

CHEMISTRY (CHEM)

CHEM 050 RESEARCH METHODS IN CHEMISTRY (1 credit)

Introduction to scientific research methods in chemistry. Use of spreadsheets, symbolic mathematics, and techniques for searching chemistry databases. May be repeated once.

Prerequisites: Consent of instructor.

(EXPERIENTIAL LEARNING)

CHEM 100 CONCEPTS IN CHEMISTRY (3 credits)

Basic concepts of chemistry including the periodic table; chemical bonding; nomenclature; molecular geometry; simple qualitative aspects of energy, thermodynamics and kinetics; and the relation between chemical structure and reactivity. Concepts covered using one common theme, such as nutrition, atmospheric sciences, environmental sciences, or another topic of faculty and student interest. Not for chemistry majors.

Prerequisites: Highschool Algebra or equivalent, or instructor consent.

(NATURAL WORLD)

CHEM 120 CHEMISTRY IN THE ATMOSPHERE (4 credits)

Basic concepts of chemistry in the atmosphere including the periodic table, chemical reactivity, and spectroscopy, with particular emphasis on the study of pollution, the formation of the ozone hole, global warming, and the relationship between human activity and atmospheric chemistry. Not applicable to Chemistry major or minor.

Prerequisites: Highschool Algebra or equivalent, or instructor consent.

Typically offered: Spring Semester

(NATURAL WORLD)

CHEM 170 INTRODUCTORY TOPICS IN CHEMISTRY (4 credits)

Exploration of how chemistry applies to professional activity in areas relevant to course title focus. Descriptive introductions to basic chemistry concepts essential to understanding each area, leading to applications of this knowledge to historical and/or hypothetical situations. Not for chemistry majors.

Prerequisites: Highschool Algebra or equivalent.

(NATURAL WORLD)

CHEM 198 SPECIAL TOPICS: JAN TERM TRAVEL (4 credits)

Topics vary according to faculty availability and interest. May be repeated for credit with different topics.

Prerequisites: IDST 098 previous fall.

Typically offered: January Term

CHEM 201 GENERAL, ORGANIC, AND BIOLOGICAL CHEMISTRY (I) (4 credits)

Basic principles of general, organic, and biological chemistry: atomic structure, mole concept, chemical reactions, stoichiometry, gases/gas laws, oxidation-reduction, acid-base chemistry, equilibrium, solutions, and nuclear chemistry. Content is presented through the application of chemistry in health sciences, comparable to courses described as chemistry for allied health at other institutions. Designed for students requiring a broad introduction to chemical principles such as nursing, emergency medical technician (EMT), health education, and similar; not for chemistry, biology or biochemistry majors. Lecture, Lab.

Total Course fees: \$60.00

Prerequisites: CHEM 201L must be taken concurrently with lecture.

MATH 150 recommended.

Typically offered: Fall Semester

(NATURAL WORLD)

CHEM 202 GENERAL, ORGANIC, AND BIOLOGICAL CHEMISTRY (II) (4 credits)

Basic principles of general, organic, and biological chemistry: atomic structure, mole concept, chemical reactions, stoichiometry, gases/gas laws, oxidation-reduction, acid-base chemistry, equilibrium, solutions, and nuclear chemistry; organic hydrocarbons, organic functional groups, and nomenclature; biological macromolecules (proteins, lipids, carbohydrates, and nucleic acids), membrane transport, and metabolic reactions. Content is presented through the application of chemistry in health sciences, comparable to courses described as chemistry for allied health at other institutions. Designed for students requiring a broad introduction to chemical principles such as nursing, emergency medical technician (EMT), health education, and similar; not for chemistry, biology or biochemistry majors. Lecture, lab.

Total Course fees: \$60.00

Prerequisites: CHEM 201 or equivalent with grade of C- or better. CHEM 202L must be taken concurrently with lecture.

Typically offered: Spring Semester

(NATURAL WORLD)

CHEM 210 GENERAL CHEMISTRY (4 credits)

Principles of chemistry, including stoichiometry; gases, liquids, and solids; atomic and molecular structures; solutions; properties of selected elements, including introduction to transition metals. Quantitative and inorganic qualitative analysis in the lab. Lecture, lab.

Total Course fees: \$60.00

Prerequisites: MATH 150 completed or concurrent. CHEM 210L must be taken concurrently with lecture.

Typically offered: Fall Semester

(NATURAL WORLD)

CHEM 211 GENERAL CHEMISTRY (4 credits)

Principles of chemistry, including solutions; equilibrium; thermodynamics, reaction kinetics and electrochemistry. Quantitative and inorganic qualitative analysis in the lab. Lecture, lab.

Total Course fees: \$60.00

Prerequisites: CHEM 210 or equivalent with a grade of C- or better. CHEM 211L must be taken concurrently with lecture.

Typically offered: Spring Semester

(NATURAL WORLD)

CHEM 298 SPECIAL TOPICS: JAN TERM TRAVEL (4 credits)

Topics vary according to faculty availability and interest. May be repeated for credit with different topics.

Prerequisites: IDST 098 previous fall.

Typically offered: January Term

CHEM 300 THE ART AND SCIENCE OF BREWING (4 credits)

Academic approach to the production and critique of brewed beverages. Malting, brewing, fermentation and bottling/kegging. Historical development of brewing science. Human health aspects related to brewing and the consumption of fermented beverages.

Total Course fees: \$60.00

Prerequisites: Highschool Algebra or equivalent, completion of an NW, plus 21 years of age or older by the first day of class. Application & interview required.

Typically offered: January Term, Even Years

(NATURAL WORLD)

CHEM 301 FOOD SCIENCE (ALSO LISTED AS HHPA 301) (4 credits)

Overview of the chemical and physical properties of food and beverage; quality and safety; preservation, fermentation and cooking methods; objective and subjective food evaluation, recipe modification.

Total Course fees: \$35.00

Prerequisites: Nutrition, Chemistry, and/or Biology Recommended.

Typically offered: January Term, Alternate Years

(NATURAL WORLD)

CHEM 321 ORGANIC CHEMISTRY (4 credits)

The chemistry of carbon, including preparation, properties, and reactions of alkanes, alkenes, alkyl halides and alcohols and their spectroscopic structure determination. Emphasis on reaction mechanisms, synthesis, and analysis. Lecture/discussion, lab.

Total Course fees: \$50.00

Prerequisites: CHEM 211 with a grade of C or better. CHEM 321L & CHEM 321D must be taken concurrently with lecture.

Typically offered: Fall Semester

CHEM 322 ORGANIC CHEMISTRY (4 credits)

The chemistry of carbon continued, including preparation, properties, and reactions of conjugated, aromatic and carbonyl compounds. Emphasis on reaction mechanisms, synthesis, and analysis. Lecture/discussion, lab.

Total Course fees: \$50.00

Prerequisites: CHEM 321 with a grade of C or better. CHEM 322L & CHEM 321D must be taken concurrently with lecture.

Typically offered: Spring Semester

CHEM 330 WRITING IN CHEMISTRY (4 credits)

Introduction to the genres of scientific writing, emphasizing writing and library skills in scientific research. Completion of a collaborative research project prior to enrollment in CHEM 330 is encouraged.

Prerequisites: CHEM 322, IDST 125 or instructor consent.

Typically offered: Fall Semester

(MAJOR WRITING INTENSIVE)

CHEM 335 QUANTITATIVE ANALYSIS (4 credits)

Principles of analytical chemistry, emphasizing applications of equilibrium. Lecture, lab, discussion.

Total Course fees: \$50.00

Prerequisites: CHEM 211 with a grade of C or better. CHEM 335L must be taken concurrently with lecture.

Typically offered: January Term

CHEM 340 INSTRUMENTAL METHODS OF ANALYSIS (4 credits)

Introduction to the theory and principles of instrumental methods of chemical analysis. Emphasis on spectrophotometry, electrochemistry, chromatography and electronics. Lecture/lab.

Total Course fees: \$50.00

Prerequisites: CHEM 335 with a grade of C or better. CHEM 340L must be taken concurrently with lecture.

Typically offered: Spring Semester

CHEM 350 INORGANIC CHEMISTRY I (4 credits)

Periodic properties of elements, including descriptive chemistry of the main group elements and coordination compounds of the transition metals. Emphasis on basic chemical bonding in molecules, an introduction to symmetry with term symbols, and acid/base reactions. Lecture/discussion.

Prerequisites: CHEM 211 or equivalent.

Typically offered: Fall Semester

CHEM 351 INORGANIC CHEMISTRY II (4 credits)

Presentation of theoretical and descriptive material on inorganic chemical compounds, synthetic and reaction strategies for important transformations including structures and bonding models, inorganic reaction mechanisms, transition metal chemistry, electron deficient compounds, organometallic compounds, and the main group elements. Laboratory experiments illustrate common synthetic and characterization processes for inorganic compounds. Lecture/discussion/lab.

Prerequisites: CHEM 350 or equivalent. CHEM 351L must be taken concurrently with lecture.

Typically offered: Spring Semester

CHEM 361 PHYSICAL CHEMISTRY I (4 credits)

Chemical thermodynamics, kinetics and molecular spectroscopy. Applications including thermochemistry and calorimetry; bulk properties of pure substances; methods of describing the properties of solutions; reaction rates; mechanisms of chemical reactions; transition state theory; spectroscopic determination of molecular structure. Lecture/lab.

Prerequisites: CHEM 211 or equivalent, PHYS 211 (may be taken concurrently), MATH 175, or consent of instructor. Recommended: MATH 200. CHEM 361L must be taken concurrently with lecture.

Typically offered: Fall Semester

CHEM 362 PHYSICAL CHEMISTRY II (4 credits)

The quantum mechanical description of matter with emphasis on atomic structure and chemical bonding. Introduction to statistical mechanics. Four hours of lecture.

Prerequisites: CHEM 361 or equivalent; MATH 175; PHYS 211; or consent of instructor. Recommended: MATH 200, MATH 210.

Typically offered: Spring Semester

CHEM 370 ADVANCED TOPICS IN CHEMISTRY (4 credits)

Selected advanced chemistry topics not regularly offered at Linfield.

Prerequisites: CHEM 321 or consent of instructor.

CHEM 381 RESEARCH IN MOLECULAR AND ADVANCED MATERIALS (1-3 credits)

Collaborative research experience in molecular and advanced materials. Discussion of current readings, experience with research methodology, experimental design, data collection and analysis. May be repeated twice.

Prerequisites: CHEM 210 or consent of instructor.

Typically offered: Spring Semester

CHEM 382 RESEARCH IN BASIC AND APPLIED NANOTECHNOLOGY (1-3 credits)

Introduction to basic and applied research in nanotechnology. Weekly meetings include seminars, discussions of research methods, review of current scientific research, experimental design, and ethical issues in chemistry. Each student prepares an independent research proposal and an oral presentation, and carries out research. May be repeated twice.

Prerequisites: CHEM 210 or consent of instructor.

Typically offered: Spring Semester

CHEM 384 RESEARCH IN BIOCHEMICAL TRANSCRIPTION REGULATION & ANALYSIS (1-3 credits)

Collaborative research experience in biochemistry focusing on transcriptional regulation and analysis using an in vitro system. Research methods, review of current scientific research, experimental design, and ethical issues in chemistry. Preparation of independent research proposal and oral presentation; implementation of research. May be repeated twice.

Prerequisites: CHEM 210, or consent of instructor.

Typically offered: Spring Semester

CHEM 385 RESEARCH IN SMALL MOLECULE SYNTHESIS (1-3 credits)

Introduction to small molecule synthesis and organic method development, projects carried out individually or in small groups. Projects feature organic reactions, purifications, analysis, and biochemical protein-based assays. Weekly meetings feature discussion of results and literature. Each student prepares independent research proposal and oral presentation, and carries out research. May be repeated twice.

Prerequisites: CHEM 211 or consent of instructor.

Typically offered: Spring Semester

CHEM 398 SPECIAL TOPICS: JAN TERM TRAVEL (4 credits)

Topics vary according to faculty availability and interest. May be repeated for credit with different topics.

Prerequisites: IDST 098 previous fall.

Typically offered: January Term

CHEM 440 BIOCHEMISTRY (4 credits)

Chemical and physical properties of substances of biological origin and their interactions in living systems. Relationships among various metabolic pathways and how molecular traffic along these pathways is regulated. Recommended for pre-professional students. Lecture/discussion, lab.

Total Course fees: \$60.00

Prerequisites: CHEM 322 or equivalent. CHEM 440L must be taken concurrently with lecture.

Typically offered: Fall Semester

CHEM 480 INDEPENDENT STUDY (1-5 credits)

Supplemental work for students with advanced standing in chemistry.

Prerequisites: Consent of instructor.

CHEM 490 RESEARCH OR THESIS (1-4 credits)

Individual investigative project culminating in a comprehensive written report or a baccalaureate thesis.

Prerequisites: Advanced standing in chemistry.

CHEM 498 SPECIAL TOPICS: JAN TERM TRAVEL (4 credits)

Topics vary according to faculty availability and interest. May be repeated for credit with different topics.

Prerequisites: IDST 098 previous fall.

Typically offered: January Term