport; hormone action; control of gene expression; muscle contraction; cell physiology; drug action; protein folding; HIV mechanisms; and mechanisms of infectious disease. Seminar format with leading researchers presenting current work.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204363>)

**CHM 4371 Biochemistry Lecture (3 Credits)**

Studies chemical properties of biological compounds (carbohydrates, lipids, amino acids and proteins, and nucleic acids); metabolism (biochemical energetic, enzymes, electron transport, and oxidative phosphorylation), and integration of metabolism (biochemical genetics and metabolic regulation). Does not include laboratory.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204371>)

**CHM 4372 Biochemistry Lecture (3 Credits)**

Continuation of CHM 4361 and CHM 4371. Studies chemical properties of biological compounds (carbohydrates, lipids, amino acids and proteins, and nucleic acids); metabolism (biochemical genetics and metabolic regulation). Does not include laboratory.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204372>)

**CHM 4374 Advanced Organic Laboratory (3 Credits)**

An advanced laboratory course using synthetic separation and instrumental techniques to study properties of organic compounds. Typically offered: Alternate Years.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204374>)

**CHM 4542 Transition Metals (3 Credits)**

Students are encouraged to complete CHM 3421 prior to taking this course. Studies the chemistry of the d- and f-block elements, with emphasis on the correlation of color, magnetic properties, structure, and reactivity to fundamental theory. Topics from the current chemical literature will be included. Topics may include bioinorganic chemistry, organometallic chemistry, and chemical applications of group theory. Typically offered: Alternate Years.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204542>)

**CHM 4700 Selected Topics in Chemistry/Biochemistry (3 Credits)**

An advanced course on any area of chemical science. It is designed to deepen the student's knowledge in one area of chemistry, expose him or her to the current research literature, and give him or her experience in writing and speaking critically on examples of recent research. Typically offered: Alternate Years.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204700>)

**CHM 4760 Advanced Synthesis (1-2 Credit)**

Recommended Prerequisite: CHM 4542. A laboratory course involving organic and/or inorganic synthesis using advanced techniques such as the handling of air-sensitive compounds, vacuum distillations and vacuum line transfers. Recommended especially for students who plan a research project involving synthesis. Typically offered: Varies.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204760>)

**CHM 4898 Chemistry and Biochemistry Capstone Seminar (3 Credits)**

A capstone experience for seniors that explores current chemistry and biochemistry sciences topics. Seminars addressing current research advances, ethical issues in science or the intersection of science, vocation and Christian faith are presented by faculty, students and guest scholars. Discussion and reflection incorporate appropriate readings. This capstone with its writing projects must be completed during the senior year to fulfill the senior capstone requirement. Typically offered: Spring.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204898>)

**CHM 4899 Natural Sciences Capstone Seminar (1 Credit)**

A capstone experience for seniors that explores current natural sciences topics in an interdisciplinary setting. Seminars addressing current research advances, ethical issues in science or the intersection of science, vocation and Christian faith are presented by faculty, students and guest scholars. Discussion and reflection incorporate appropriate readings. A minimum of two quarters of seminar must be completed during the senior year to fulfill the senior capstone requirement.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204899>)

**CHM 4900 Independent Project/Design in Chemistry/Biochemistry (1-10 Credit)**

Laboratory research, library research, or other individual project. A final written report is required, and the student must report orally on his or her results at a Chemistry Department seminar.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204900>)

**CHM 4930 Chemistry/Biochemistry Practicum (1-5 Credit)**

Selected students are assigned teaching, grading, laboratory preparation, and/or tutoring responsibilities.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204930>)

**CHM 4940 Internship in Chemistry/Biochemistry (1-5 Credit)**

Provides a significant learning experience through a closely supervised work-study program. A final written report is required, and the student must report orally on his or her work experience at a Chemistry Department seminar.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204940>)

**CHM 4950 Current Topics in Chemistry/Biochemistry (1-5 Credit)**

Deals with selected chemistry topics of general interest. No laboratory. Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204950>)

**CHM 4960 Undergraduate Research in Chemistry/Biochemistry (1-10 Credit)**

Laboratory research done with supervision/collaboration with a faculty research advisor. A final senior thesis or journal article is required. A report at the regional conference is expected.

Course Schedule (<https://catalog.spu.edu/course-search/?details&code=CHM%204960>)