



**KENTUCKY STATE  
UNIVERSITY**

## CHEMISTRY (CHE)

### CHE 101: General Chemistry I

Prerequisite/Corequisite: MAT 115 or MAT 176 or consent of instructor. Introduction to units of scientific measurement, atomic structure, nomenclature, the mole concept, stoichiometry. Introduction to chemical reactions, calculations with chemical equations and formulas, the gas laws, thermochemistry, introduction to quantum theory of the atom and chemical periodicity. (Three hours of lecture per week)

**Credit Hours:** 3

**Contact Hours:** 3

### CHE 102: General Chemistry II

This course is a continuation of CHE 101. Topics include structure and bonding, states and properties of matter, chemical kinetics, chemical equilibria, acid-base theory, complex ion equilibria, electrochemistry and nuclear chemistry. (Three hours of lecture per week)

**Prerequisite:** CHE 101 or equivalent

**Credit Hours:** 3

**Contact Hours:** 3

### CHE 109: Chemistry in Context

An overview of some of the basic concepts and principles of chemistry using a guided inquiry approach incorporating hands-on chemistry activities related to real life applications, environmental, health, and social issues. (Two hours of lecture and two hours of laboratory per week.)

**Credit Hours:** 3

**Contact Hours:** 4

### CHE 110: General Chem I Laboratory

Prerequisite/Corequisite: CHE 101. Practical methods of measurements and the accuracy. Experimental investigations of common chemical reactions. Quantitative aspects of chemical reactions. Experimental aspects of other selected concepts of CHE 101. (Three hours of lab per week)

**Credit Hours:** 1

**Contact Hours:** 1

### CHE 120: General Chemistry II Lab

Prerequisites/Corequisite: CHE 102. Elementary statistical analysis and molecular modeling. Experimental aspects of properties of matter, chemical kinetics, chemical equilibria, acid-base theory, complex ion equilibria and electrochemistry. (Three hours of laboratory per week)

**Credit Hours:** 1

**Contact Hours:** 1

### CHE 130: Ferment. & Spirits Chem.

**Credit Hours:** 4

**Contact Hours:** 4

### CHE 200: Intro to Organic & Biochem

Nomenclature, structure, stereochemistry, and reactivity of basic organic compounds. Emphasis on functional groups commonly found in biologically active compounds. (Four hours of lecture per week)

**Prerequisite:** CHE 102 or CHE 109

**Credit Hours:** 4

**Contact Hours:** 4

### CHE 209: Survey Gen/Organic/Biochemi

Topics include: properties of matter, atomic structure and the periodic table, chemical bonding, general reactions such as acid-base chemistry, organic functional groups, carbohydrates, proteins, nucleic acids, and lipids. This course is required for students in Nursing. (Three hours of lecture and three hours of lab per week.)

**Credit Hours:** 4

**Contact Hours:** 6

### CHE 301: Organic Chemistry I

Isomerism in organic molecules, reactivity of hydrocarbons, alkyl halides, free radicals, alcohols, ethers and related compounds. Introduction to reaction mechanisms. Introduction to instrumental methods (NMR, IR). (Three hours of lecture per week)

**Prerequisite:** CHE 102

**Credit Hours:** 3

**Contact Hours:** 3

### CHE 302: Organic Chemistry II

A continuation of CHE 301 exploring the reactivity of unsaturated hydrocarbons, carbonyl compounds, and amines. Multistep synthesis of organic molecules with acquired reaction knowledge. Use of Instrumental methods (NMR, IR, MS, and UV-vis) to characterize organic compounds. (Three hours of lecture per week)

**Prerequisite:** CHE 301

**Credit Hours:** 3

**Contact Hours:** 3

### CHE 303: Quantitative Analysis

Fundamental theory and practice of volumetric, gravimetric, and electrochemical analysis. Preparation of standard solutions and analysis of salts, alloys, and ores. (Two hours of lecture, four hours of laboratory per week)

**Prerequisite:** CHE 102

**Credit Hours:** 4

**Contact Hours:** 6

### CHE 310: Organic Chemistry I Lab.

Prerequisite/Corequisite: CHE 301. Purification, separation (including TLC, GC), and characterization of organic compounds. (Three hours of laboratory per week)

**Credit Hours:** 1

**Contact Hours:** 1

### CHE 315: Biochemistry

Introduction to amino acids, proteins, buffers, enzymes, nucleic acids, carbohydrates, lipids and other biomolecules. Introduction to the metabolism of carbohydrates, lipids and nitrogen-containing molecules. (Three hours of lecture per week)

**Prerequisite:** CHE 200 or CHE 302

**Credit Hours:** 3

**Contact Hours:** 3

**CHE 320: Organic Chemistry II Lab**

Prerequisite/Corequisite: CHE 302. Use of the methods of separation and synthesis learned in CHE 310 to prepare new compounds. Compounds are characterized by instrumental methods (GC, IR, NMR) and TLC, along with other methods. (Three hours of laboratory per week)

**Credit Hours:** 1

**Contact Hours:** 1

**CHE 350: Biochemistry Laboratory**

Prerequisite/Corequisite: CHE 315. Experiments with buffers and enzymes. Properties and digestion reactions of carbohydrates, lipids and proteins. HPLC and other methods of separation and purification of compounds. (Three hours of laboratory per week)

**Credit Hours:** 1

**Contact Hours:** 3

**CHE 399: Undergrad Teaching Experience**

Students earn course credit for undergraduate teaching experience including but not limited to (1) assisting students during laboratory sessions, (2) helping to set up laboratories or lecture/lab quizzes, or (3) conducting PLTL-Excel type workshops for students. Course may be repeated for credit.

**Prerequisite:** Consent of instructor

**Credit Hours:** 1

**Contact Hours:** 1

**CHE 401: Undergrad Research**

This course is designed to give chemistry majors an opportunity to conduct independent research, using techniques in synthesis, analysis, and applications of basic chemical theory. A formal oral presentation of the findings of the student's project is required. May be repeated for credit.

**Prerequisite:** Consent of instructor

**Credit Hours:** 1-4

**Contact Hours:** 1-4

**CHE 402: Chemistry Seminar**

Students will undertake a review of the chemical literature and give an oral presentation on a specific topic at the end of their course.

**Prerequisite:** Consent of instructor

**Credit Hours:** 1

**Contact Hours:** 1

**CHE 407: Physical Chemistry I**

Introduction to the theory and application of thermodynamics, molecular kinetics, and chemical kinetics. (Three hours of lecture, three hours of laboratory per week)

**Prerequisite:** CHE 102 and MAT 131

**Credit Hours:** 4

**Contact Hours:** 6

**CHE 408: Inorganic Preparation**

A continuation of CHE 407. Introduction to quantum mechanics, statistical mechanics, and molecular spectroscopy. (Three hours of lecture, three hours of laboratory per week)

**Prerequisite:** CHE 407

**Credit Hours:** 4

**Contact Hours:** 6

**CHE 409: Physical Chemistry II**

A continuation of CHE 407. Introduction to quantum mechanics, statistical mechanics, and molecular spectroscopy. (Three hours of lecture, three hours of laboratory per week). CREDIT: 4 SEMESTER HOURS.

**Prerequisite:** CHE 407

**Credit Hours:** 4

**Contact Hours:** 5

**CHE 412: Inorganic Chemistry**

Quantum theory of polyatomic systems, introduction to group theory, theories on bonding and structure, introduction to coordination chemistry and the chemistry of Transition Elements, inorganic reaction mechanisms, acid-base theories, inorganic reactions in non-aqueous media. (Four hours of lecture per week)

**Prerequisite:** CHE 101 and CHE 102

**Credit Hours:** 3

**Contact Hours:** 3

**CHE 414: Instrumental Analysis**

Theory and modern methods of instrumental analysis, with emphasis on spectrophotometric, chromatographic, and electroanalytical techniques. (Two hours of lecture, four hours of laboratory per week)

**Prerequisite:** CHE 303

**Credit Hours:** 4

**Contact Hours:** 6

**CHE 425: Intro. Physical Chemistry**

An introductory one-semester course in physical chemistry. The properties of gases, theory and application of thermodynamics, phase and chemical equilibria, electrochemistry, kinetics, introduction to quantum theory and spectroscopy. Credits: 4 semester hours

**Prerequisite:** CHE 102

**Co-requisite:** MAT 131

**Credit Hours:** 4

**Contact Hours:** 4