CHEMISTRY (CHEM)

Courses

CHEM 201. Advanced Chemistry Laboratory. 3 Credits.
Discussion and laboratory experiments using spectroscopy techniques (mass spectrometry, NMR, IR, UV/visible, and atomic spectroscopy) to solve problems in analytical, physical, and inorganic chemistry. Prerequisite: CHEM 121, and CHEM 142 or CHEM 144. CHEM 161 strongly recommended.

CHEM 202. Advanced Chemistry Laboratory. 2 Credits.
Laboratory problems requiring modern analytical, physical, and inorganic synthetic techniques. Journal article writing. Prerequisite: CHEM 201.

CHEM 205. Biochemistry I. 3 Credits.
Introduction to chemistry and structure of biological macromolecules; examination of mechanisms of chemical processes in biological systems including enzyme catalysis, biosynthesis, regulation, and information transfer. Prerequisite: CHEM 142 or CHEM 144. Cross-listed with: BIOC 205 and MMG 205.

CHEM 206. Biochemistry II. 3 Credits.
Continuation of Biochemistry I. Biochemistry of nucleic acids; nucleic acid based processes, such as replication and transcription; cellular information transfer, genomics, and proteomics. Prerequisite: CHEM 205. Cross-listed with: BIOC 206 and MMG 206.

CHEM 207. Biochemistry Lab. 2 Credits.
Introduction to biochemical tools, including spectrometry, chromatography, and electrophoresis; natural and recombinant enzyme isolation; assays of DNA-modifying enzymes; computer-based structure/function exercises. Co-requisite: CHEM 205 or CHEM 206. Cross-listed with: BIOC 207 and MMG 207.

CHEM 214. Polymer Chemistry. 3 Credits.
Polymer synthesis and characterization. Kinetic models for polymerization and copolymerization. Physical properties, characterization of polymers in the solid state and in solution. Prerequisite: CHEM 142 or CHEM 144, and CHEM 162.

CHEM 221. Instrumental Analysis. 3 Credits.
Systematic survey of modern methods of chemical analysis. Fundamental principles and applications of spectroscopy, electrochemistry, and separation techniques. Prerequisite: CHEM 121. Credit for or concurrent enrollment in CHEM 161 or CHEM 162 strongly recommended.

CHEM 222. Mass Spectrometry. 3 Credits.
An in-depth treatment of modern mass spectrometry, instrumentation and techniques with discussion of biological and chemical applications. Prerequisites: CHEM 142 or CHEM 144, and CHEM 221, or Instructor permission.

CHEM 225. Electroanalytical Chemistry. 3 Credits.
Principles and techniques of modern electrochemical analysis and applications to redox chemistry. Heterogeneous effects; voltammetry; electron-transfer processes and reactions. Prerequisite: CHEM 221.

CHEM 226. Analytical Spectroscopy. 3 Credits.

CHEM 227. Spec Topics in Analytical Chem. 1-3 Credits.
Selected topics of current interest in analytical chemistry. New techniques and methodologies, especially in chemical instrumentation. Credit as arranged.

CHEM 228. Spec Topics in Analytical Chem. 1-4 Credits.
Selected topics of current interest in analytical chemistry. New techniques and methodologies, especially in chemical instrumentation. Credit as arranged.

CHEM 231. Advanced Inorganic Chemistry. 3 Credits.
Molecular symmetry and group theory with an emphasis on applications (vibrational and electronic spectra, bonding and reactivity); introduction to transition metal processes; bioinorganic chemistry. Prerequisites: CHEM 142 or CHEM 144. Credit for or concurrent enrollment in CHEM 161.

CHEM 234. Organometallic Chemistry. 3 Credits.
Synthesis, structure, bonding, properties, reactions, and applications of organometallic systems; mechanisms of organometallic reactions including oxidative addition and insertion reactions with applications in catalysis. Prerequisite: CHEM 131 or CHEM 231.

CHEM 236. Physical Inorganic Chemistry. 3 Credits.
Determination of molecular and electronic structure of inorganic complexes using spectroscopic techniques. Topics include ligand field theory, magnetism, magnetic resonance, Mossbauer spectroscopy, and X-ray crystallography. Prerequisites: CHEM 131 or CHEM 231; CHEM 161.

CHEM 237. Special Topics: Inorganic. 1-3 Credits.
Areas of current interest involving inorganic systems.

CHEM 238. Special Topics: Inorganic. 1-3 Credits.
Areas of current interest involving inorganic systems.

CHEM 241. Advanced Organic Chemistry 1. 3 Credits.
Stereochemistry, conformational analysis, stereoelectronic effects, transition state theory, molecular orbital theory, and reactivity criteria are discussed in regards to reaction mechanisms and functional group manipulations. Prerequisite: CHEM 142 or CHEM 144.

CHEM 242. Advanced Organic Chemistry 2. 3 Credits.
Modern synthetic organic methods and approaches to multi-step synthesis are discussed. Selected total syntheses are reviewed to highlight important concepts including diastereoselective and enantioselective processes. Prerequisite: CHEM 241.

CHEM 251. Physical Organic Chemistry. 3 Credits.
Experimental and computational techniques for determining structure, properties and reactivity of organic molecules, with an emphasis on the mechanisms of organic reactions. Prerequisites: CHEM 142 or CHEM 144, CHEM 161, and CHEM 162 strongly recommended.
CHEM 257. Special Topics in Organic Chem. 1-3 Credits.
Advanced level discussion of specific topics in organic chemistry of current interest such as photochemistry, carbenes, bioorganic chemistry, magnetic resonance, etc. Credit as arranged.

CHEM 258. Special Topics in Organic Chem. 1-3 Credits.
Advanced level discussion of specific topics in organic chemistry of current interest such as photochemistry, carbenes, bioorganic chemistry, magnetic resonance, etc. Credit as arranged.

CHEM 262. Chemical Thermodynamics. 3 Credits.
Classical and statistical thermodynamics. Systematic study of applications of thermodynamics to chemical problems. Prerequisite: CHEM 161 and 162.

CHEM 264. Adv Quantum & Spectroscopy. 3 Credits.
In-depth theoretical discussion of molecular states, their symmetry, and transition probabilities. Explicit treatment of vibrations, electronic states, and vibronic spectroscopy. Prerequisites: CHEM 161 and MATH 121.

CHEM 267. Special Topics: Physical. 1-3 Credits.
Selected topics of current interest in physical chemistry.

CHEM 268. Special Topics: Physical. 1-3 Credits.
Selected topics of current interest in physical chemistry.

CHEM 285. Special Topics. 1-3 Credits.
CHEM 286. Special Topics. 1-3 Credits.

CHEM 318. Current Topics in Chemistry. 0 or 1 Credits.
Survey of current topics in the chemistry literature. Prerequisite: Graduate standing.

CHEM 380. Chemical Investigations. 1 Credit.
Current problems and literature.

CHEM 381. Grad Seminar. 1 Credit.
Current problems and literature.

CHEM 384. Advanced Topics in Chemistry. 2 Credits.
Comprehensive independent study in chemistry. Prerequisite: Permission of the Department.

CHEM 391. Master’s Thesis Research. 1-18 Credits.
CHEM 395. Independent Lit Rsch Project. 1-12 Credits.
Reading and literature research culminating in the preparation of a comprehensive and critical review of a topic of current interest in chemistry.

CHEM 484. Advanced Topics in Chemistry. 2 Credits.
Comprehensive independent study in chemistry. Prerequisite: Permission of the Department.

CHEM 488. Rsch Prob Conception&Solution. 1 Credit.
Independent origination of research problems and the methods of their solution. Prerequisite: Permission of Department.

CHEM 491. Doctoral Dissertation Research. 1-18 Credits.