

# Chemistry

*Chemistry majors and minors must earn a minimum grade of C- in all chemistry courses.*

## LOWER DIVISION

**CHEM 104. Chemistry & Society** (3). Investigate chemical basis of issues affecting our lives. Topics may include chemistry of everyday consumer items; environmental issues; industrial chemistry; solar and nuclear power. [GE.]

**CHEM 107. Fundamentals of Chemistry** (4). Terminal course. Fundamental concepts and applications of general and inorganic chemistry. [Letter grade only. Prereq: math code 30. Weekly: 3 hrs lect, 3 hrs lab. GE.]

**CHEM 109 - 110. General Chemistry** (5-5) FS. Fundamental concepts: stoichiometry, gases, atomic theory, solutions, bonding, acid/base theory, kinetics, equilibrium, thermochemistry, aqueous equilibria, thermodynamics, electrochemistry, descriptive inorganic chemistry, qualitative analysis. For students in science, engineering, and related majors. [Letter grade only. Prereq: math code 40. Prereq for CHEM 110: CHEM 109 with C- or higher. CHEM 109: weekly: 3 hrs lect, 3 hrs lab, 1 hr disc. CHEM 110: weekly: 3 hrs lect, 6 hrs lab. CAN CHEM 2=109; CAN CHEM 4=110.]

**CHEM 117. Nursing Chemistry** (1) Brief survey of organic and biochemistry with emphasis on nursing topics. In conjunction with CHEM 107, meets nursing discipline requirements. [Prereq CHEM 107 (C) and Math Code 30.]

**CHEM 199. Supplemental Instruction in Chemistry** (1). Collaborative work for students enrolled in chemistry.

## UPPER DIVISION

**CHEM 305. Environmental Chemistry** (3) Chemical issues of environmental concern. Background of chemical knowledge to make intelligent, critical decisions about science and technology. [Prereq: completed lower division science GE. Weekly: 2 hrs lect, 2 hrs activ.]

**CHEM 308. Alchemy** (3). Inquiry into materials, methods, and processes of alchemy from perspectives of alchemist, contemporary chemistry. [GE.]

**CHEM 321 - 322. Organic Chemistry** (5-5). One-year sequence. Chemical bonding, physical properties, stereochemistry, reaction mechanisms, synthesis. [Letter grade only. Prereq: CHEM 110 with C- or higher. Prereq for CHEM 322: CHEM 321 with a grade of C- or higher. Weekly each semester: 3 hrs lect, 6 hrs lab.]

**CHEM 323. Nuclear Magnetic Resonance Spectroscopy (NMR) Techniques** (1). Operate NMR spectrometer; prepare samples. Individual projects. [Prereq: CHEM 321; concurrent enrollment in CHEM 322. CR/NC.]

**CHEM 328. Brief Organic Chemistry** (4) FS. For

majors in biological science/natural resource areas. Nomenclature, physical properties, synthesis, and reactions of compounds representing major functional group categories. Reaction mechanisms emphasized. [Letter grade only. Prereq: CHEM 107 or 109 with C- or higher. Weekly: 3 hrs lect, 3 hrs lab.]

**CHEM 330. Molecular Modeling** (3). Apply molecular modeling and computational chemistry methods (semiempirical, ab initio, and density functional) to problems in organic and inorganic chemistry, biochemistry, and molecular biology. [Prereq: CHEM 328 or 322 (C). Weekly: 2 hrs lect, 3 hrs lab.]

**CHEM 340 / PHYX 340. Symbolic Computation in the Sciences** (2). Numerical, symbolic, graphical, programming, and simulation capabilities of the computer algebra system, Mathematica. Application to problems in the sciences. [Prereq: CHEM 110, MATH 241, PHYX 110.]

**CHEM 341. Quantitative Analysis** (5) F. Principles and methods of classical chemical analysis. Introduction to instrumental methods. For chemistry majors and others who require a rigorous treatment of solution equilibria and training in precise quantitative lab techniques. [Prereq: CHEM 110 with C- or higher. Weekly: 3 hrs lect, 6 hrs lab.]

**CHEM 361 - 362. Physical Chemistry** (3-3). Apply quantitative mathematical methods to fundamental chemical systems. For chem majors and others requiring rigorous mathematical treatment of chemical systems. [Prereq: PHYX 111, MATH 210, CHEM 340, 341 (CHEM 340 and/or 341 may be concurrent with 361), all with grades of C- or higher. Prereq: for 362: CHEM 361 with grade of C- or higher.]

**CHEM 363. Physical Chemistry Lab** (2). [Prereq: CHEM 362 (C). Weekly: 6 hrs lab.]

**CHEM 364. Introductory Physical Chemistry** (3). Mathematical treatment of chemical systems. Apply thermodynamics, kinetics, and quantum mechanics to practical systems. [Prereq: CHEM 341, MATH 110 (C) or MATH 205 (C), PHYX 107 or PHYX 110; CHEM 340 (C) or PHYX 340 (C).]

**CHEM 367. Introductory Physical Chemistry Lab** (1). [Coreq: CHEM 364.]

**CHEM 370. Global Climate Change** (3). A geochemical view of introductory knowledge in earth system science, global biogeochemical cycles, and natural processes and anthropogenic activities that affect global climate change. [Prereq: CHEM 107 or CHEM 109. Cannot be taken CR/NC.]

**CHEM 399. Supplemental Work in Chemistry** (1-3). Directed study for transfer student whose prior course work is not equivalent to corresponding courses at HSU. [Prereq: DA. Rep.]

**CHEM 410. Inorganic Chemistry** (5). Structure, bonding, coordination chemistry, reaction mech-

anisms, and solid-state chemistry of inorganic and organometallic systems. Emphasis on theoretical foundations. Lab syntheses of inorganic compounds. [Prereq: CHEM 322, 361 (C) or 364. Weekly: 4 hrs lect, 3 hrs lab. Offered alternate years.]

**CHEM 421. Advanced Organic Chemistry** (1-3). Introduces physical organic chemistry. [Prereq: CHEM 322 with C- or higher. Offered upon sufficient demand.]

**CHEM 422. Advanced Organic Lab** (1-2). Lab work synthesizing and purifying selected organic compounds. [Prereq: CHEM 322 with grade of C- or higher. Offered upon sufficient demand.]

**CHEM 429. Organic Chemistry of Biologically Important Compounds** (3). Chemistry of natural products. Emphasis/topics vary with instructor. [Prereq: CHEM 322 or 328 with grade of C- or higher. Offered upon sufficient demand.]

**CHEM 431 - 432. Biochemistry** (5-5). One-year lect/lab sequence. Biochemical energetics, introductory metabolism, nature and mechanism of action of enzymes. [Prereq for CHEM 431: CHEM 110, any calculus course and either CHEM 322 or 328 with C- or higher. Prereq for CHEM 432: CHEM 431 with a grade of C- or higher. Weekly: 3 hrs lect, 6 hrs lab.]

**CHEM 433. Principles of Chromatography** (3). Chromatographic methods. Prepare and analyze lab and environmental samples. Individual instruction in operating modern instrumentation, including GC, HPLC, and GC-MS. [Prereq: CHEM 321 or 328; CHEM 341; all with grades of C- or higher. Weekly: 1 hr lect, 6 hrs lab.]

**CHEM 438. Introductory Biochemistry** (4). Brief course. [Prereq: CHEM 322 or 328 with C- or higher.]

**CHEM 438L. Introductory Biochemistry Lab** (1). [Prereq: CHEM 322 or 328, 438 (C). Offered upon sufficient demand.]

**CHEM 441. Instrumental Analysis** (4). Principles and methods. For chemistry majors and others requiring training in instrumental techniques of analysis. [Prereq: or coreq: CHEM 341 and either CHEM 362-363. Weekly: 2 hrs lect, 6 hrs lab.]

**CHEM 450. Chemical Concepts in Toxicant Behavior** (2). Chemistry of environmental toxicants and pollutants, emphasizing their transformation and mode of movement through the environment. [Prereq: CHEM 110 and either 322 or 328.]

**CHEM 451. Biochemical Toxicology** (2). Mechanisms of biochemical/physiological toxicity due to environmental pollutants and toxicants. Biological and clinical manifestations. [Prereq: BIOL 105, CHEM 110, and either CHEM 322 or 328.]

**CHEM 480. Selected Topics in Advanced Chemistry** (0.5 - 3). [Prereq: IA. Rep.]

**CHEM 485. Seminar in Chemistry** (1). Seminar

presentations on current chemistry topics by majors with senior standing in chemistry. Capstone course. All chemistry majors are encouraged to attend. [Prereq: Senior standing. Rep.]

**CHEM 495. Undergraduate Research** (1-3). Individual investigation of selected problem. Conference, reading, research. Final written report. For students showing outstanding ability. [Prereq: IA. Rep.]

**CHEM 499. Directed Study** (1-4). [Prereq: IA. Rep.]

### **GRADUATE**

**CHEM 599. Independent Study** (1-3). [Prereq: IA. Rep.]

### **CREDENTIAL/LICENSURE**

**CHEM 700. In-Service Professional Development in Chemistry** (1-3). Directed studies for chemistry professionals desiring specialized or advanced instruction, especially that leading to credentialing and certification. [Prereq: DA. Rep.]