Courses

**CHEM 1011 Inorganic Chemistry Laboratory I: 1 semester hour.**
A general laboratory course covering aspects of qualitative and quantitative analysis and determination of chemical and physical properties.
Prerequisites: CHEM 1013 (may be taken concurrently) or CHEM 1033 (may be taken concurrently) or MATH 1113 (may be taken concurrently).

**CHEM 1013 General Inorganic Chemistry I: 3 semester hours.**
This course is designed for non-majors and non-minors. This first semester course entails exploration of the fundamental concepts, laws and theory of chemistry through study of the states of matter. A descriptive view of the periodic chart, chemical properties, reactions, and chemical bonding theories and stoichiometry.
Prerequisites: MATH 1113.
Co-requisite: MATH 1113.

**CHEM 1021 Inorganic Chemistry Laboratory II: 1 semester hour.**
The second semester continuation of CHEM 1011. A general laboratory course covering aspects of qualitative and quantitative analysis and determination of chemical and physical properties.
Prerequisites: MATH 1113 or MATH 1115 and CHEM 1043 (may be taken concurrently) or CHEM 1034 (may be taken concurrently).

**CHEM 1023 General Inorganic Chemistry II: 3 semester hours.**
This course is designed for non-majors and non-minors. This second semester course includes theories of acids, bases and salts. Elementary concepts of chemical kinetics, thermodynamics, equilibria, electrochemistry and redux reactions. An introduction to organic chemistry and selected topics.
Prerequisites: MATH 1113 and (CHEM 1013 or CHEM 1033).

**CHEM 1032 General Inorganic Chemistry Laboratory I: 2 semester hours.**
For students majoring or minoring in chemistry. A general laboratory course covering aspects of volumetric and gravimetric analysis, qualitative analysis, determination of chemical and physical properties, and chemical synthesis.
Prerequisites: MATH 1113 (may be taken concurrently) or MATH 1115 (may be taken concurrently) and CHEM 1033 (may be taken concurrently).

**CHEM 1033 General Inorganic Chemistry: 3 semester hours.**
For students majoring or minoring in chemistry. Theory of matter and concepts of measurement, atoms, molecules and ions. Stoichiometry and chemical calculations, reactions in aqueous solutions, kinetics of gases, thermo-chemistry, atomic structure, electron configurations and chemical bonds.
Prerequisites: MATH 1113 or MATH 1115.

**CHEM 1034 Chemistry for Engineers: 4 semester hours.**
Fundamental and Physical principles in chemistry, bonding, thermodynamics and kinetics with emphasis to engineering applications.
Prerequisites: CHEM 1033 or CHEM 1013.

**CHEM 1042 General Inorganic Chemistry Laboratory: 2 semester hours.**
For students majoring or minoring in chemistry. A continuation of CHEM 1032. General laboratory course covering aspects of volumetric, gravimetric and qualitative analyses; determination of chemical and physical properties, and chemical synthesis.
Prerequisites: MATH 1113 or MATH 1115 and CHEM 1043 (may be taken concurrently).

**CHEM 1043 General Inorganic Chemistry: 3 semester hours.**
For students majoring or minoring in chemistry. A continuation of CHEM 1033. Bonding theory and molecular structure, intermolecular forces properties of solutions, chemical kinetics, chemical equilibrium, acid-based equilibria, thermodynamics, electrochemistry and nuclear chemistry and introduction to organic chemistry.
Prerequisites: MATH 1113 and CHEM 1033.

**CHEM 1051 General Inorganic Chemistry Laboratory: 1 semester hour.**
A laboratory course in general chemistry for students in the health sciences.
Prerequisites: CHEM 1053 (may be taken concurrently).

**CHEM 1053 Introduction to General Chemistry: 3 semester hours.**
An introductory course to essential chemical principles including atoms, atomic structure, molecules, compounds, elementary stoichiometry, and calculations, type of chemical reactions and fundamental principles. The interpretation and evaluation of case studies to develop fundamental knowledge and skills. This course will require a fair amount of writing and teamwork. For health science and nonmajors.

**CHEM 1063 Survey of Organic Chemistry and Biochemistry: 3 semester hours.**
A course in general organic chemistry and biochemistry for students in health sciences.
Prerequisites: CHEM 1053.

**CHEM 2012 Quantitative Analysis: 2 semester hours.**
Introduction to the principles and techniques of volumetric and gravimetric analysis employing modem instrumentation. Techniques include potentiometric, spectral-photometric, precipitation, electrochemical, and separation methods.
Prerequisites: CHEM 1033 and CHEM 1042 and CHEM 1043.
CHEM 2032 General Organic Chemistry Laboratory I: 2 semester hours.
A laboratory course including qualitative and quantitative investigations focusing on preparation and characterization of organic compounds.
Prerequisites: CHEM 2033 (may be taken concurrently).

CHEM 2033 General Organic Chemistry I: 3 semester hours.
For chemistry majors and minors, chemical engineering, and science majors. Electronic structure and bonding, introduction to organic compounds, reactions of alkenes, stereochemistry, reactions of alkynes, electron delocalization and resonance, reaction of dienes, substitution and elimination reactions.
Prerequisites: CHEM 1043.

CHEM 2042 General Organic Chemistry Laboratory II: 2 semester hours.
This is a continuation of CHEM 2032.
Prerequisites: CHEM 2043 (may be taken concurrently).

CHEM 2043 General Organic Chemistry II: 3 semester hours.
For chemistry majors and minors, chemical engineering, and science majors. A continuation of CHEM 2033. Substitution and elimination reactions, spectroscopic identification of organic compounds, reactions of substituted benzenes, reactions of carbonyl compounds, bioorganic compounds and special topics in organic chemistry.
Prerequisites: CHEM 2033.

CHEM 2112 Quantitative Analysis Laboratory: 2 semester hours.
This course is a continuation of the CHEM 2012.
Prerequisites: CHEM 1042 and CHEM 2012 (may be taken concurrently).

CHEM 3023 Special Topics in Chemistry w/revolving themes forensic science/emerging areas of interests in Chem: 3 semester hours.
Special Topics in Chemistry with revolving themes around forensic science and emerging areas of interests in Chemistry and Technology.
Prerequisites: CHEM 2043.

CHEM 3413 Physical Chemistry: 3 semester hours.
A rigorous treatment of thermodynamics (Laws), thermo-chemistry, application of thermodynamic laws to gases (ideal and real), chemical equilibria, ionic equilibria, and electrochemistry.
Prerequisites: CHEM 1043 and MATH 1124.

CHEM 3422 Physical Chemistry Laboratory: 2 semester hours.
A laboratory course including experimental studies in chemical thermodynamics, equilibria, chemical kinetics, transport properties, spectroscopy, and molecular structure.
Prerequisites: CHEM 3413 (may be taken concurrently).
Co-requisite: CHEM 3413.

CHEM 3423 Physical Chemistry: 3 semester hours.
Prerequisites: MATH 2043 and CHEM 3413.

CHEM 3432 Physical Chemistry Laboratory: 2 semester hours.
This course is a continuation of CHEM 3422.
Co-requisite: CHEM 3423.

CHEM 4001 Journal Reading and Chemical Literature: 1 semester hour.
Initial instruction in the methodology and practice of efficient use of the chemical literature. Detailed study of recent developments in chemistry. Designed to develop and stimulate research attitudes.

CHEM 4023 Forensic Chemistry: 3 semester hours.
Introduction to forensic science, chemical evidence handling, analysis and drug classification. Sampling techniques in forensic chemistry.
Prerequisites: CHEM 2043.
Co-requisite: CHEM 4033.

CHEM 4032 Forensic Chemistry Laboratory: 2 semester hours.
Drug identification and confirmatory tests using spectroscopic techniques that include HPLC, GC, ICP/ AES, FTIR. Sample handling and storage.
Prerequisites: CHEM 4023 (may be taken concurrently) CHEM 4053.

CHEM 4033 Biochemistry: 3 semester hours.
Prerequisites: CHEM 2033 and CHEM 2043.
CHEM 4042 Biochemistry Laboratory: 2 semester hours.
Experiments in basic methodology for the isolation, purification and characterization of carbohydrates, lipids, proteins, nucleic acids and enzymes from natural products.
Prerequisites: CHEM 4033 (may be taken concurrently).
Co-requisite: CHEM 4033.

CHEM 4051 Research: 1 semester hour.
Library and laboratory work on selected problems.

CHEM 4052 Instrumental Analysis Laboratory: 2 semester hours.
Laboratory course that includes experimental applications of spectroscopy, electro-analytical methods, and chromatography.
Co-requisite: CHEM 4053.

CHEM 4053 Instrumental Analysis: 3 semester hours.
An introduction to the theory and application of modern instrumentation and techniques to the analysis of chemical systems. Includes interpretive spectroscopy, computer-assigned experimentation, and the use of the chemical literature.
Prerequisites: CHEM 3413.

CHEM 4061 Research: 1 semester hour.
Library and laboratory work on selected problems.

CHEM 4063 Inorganic Chemistry: 3 semester hours.
Modern atomic theory and the Periodic System, valence and bonding. The constitution of inorganic compounds; coordination chemistry and ligand field theory. The chemistry of nonmetals including polyacids, peracids and hydrides. Reactions in non-aqueous systems. Some interstitial and nonstoichiometric compounds. Radioactivity and atomic integration.
Prerequisites: CHEM 3413.

CHEM 4993 Independent Study: 1-3 semester hour.
Readings, research, and/or field work on selected topics.

CHEM 5013 Research: 3 semester hours.
Problems for investigation may be selected from one of the following fields of Chemistry: 1. Analytical; 2. Biochemistry; 3. Inorganic; 4. Organic; and 5. Physical.

CHEM 5023 Research: 1-3 semester hour.
Problems for investigation may be selected from one of the following fields of Chemistry: 1. Analytical; 2. Biochemistry; 3. Inorganic; 4. Organic; and 5. Physical.

CHEM 5026 Research: 6 semester hours.
Problems for investigation may be selected from one of the following fields of chemistry: 1. Analytical; 2. Biochemistry; 3. Inorganic; 4. Organic; and 5. Physical.

CHEM 5313 Advanced Analytical Chemistry: 3 semester hours.
Fundamental principles and investigation of chemical reactions as they relate to application of classical and modern instrumental methods. Focuses on the processes occurring in sampling, separation and quantitative measurement emphasizing chemical concepts.
Prerequisites: CHEM 5783.

CHEM 5322 Instrumental Lab: 2 semester hours.
An integrated laboratory that uses modern instrumentation to analyze complex chemical systems. Theories and principles encountered in CHEM 5313 and CHEM 5323 will provide the basis for bulk, surface, and interfacial analysis at the atomic and molecular levels.
Prerequisites: CHEM 5313 and CHEM 5323.

CHEM 5323 Instrumental Analysis: 3 semester hours.
Fundamental principles and theories underlying modern instrumental methods and techniques for analysis of complex systems. Atomic and molecular level characterization of surfaces, interfaces, and bulk systems will be emphasized.
Prerequisites: CHEM 5783.

CHEM 5402 Advanced Organic Chemistry: 2 semester hours.
A review of elementary Organic Chemistry with an extension of more advanced topics. Includes assigned subject materials.

CHEM 5414 Identification of Organic Compounds: 4 semester hours.
The separation and identification of pure organic compounds and mixtures.

CHEM 5442 Polymer Chemistry Laboratory: 2 semester hours.
A laboratory course in polymer chemistry focusing on characterization and synthesis of polymers and copolymer systems.

CHEM 5443 Polymer Chemistry: 3 semester hours.
Presentation of polymer concepts including polymerization and copolymerization processes, nomenclature, classifications, stereochemistry, structure-property relationships and morphology.
CHEM 5534 General Biochemistry: 4 semester hours.
A basic and extension course designed for graduate students planning to major or minor in Biochemistry or related fields and who require more than an elementary knowledge of the subject.

CHEM 5613 Advanced Inorganic Chemistry: 3 semester hours.
Consideration of important aspects of modern inorganic chemistry. Application of thermodynamics and kinetics in inorganic chemistry; practical and potential applications of inorganic systems.

CHEM 5783 Advanced Physical Chemistry: 3 semester hours.
A lecture course dealing with advanced topics of special interest in modern physical chemistry in areas including experimental and theoretical thermodynamics, chemical kinetics, collision and transition state theories, atomic and molecular spectra, quantum mechanical systems, photochemistry, structure of crystals and liquids, surface chemistry, macro-molecules, and gas phase reactions.

CHEM 5993 Independent Study: 1-3 semester hour.
Individual studies in advanced chemistry, reading, literature research/analysis/problem solving/writing research reports on selected topics in advanced chemistry.

CHEM 5994 Independent Study: 1-4 semester hour.
Individual studies in advanced chemistry, reading, literature research/analysis/problem solving/writing research reports on selected topics in advanced chemistry.