CHEM-CHEMISTRY (CHEM)

CHEM 100. Basic Chemistry
3 Credits
For students whose preparatory science or math training has been deficient. Does not meet the chemistry requirement in any curriculum.
Prerequisite: Enhanced ACT composite score of at least 18 or a grade of C or better in CCDM 114N.

CHEM 101. General Supplemental Instruction I
1 Credit
Collaborative workshop for students in General Chemistry I. Course does not count toward departmental degree requirements. May be repeated for a maximum of 2 credits.
Corequisite: CHEM 111G.

CHEM 102. General Supplemental Instruction II
1 Credit
Collaborative workshop for students in General Chemistry II. Course does not count toward departmental degree requirements. May be repeated for a maximum of 2 credits.
Corequisite: CHEM 112G.

CHEM 103. Principles of Supplemental Instruction III
1 Credit
Collaborative workshop for students in CHEM 110G, Principles and Applications of Chemistry. Course does not count toward departmental degree requirements. May be repeated for a maximum of 2 credits.
Corequisite: CHEM 110G.

CHEM 110G. Principles and Applications of Chemistry
4 Credits (3+3P)
A survey of the properties and uses of the elements and their compounds. In addition to classical chemistry, attention is paid to the materials from which consumer products are made, to the production of energy, and to environmental considerations.
Prerequisite: 3 years of high school math or CCDM 114N.

CHEM 111G. General Chemistry I
4 Credits (3+3P)
Descriptive and theoretical chemistry. CHEM 111G/112G are General Education alternative to CHEM 110G.
Prerequisite: (1) grade of C or better in MATH 120 or a Mathematics Placement Exam Score adequate to enroll in mathematics courses beyond MATH 120; and (2) one of the following: B or better in a second semester high school chemistry course, or grade of at least C in CHEM 100, or an enhanced ACT score of at least 22.

CHEM 112G. General Chemistry II
4 Credits (3+3P)
Descriptive and theoretical chemistry. CHEM 111G/112G are General Education alternative to CHEM 110G.
Prerequisite(s): CHEM 111G.

CHEM 115. Principles of Chemistry I
4 Credits (3+3P)
Detailed introduction to analytical, inorganic and physical aspects of chemistry; both descriptive and theoretical explanations. Structured for chemistry and biochemistry majors but appropriate for other physical and life science students. CHEM 115/116 are General Education alternatives to CHEM 110G.
Prerequisite: Eligible to take MATH 190G and an ACT composite score of 22 or higher.

CHEM 116. Principles of Chemistry II
4 Credits (3+3P)
Recommended for chemistry majors and other qualified students. CHEM 115/116 are General Education alternatives to CHEM 110G.
Prerequisites: grade of C or better in CHEM 115.

CHEM 210. Chemistry for the Allied Health Sciences
3 Credits
Discussion and application of the established facts and concepts of general organic chemistry and biochemistry to acquire a molecular understanding of a variety of health related issues, from atmospheric ozone holes to human nutrition.
Prerequisite: CHEM 110G or CHEM 111G.

CHEM 211. Organic Chemistry
4 Credits (3+3P)
A one-semester survey for students requiring a brief coverage of important classes of organic compounds.
Prerequisite: CHEM 112G or CHEM 114.

CHEM 217. General Chemistry III
3 Credits (2+3P)
Quantitative aspects of general chemistry: solid state structure, equilibrium, thermodynamics, and kinetics. Required of chemical science majors who have taken CHEM 111G/112.
Prerequisite: CHEM 112G.

CHEM 241. Introduction to Research
1-3 Credits (3+9P)
Techniques and procedures of chemical research. May be repeated for a maximum of 3 credits.
Prerequisites: 8 credits of chemistry and a 3.0 GPA in chemistry.

CHEM 242. Explorations in Chemistry
1 Credit
Historical and current developments, careers in chemistry, computer applications and use of the library by chemists. To be completed before the end of the sophomore year. Graded S/U.

CHEM 251. Special Topics in Chemistry
1-6 Credits (1-6)
Specific subjects in Chemistry. These subjects will be announced in the 'Schedule of Classes'. It may be repeated under different topics for a maximum of 12 credits.

CHEM 303. Organic Supplemental Instruction I
1 Credit
Collaborative workshop for students in Organic Chemistry I. Course does not count toward departmental degree requirements. May be repeated for a maximum of 2 credits.
Corequisite: CHEM 313.

CHEM 304. Organic Supplemental Instruction II
1 Credit
Collaborative workshop for students in Organic Chemistry II. Course does not count toward departmental degree requirements. May be repeated for a maximum of 2 credits.
Corequisite: CHEM 314.

CHEM 313. Organic Chemistry I
3 Credits
Nomenclature, uses, basic reactions, and preparation methods of the most important classes of aliphatic and aromatic compounds.
Prerequisite: CHEM 112G or CHEM 116.
CHEM 314. Organic Chemistry II
3 Credits
Nomenclature, uses, basic reactions, and preparation methods of the most important classes of aliphatic and aromatic compounds.
Prerequisite: C or better in CHEM 313.

CHEM 315. Organic Chemistry Laboratory
2 Credits
Techniques, preparative and analytical methods in organic chemistry.
Prerequisite: C or better in CHEM 313 or consent of instructor.
Corequisite: CHEM 314.

CHEM 351. Special Topics
1-3 Credits
Specific subjects to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits.
Prerequisite: consent of instructor.

CHEM 356. Descriptive Inorganic Chemistry
3 Credits
Occurrence and properties of the elements and the chemistry of their compounds.
Prerequisites: CHEM 112G and CHEM 116; and CHEM 211 or CHEM 313.

CHEM 357. Synthetic Inorganic Laboratory
2 Credits
Explores synthesis and analysis of main group and transition metal inorganic compounds. Inorganic laboratory and spectroscopic techniques will be used.
Prerequisites: CHEM 356.

CHEM 360. General Geochemistry
3 Credits
Same as GEOL 360.

CHEM 371. Analytical Chemistry
4 Credits (2+6P)
The fundamentals of quantitative chemical analysis.
Prerequisite: CHEM 112G.

CHEM 422. Environmental Chemistry
3 Credits
Chemistry of organic and metal ion pollutants in the environment and principles important to their remediation including bioremediation. Restricted to: Main campus only. Crosslisted with: E S 422
Prerequisite(s): CHEM 112G and either CHEM 211 or CHEM 313.

CHEM 424. Soil Chemistry
3 Credits
Same as SOIL/GEOL 424.

CHEM 431. Physical Chemistry
3 Credits
Principles that govern the physical and chemical behavior of matter. May not be counted toward Bachelor of Science degree in Chemistry.
Prerequisite(s): CHEM 116 or CHEM 217; MATH 192G; PHYS 212 or PHYS 222G or PHYS 214 or PHYS 216G.

CHEM 431 H. Physical Chemistry Honors
3 Credits
Same as CHEM 431. Additional work to be arranged.
Prerequisite(s): CHEM 116 or CHEM 217; MATH 192G; PHYS 212G or PHYS 222G or PHYS 214 or PHYS 216G.

CHEM 433. Physical Chemistry I
3 Credits
Laws and theories underlying chemical phenomena.
Prerequisite(s): CHEM 116 or CHEM 217; MATH 192G; PHYS 214 or PHYS 216G, or consent of instructor.

CHEM 433 H. Physical Chemistry I Honors
3 Credits
Same as CHEM 433. Additional work to be arranged.
Prerequisite(s): CHEM 116 or CHEM 217; MATH 192G; PHYS 214 or PHYS 216G, or consent of instructor.

CHEM 434. Physical Chemistry II
3 Credits
Laws and theories underlying chemical phenomena.
Prerequisite: CHEM 302 or CHEM 433.

CHEM 435. Physical Chemistry Laboratory
2 Credits
Prerequisite: concurrent registration in CHEM 434.

CHEM 441. Advanced Research
1-3 Credits (3+9P)
Investigation of chemical problems and the development of special techniques. May be repeated for a maximum of 3 credits.
Prerequisites: consent of instructor, 16 credits of chemistry and 3.0 GPA in chemistry for nonmajors.

CHEM 443. Senior Seminar
1 Credit
Discussions of current chemical research, impact of chemistry on society and/or ethics as applied to chemists. Each student will present a written and an oral report on an approved topic.
Prerequisite: CHEM 431 or CHEM 433.

CHEM 451. Special Topics
1-3 Credits
Specific subjects to be announced in the Schedule of Classes. May be repeated for a maximum of 12 credits.
Prerequisite: consent of instructor.

CHEM 455. Independent Studies
1-3 Credits
Independent studies directed by consulting faculty.
Prerequisite: consent of instructor.

CHEM 456. Inorganic Structure and Bonding
3 Credits
Theoretical principles and a systematic study of the periodic table.
Prerequisite: CHEM 356 or CHEM 431 or CHEM 433.

CHEM 466. Advanced Organic Chemistry
3 Credits
Recent developments in synthesis and theoretical principles of organic chemistry.
Prerequisite: CHEM 314.

CHEM 466 H. Advanced Organic Chemistry Honors
3 Credits
Same as CHEM 466. Additional work to be arranged.

CHEM 471. Instrumental Methods of Analysis
4 Credits (3+3P)
Analytical techniques, including optical and procedures.
Prerequisites: CHEM 371 and either PHYS 212G or PHYS 216G.

CHEM 500. Seminar in Inorganic Chemistry
1 Credit
Current topics. May be repeated.
CHEM 506. Atomic and Molecular Structure in Inorganic Chemistry  
3 Credits  
Theories of ionic and molecular bonding.

CHEM 507. Chemistry of the Elements  
3 Credits  
Discussion of the reactions and structures of inorganic compounds.

CHEM 508. Main Group Chemistry  
3 Credits  
Chemistry, structure and bonding of main group elements are covered along with some spectroscopy.

CHEM 509. Transition Metal Chemistry  
3 Credits  
The chemistry, bonding theory, spectroscopy and industrial applications of the transition metals will be covered.

CHEM 510. Seminar in Organic Chemistry  
1 Credit  
Current topics. May be repeated.

CHEM 514. Organic Structure Determination  
3 Credits  
Modern spectroscopic techniques for characterization of organic compounds.

CHEM 515. Modern Organic Chemistry  
3 Credits  
Recent developments in synthesis and theoretical principles of organic chemistry.

CHEM 516. Physical Organic Chemistry  
3 Credits  
Physical organic chemistry.

CHEM 517. Synthetic Organic Chemistry  
3 Credits  
Synthetic methods in organic chemistry.

CHEM 520. Seminar in Analytical Chemistry  
1 Credit  
Current topics. May be repeated.

CHEM 521. Chemical Instrumentation  
3 Credits (2+3P)  
Theory and application of electronic devices to chemical analysis.

CHEM 526. Advanced Analytical Chemistry  
3 Credits  
Equilibria, and the theories of gravimetric, volumetric, and instrumental analysis.

CHEM 527. Separations  
3 Credits  
Covers the fundamentals of separation methods and relationships to modern analytical techniques such as gas chromatography and liquid chromatography.

CHEM 528. Electroanalytical Techniques  
3 Credits  
Theory and application of modern electrochemical methods of analysis including voltammetry, amperometry, modern cyclic and pulse methods, and stripping analysis.

CHEM 529. Spectrochemical Analysis  
3 Credits  
Fundamentals, instrumentation, and applications of spectrochemical analysis.

CHEM 530. Seminar in Physical Chemistry  
1 Credit  
Current topics. May be repeated.

CHEM 536. Chemical Thermodynamics  
3 Credits  
First, second, and third laws of thermodynamics, and the concepts, interrelations, and applications of thermodynamic state functions.

CHEM 537. Quantum Chemistry  
3 Credits  
Fundamentals of quantum mechanics.  
Prerequisite: consent of instructor.

CHEM 538. Chemical Kinetics  
3 Credits  
Empirical analysis of rate measurements, collision theory, transition state theory, and chain reactions.

CHEM 539. Spectroscopy  
3 Credits  
Molecular spectroscopy for physical chemistry. Quantum mechanics applied to spectroscopy of polyatomic molecules: UV-VIs, IR, magnetic resonance. CHEM 537 desired but not required. Prerequisite: consent of instructor.  
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CHEM 550. Discussions in Inorganic Chemistry  
1 Credit  
Current research problems in inorganic chemistry. May be repeated. Graded S/U.

CHEM 556. Discussions in Organic Chemistry  
1 Credit  
Current research problems in organic chemistry. May be repeated. Graded S/U.

CHEM 557. Discussions in Analytical Chemistry  
1 Credit  
Current research problems in analytical chemistry. May be repeated. Graded S/U.

CHEM 558. Discussions in Physical Chemistry  
1 Credit  
Current research problems in physical chemistry. May be repeated. Graded S/U.

CHEM 559. Special Research Programs  
1-3 Credits  
Individual investigations, either analytical or experimental. Graded S/U.

CHEM 599. Master's Thesis  
15 Credits  
Thesis preparation.

CHEM 600. Research  
1-15 Credits  
Course used for assigning credit for research performed prior to successful completion of the doctoral qualifying examination.

CHEM 609. Topics in Inorganic Chemistry  
1-3 Credits  
Selected topics of current interest designated by subtitle.

CHEM 619. Topics in Organic Chemistry  
1-3 Credits  
Selected topics of current interest designated by subtitle.
CHEM 629. Advanced Topics in Analytical Chemistry
3 Credits
Discussion of advanced topics in the field of analytical chemistry. May be repeated with different subtitles. Consent of instructor required.

CHEM 639. Topics in Physical Chemistry
1-3 Credits
Selected topics of current interest designated by subtitle.

CHEM 650. Advanced Seminar
1 Credit
Intended for students who have earned a master’s degree or the equivalent. A discussion of current topics of interest in chemistry. May be repeated.

CHEM 700. Doctoral Dissertation
17 Credits
Dissertation preparation.