

# CHEMISTRY (CHM)

## CHM 110 Basic Concepts in Chemistry (3 Credits)

Introduction to the basic concepts necessary for an understanding of chemistry. These fundamental concepts are the foundation for this course and are more fully developed in later chemistry courses. Designed for students with no chemistry background.

## CHM 110L Basic Concepts in Chemistry Laboratory (1 Credits)

Introduction to chemistry laboratory techniques and skills required for successful chemistry experimental work. Co-enrollment in Basic Concepts in Chemistry, CHM 110, is required. Restricted to chemistry majors.

## CHM 210 General Chemistry for Engineers (3 Credits)

General Chemistry for Engineering Majors, emphasizing theoretical principles necessary for an understanding of the nature of matter and the physical and chemical changes which it undergoes. A good understanding of algebra is required.

## CHM 215 Chemistry I (3 Credits)

Study of the main concepts of general, organic, and biological chemistry. Designed for health science students whose curricula require only one year of chemistry.

## CHM 215L Chemistry I Laboratory (1 Credits)

Introduction to laboratory techniques in chemistry. For the Health Science/Exercise Science Majors.

## CHM 221 General Chemistry I (3 Credits)

Emphasis on theoretical principles necessary for an understanding of the nature of matter and the physical and chemical changes which it undergoes. High school chemistry is required. Algebra proficiency is required.

**Prerequisites:** Take MTH-153.

## CHM 221H General Chemistry I Honors (3 Credits)

Emphasis on theoretical principles necessary for an understanding of the nature of matter and the physical and chemical changes which it undergoes. High school chemistry is required. Good understanding of algebra desirable.

**Prerequisites:** Take MTH-153.

## CHM 221L General Chemistry I Laboratory (1 Credits)

Experimental chemistry utilizing methods of separation, identification, and purification of mixtures. Emphasis on thermochemical and chemical equilibrium concepts through analysis of experimental data. Must be taken in sequence.

## CHM 222 General Chemistry II (3 Credits)

Emphasis on theoretical principles necessary for the understanding of the nature of matter and the physical and chemical changes which it undergoes. Completion of General Chemistry I is required.

**Prerequisites:** Take MTH-153.

## CHM 222H General Chemistry II Honors (3 Credits)

Emphasis on theoretical principles necessary for an understanding of the nature of matter and the physical and chemical changes which it undergoes. High school chemistry is not required but desirable. Good understanding of algebra is desirable. Must be taken in sequence.

**Prerequisites:** Take MTH-153;

## CHM 222L General Chemistry II Laboratory (1 Credits)

Experimental chemistry utilizing methods of separation, identification, and purification of mixtures. Emphasis on thermochemical and chemical equilibrium concepts through analysis of experimental data. Must be taken in sequence.

## CHM 223A General Chemistry I (4 Credits)

General Chemistry for chemistry majors, emphasizing theoretical principles necessary for understanding the nature of matter and the changes it undergoes. High school chemistry or its equivalent is desirable. Good algebra skills are required because of the quantitative nature of much of the work. Includes problem-solving practice and inclusion of special chemistry topics.

**Prerequisites:** Take MTH-153.

## CHM 224 General Chemistry II (4 Credits)

General Chemistry for chemistry majors, emphasizing theoretical principles necessary, for understanding the nature of matter and the , changes it undergoes. High school chemistry, or its equivalent is desirable. Good algebra , skills are required because of the quantitative, nature of much of the work. Includes, problem-solving practice and inclusion of special , chemistry topics.

## CHM 224A General Chemistry II (4 Credits)

General Chemistry for chemistry majors, emphasizing theoretical principles necessary for understanding the nature of matter and the changes it undergoes. High school chemistry or its equivalent is desirable. Good algebra skills are required because of the quantitative nature of much of the work. Includes problem-solving practice and inclusion of special chemistry topics.

## CHM 231 General Chemistry I (3 Credits)

General Chemistry for chemistry majors, emphasizing theoretical principles necessary for understanding the nature of matter and the changes it undergoes. Good algebra skills are required because of the quantitative nature of much of the work.

## CHM 231H General Chemistry I Honors (3 Credits)

General Chemistry for chemistry majors, emphasizing theoretical principles necessary for understanding the nature of matter and the changes it undergoes. Good algebra skills are required because of the quantitative nature of much of the work.

## CHM 231R General Chemistry Applications I (1 Credits)

General Chemistry Applications is a two-semester course sequence for chemistry majors. It aims to develop students' critical thinking skills necessary for success in all their major courses. Students work in facilitated learning teams, solving problems related to General Chemistry content.

## CHM 232 General Chemistry II (3 Credits)

General Chemistry for chemistry majors, emphasizing theoretical principles necessary for understanding the nature of matter and the changes it undergoes. Good algebra skills are required because of the quantitative nature of much of the work.

## CHM 232H General Chemistry II Honors (3 Credits)

General Chemistry for chemistry majors, emphasizing theoretical principles necessary for understanding the nature of matter and the changes it undergoes. Good algebra skills are required because of the quantitative nature of much of the work.

## CHM 232R General Chemistry Applications II (1 Credits)

General Chemistry Applications is a two-semester course sequence for chemistry majors. It aims to develop students' critical thinking skills necessary for success in all their major courses. Students work in facilitated learning teams, solving problems related to General Chemistry content.

**CHM 312 Organic Chemistry I (3 Credits)**

Study of organic nomenclature, structure of, organic compounds, the classes of organic , compounds, and the reactions of organic molecules., A one semester organic chemistry for Health , Science Majors.

**Prerequisites:** Take CHM-120. Take CHM-222.

**CHM 321 Organic Chemistry I (3 Credits)**

Introduction to the chemistry of carbon-containing compounds, with emphasis on the relationship between the structure of organic molecules and their chemical reactions. Designed for science majors, including pre-medicine. Must be taken in sequence.

**Prerequisites:** Take CHM-222. Take CHM-224.

**CHM 321L Organic Chemistry I Laboratory (2 Credits)**

Laboratory course designed to teach modern laboratory procedures and techniques and to illustrate the reactions and theoretical material presented in CHM 321 and CHM 322. Must be taken in sequence.

**Prerequisites:** Take CHM-222L;

**CHM 322 Organic Chemistry II (3 Credits)**

Introduction to the chemistry of carbon-containing compounds, with emphasis on the relationship between the structure of organic molecules and their chemical reactions. Designed for science majors, including pre-medicine. Must be taken in sequence.

**CHM 322L Organic Chemistry II Laboratory (2 Credits)**

Laboratory course designed to teach modern laboratory procedures and techniques and to illustrate the reactions and theoretical material presented in CHM 321 and CHM 322. Must be taken in sequence.

**Prerequisites:** Take CHM-222L;

**CHM 323L Synthesis/Analysis in Organic Chem Lab (2 Credits)**

Project-based course providing research-level laboratory experience in modern organic chemistry, synthesis and analysis and the development of literature review and scientific presentation skills. For chemistry majors (others by permission of instructor).

**Prerequisites:** Take CHM-321L., Take CHM-322.

**CHM 331 Analytical Chemistry I (3 Credits)**

Study of volumetric and gravimetric methods of analysis with emphasis on chemical equilibrium, including acid-base, precipitation, oxidation-reduction, and complex metric methods of analysis.

**Prerequisites:** Take CHM-222. Take CHM-224. Take MTH-153.

**CHM 331L Analytical Chemistry I Laboratory (2 Credits)**

Practice of volumetric and gravimetric methods of analysis, including the use of instruments such as pH meters and electro analyzers.

**Prerequisites:** Take CHM-331.

**CHM 332 Analytical Chemistry II (3 Credits)**

Study of instrumental methods of analysis, including electrochemical, spectroscopic, chromatographic, thermal, and kinetic methods.

**CHM 332L Analytical Chemistry II Laboratory (2 Credits)**

Methods of analysis employing electrochemical techniques, spectrophotometer, chromatograph, microprocessor analyzers, and thermal analyzers.

**Prerequisites:** Take CHM-332.

**CHM 345 Math Methods/Logic for Physical Science (3 Credits)**

Application of differential equations, vector analysis, determinants and functions to problems encountered in the physical sciences. Emphasis on practical problem-solving skills.

**Prerequisites:** Take MTH-252.

**CHM 351 Chemistry Seminar (1 Credits)**

Presentation and discussion of current topics in all areas of chemistry. Required of junior chemistry majors.

**CHM 351H Honors Chemistry Seminar (1 Credits)**

Presentation and discussion of current topics in all areas of chemistry. Required of junior chemistry majors.

**CHM 352 Chemistry Seminar (1 Credits)**

Presentation and discussion of current topics in all areas of chemistry. Required of junior chemistry majors.

**CHM 361 Physical Chemistry I (3 Credits)**

Quantitative study of the structure and physical properties of matter, including study of the laws governing chemical interaction and the foundations upon which these laws rest. Covers energy change accompanying physical and chemical changes. Must be taken in sequence.

**Prerequisites:** Take MTH-251. Take PHY-153., Take CHM-331. Take CHM-345. Take MTH-252.

**CHM 362 Physical Chemistry II (3 Credits)**

Quantitative study of the structure and physical properties of matter, including study of the laws governing chemical interaction and the foundations upon which these laws rest. Covers energy change accompanying physical and chemical changes. Must be taken in sequence.

**Prerequisites:** Take MTH-252. Take PHY-153., Take CHM-331. Take CHM-345. Take MTH-252.

**CHM 363L Physical Chemistry Laboratory (2 Credits)**

Typical physicochemical measurements which seek to refine computational skills and experimental techniques. Instrumentation associated with spectroscopy, kinetics, and macromolecular characterization is regularly employed.

**CHM 370 Industrial Chmstry (3 Credits)**

Seminars supervised by visiting industrial , chemists as well as the departmental faculty,, including internship for cooperative training at , an industrial chemical company with co-op , assignment opportunities.

**CHM 397 Introduction to Research (1 Credits)**

Investigation of current problems in chemistry supervised by one of the members of the Chemistry Department. (5 hours lab per week required for one semester credit hour.)

**CHM 398 Introduction to Research (1 Credits)**

Investigation of current problems in chemistry supervised by one of the members of the Chemistry Department. (5 hours lab per week required for one semester credit hour.)

**CHM 431 Biochemistry I (3 Credits)**

In-depth study of the reactions occurring in living systems, designed for science majors (especially students intending advanced study in the health sciences). Topics include molecular architecture, molecular energetics, interactions of biomolecules, intermediary metabolism, mass transport in biological systems, and molecular genetics.

**Prerequisites:** Take CHM-322. Take Take CHM-362.

**CHM 431L Biochemistry I Laboratory (2 Credits)**

Emphasis on the procedures and operations of modern instrumentation used for isolation, purification, and study of biomolecules including modern chromatography techniques, gel and paper electrophoreses, ultra centrifugation, and spectroscopic techniques.

**Prerequisites:** Take CHM-322L. Take CHM-323L.

**CHM 432 Biochemistry II (3 Credits)**

In-depth study of the reactions occurring in living systems, designed for science majors (especially students intending advanced study in the health sciences). Topics include molecular architecture, molecular energetics, interactions of biomolecules, intermediary metabolism, mass transport in biological systems, and molecular genetics.

**Prerequisites:** Take CHM-322. Take CHM-362.

**CHM 432L Biochemistry II Laboratory (2 Credits)**

Emphasis on the procedures and operations of modern instrumentation used for isolation, purification, and study of biomolecules including modern chromatography techniques, gel and paper electrophoreses, ultra centrifugation, and spectroscopic techniques.

**Prerequisites:** Take CHM-322L. Take CHM-323L.

**CHM 451 Chemistry Seminar I (1 Credits)**

Presentation and discussion of current topics in all areas of chemistry. Required of all senior chemistry majors.

**CHM 452 Chemistry Seminar II (1 Credits)**

Presentation and discussion of current topics in all areas of chemistry. Required of all senior chemistry majors.

**CHM 473 Advanced Inorganic Chemistry (3 Credits)**

Study of chemical bonding, molecular structure, coordination compounds, and descriptive inorganic chemistry.

**CHM 473H Honors Advanced Inorganic Chemistry (3 Credits)**

Study of chemical bonding, molecular structure, coordination compounds, and descriptive inorganic chemistry.

**CHM 474 Applied Inorganic Chemistry (3 Credits)**

Introduction to the synthesis, isolation, and characterization of inorganic and organometallic compounds. Students will conduct basic synthetic laboratory procedures and utilize a variety of analytical characterization techniques. Students will complete a series of structured, interconnected laboratory experiments derived from current literature.

**CHM 474H Honors Applied Inorganic Chemistry (3 Credits)**

Introduction to the synthesis, isolation, and characterization of inorganic and organometallic compounds. Students will conduct basic synthetic lab procedures and utilize a variety of analytical characterization techniques. Students will complete a series of structured, interconnected lab experiments derived from current literature. Honors students will complete a literature review and present a seminar.

**CHM 481 Special Topics in Chemistry (3 Credits)**

Emphasis on modular topics including modern chemical bonding, stereochemistry, spectroscopy, ionization equilibrium, macromolecule, acid-base chemistry, organic and inorganic nomenclature, kinetics, and advanced analytical techniques.

**CHM 481B Special Topics: Atom/Molec Spectroscopy (3 Credits)**

Emphasis on modular topics including modern chemical bonding, stereochemistry, spectroscopy, ionization equilibrium, macromolecule, acid-base chemistry, organic and inorganic nomenclature, kinetics, and advanced analytical techniques.

**CHM 481C Special Topics: Organic Optoelectro Mat (3 Credits)**

Emphasis on modular topics including modern chemical bonding, stereochemistry, spectroscopy, ionization equilibrium, macromolecule, acid-base chemistry, organic and inorganic nomenclature, kinetics, and advanced analytical techniques.

**CHM 482 Special Topics in Chemistry (3 Credits)**

Emphasis on modular topics including modern chemical bonding, stereochemistry, spectroscopy, ionization equilibrium, macromolecule, acid-base chemistry, organic and inorganic nomenclature, kinetics, and advanced analytical techniques.

**CHM 497 Introduction to Research (1 Credits)**

Investigation of current problems in chemistry supervised by one of the Chemistry Department faculty (12 hours per week).

**CHM 498 Introduction to Research (1 Credits)**

Investigation of current problems in chemistry supervised by one of the Chemistry Department faculty (12 hours per week).