

# Chemistry

## CHEM& 110

### Chemical Concepts W/ Lab [M/S] • 5.0 Credits

Formerly CHEM& 110, CHM 100

Basic introduction to chemical principles as they apply to the structure and behavior of matter. Illustrations from everyday life, environmental topics, medicine, and biochemistry are used to illustrate chemical principles. Topics include: measurement in science, atoms, molecules, nuclear chemistry, and current chemical issues such as energy, polymers, or foods and drugs among others. Assumes no previous chemistry background. Course intended for non-science majors and may be used to fulfill the general science requirement for the AA degree. \$25 science fee. **Prerequisite: A grade of 2.0 or better in MATH 50, 60, or 62, or a grade of 0.7 or better in a higher math class, or appropriate placement.**

## CHEM& 121

### Intro to Chemistry W/ Lab [M/S] • 5.0 Credits

Formerly CHEM& 121, CHM 110

Fundamentals of inorganic chemistry with special emphasis on the application of principles to the health sciences. Topics covered include: measurements, energy, atomic structure, chemical bonding, nomenclature, mole concept, stoichiometry, gas laws, liquid and solid states, solutions, equilibrium, acid/base chemistry, oxidation-reduction, and nuclear chemistry. Course intended for students who plan to pursue an associate degree or enter a four-year baccalaureate program in the Health Sciences. May also be used to fulfill the general science requirement for the AA degree. \$25 science fee. **Prerequisite: A grade of 2.0 or better in MATH 50, 60, or 62, or a grade of 0.7 or better in a higher math class, or appropriate placement.**

## CHEM& 122

### Intro to Organic Chemistry W/ Lab [M/S] • 5.0 Credits

Formerly CHEM& 122, CHM 120

Fundamentals of organic chemistry with special emphasis on the application of principles to the health sciences. Topics covered include: saturated, unsaturated, aromatic hydrocarbons, alcohols, thiols, phenols, ethers, aldehydes, ketones, carboxylic acids, esters, amines, and amides. Each family of compounds are studied with respect to its structure, behavior, and function. Biochemical applications are integrated into this approach. \$25 science fee. **Prerequisite: A grade of 2.0 or better in CHEM& 121, CHEM& 140, or CHEM& 161.**

## CHEM& 123

### Intro to Biochemistry W/ Lab [M/S] • 5.0 Credits

Formerly CHEM& 123, CHM 130

Topics covered include: optical isomerism; structure and function of carbohydrates, lipids, proteins, and nucleic acids; protein synthesis, enzymes, hormones; biochemical energetics and metabolism of carbohydrates, lipids, and proteins. \$25 science fee. **Prerequisite: A grade of 2.0 or better in CHEM& 122 or CHEM& 242.**

## CHEM& 131

### Intro to Organic/Biochemistry W/ Lab [M/S] • 5.0 Credits

Formerly CHEM& 131, CHM 135

The course provides the fundamental chemistry of organic compounds in molecules and reactions of living systems. Topics covered include: hydrocarbons, alcohols and thiols, carbonyl compounds, carboxylic acids, esters, amines, amides, carbohydrates, proteins, lipids, and nucleic acids. Universal metabolic pathways that occur in both simple and complex organisms are covered, including: glycolysis, gluconeogenesis, citric acid cycle, electron transport chain, oxidative phosphorylation, fatty acid biosynthesis and degradation, amino acid transamination, and all aspects of the storage and expression of genetic information. This course

is designed for students that need a laboratory science class that has a depth of both organic chemistry and biochemistry. \$25 science fee.

**Prerequisite: A grade of 2.0 or better in either CHEM& 140 or CHEM& 121.**

## CHEM& 140

### General Chemistry Prep W/ Lab [M/S] • 5.0 Credits

Formerly CHEM& 140, CHM 101

Introduction to chemical principles, chemical measurements, matter and energy, atomic theory, periodic properties, mole concept, molecules, compounds and chemical bonding, nomenclature and chemical equations, stoichiometry and chemical calculations, gas laws, solids, liquids, phase changes, oxidation-reduction reactions, solutions, reaction rates and chemical equilibrium, and acids/bases. The course is directed toward students needing a knowledge of the fundamentals of inorganic chemistry and planning to obtain a degree in the physical/life science/engineering disciplines. Excellent preparation for CHEM& 161. \$25 science fee. **Prerequisite: A grade of 2.0 or better in MATH 70 or 72, or a grade of 0.7 or better in a higher math class, or appropriate placement.**

## CHEM& 161

### General Chemistry I W/ Lab [M/S] • 6.0 Credits

Formerly CHEM& 161, CHM 111

Fundamental concepts in chemistry including matter, measurement, and dimensional analysis, atomic theory, atomic structure, chemical bonding, chemical formulas and nomenclature, mole concept, chemical reactions and stoichiometry, thermochemistry, electronic structure, periodic trends, molecular geometry, valence bond theory, molecular orbital theory, chemical instrumentation, data acquisition, and data analysis. Problem-solving techniques and critical thinking are fundamental in both the lecture and laboratory. \$25 science fee. **Prerequisite: Completion of CHEM& 140 or CHEM& 121 with a grade of 2.0 or better or completion of a year-long high school chemistry course with a B or better.**

## CHEM& 162

### General Chemistry II W/ Lab [M/S] • 6.0 Credits

Formerly CHEM& 162, CHM 112

Principles of the gas, liquid, and solid states of matter, intermolecular forces, solutions, chemical kinetics, chemical equilibria, chemical instrumentation, data acquisition, and data analysis. Problem-solving techniques and critical thinking are fundamental in both the lecture and laboratory. \$25 science fee. **Prerequisite: Completion of CHEM& 161 with a 2.0 or better.**

## CHEM& 163

### General Chemistry III W/ Lab [M/S] • 6.0 Credits

Formerly CHEM& 163, CHM 113

Spontaneity, entropy, free energy, electrochemistry, nuclear chemistry, introduction to organic chemistry, chemical instrumentation, data acquisition, data analysis, and other special topics in chemistry. Problem-solving techniques and critical thinking are fundamental in both the lecture and laboratory. \$25 science fee. **Prerequisite: Completion of CHEM& 162 with a 2.0 or better.**

## CHEM 199

### Special Studies • 1.0–15.0 Credits

A class used to explore new coursework. \$25 science fee.

## CHEM& 241

### Organic Chemistry I [M/S] • 4.0 Credits

Formerly CHEM& 241, CHM 221

# Chemistry

Stresses nomenclature, structure, stereochemistry, and introduces conceptual material needed to understand reaction mechanisms and synthesis. **Prerequisite: A grade of 2.0 or better in CHEM& 163 and concurrent enrollment in CHEM& 251.**

## CHEM& 242

### Organic Chemistry II [M/S] • 4.0 Credits

Formerly CHEM& 242, CHM 222

Deals with the major classes of organic compounds with respect to preparations, mechanisms of reactions, syntheses and identification.

**Prerequisite: A grade 2.0 or better in CHEM& 241/251, and concurrent enrollment in CHEM& 252.**

## CHEM& 243

### Organic Chemistry III [M/S] • 4.0 Credits

Formerly CHEM& 243, CHM 223

Advanced reaction mechanisms and syntheses. Polymers, macromolecular and biochemical applications, spectroscopy, chromatography, and identification of organic compounds. **Prerequisite: A grade of 2.0 or better in CHEM& 242/252, and concurrent enrollment in CHEM& 253.**

## CHEM& 251

### Organic Chemistry I Lab [M/S] • 2.0 Credits

Lab to be taken concurrently with CHEM& 241. \$25 science fee.

**Prerequisite: Completion of CHEM& 163 with a 2.0 or better and concurrent enrollment in CHEM& 241.**

## CHEM& 252

### Organic Chemistry II Lab [M/S] • 2.0 Credits

Lab to be taken concurrently with CHEM& 242. \$25 science fee.

**Prerequisite: Completion of CHEM& 241 and CHEM& 251, both with a 2.0 or better, and concurrent enrollment in CHEM& 242.**

## CHEM& 253

### Organic Chemistry III Lab [M/S] • 2.0 Credits

Lab to be taken concurrently with CHEM& 243. \$25 science fee.

**Prerequisite: Concurrent enrollment in CHEM& 243**

## CHEM 254

### Quantitative Analysis [M/S] • 2.0 Credits

Formerly CHEM 254, CHM 251

Introduction to analytical chemistry. Sampling, statistics, and spreadsheets. Acid-base, precipitation, complexation, and redox equilibria. Activity coefficients and systematic treatment of equilibrium. Volumetric, gravimetric, potentiometric, environmental, and clinical methods of analysis taught in the lab. **Prerequisite: Completion of CHEM& 163 with a 0.7 or higher and concurrent enrollment in CHEM 264.**

## CHEM 255

### Instrumental Analysis [M/S] • 2.0 Credits

Formerly CHEM 255, CHM 252

Electrochemistry, potentiometry, coulometry, voltammetry, spectrophotometry, atomic spectroscopy, chromatography, capillary electrophoresis, and mass spectrometry. Ion-selective electrode, coulometric, spectrophotometric, atomic spectrometric, solvent extraction, chromatographic, and mass spectrometric methods of analysis taught in the lab. CHEM 255/265 has a heavy emphasis on instrumental methods of chemical analysis. Computer-interfaced instrumentation included in the lab. **Prerequisite: Completion of CHEM 254/264 with a 0.7 or higher and concurrent enrollment in CHEM 265.**

## CHEM 260

### Biochemistry [M/S] • 5.0 Credits

Fundamentals of biochemistry course covering an introduction to structure and function of proteins, carbohydrates, lipids, and nucleic acids. Essential metabolic pathways, enzymology, transcription, translation, biological membranes, and medicinal chemistry are also covered. The course is designed to provide a foundation in biochemistry for students in science fields, pre-pharmacy and pre-med programs. \$25 science fee.

**Prerequisite: A grade of 2.0 or better in CHEM& 252 and a grade of 2.0 or better in either BIOL& 160 or BIOL& 211.**

## CHEM 264

### Quantitative Analysis Lab [M/S] • 3.0 Credits

Lab to be taken concurrently with CHEM 254. \$25 science fee.

## CHEM 265

### Instrumental Analysis Lab [M/S] • 3.0 Credits

Lab to be taken concurrently with CHEM 255. \$25 science fee.

## CHEM 281

### Undergraduate Research, Special Topics [M/S] • 1.0–3.0 Credits

Designed for students who want to expand their knowledge of chemistry beyond the basics offered in their regular courses. By arrangement with the instructor, students can pursue a special topic of interest, design and carry out a project, or participate in undergraduate research (either alone or with other students) in the areas of natural product chemistry, or organic analytical chemistry. Note: credits earned in this course cannot be used as a substitute for required credits in other CBC chemistry courses. \$25 science fee. **Prerequisite: Instructor permission and completion of CHEM& 140 with a grade of 2.0 or better or high school chemistry with a grade of B or better.**

## CHEM 282

### Undergraduate Research, Special Topics [M/S] • 1.0–3.0 Credits

Designed for students who want to expand their knowledge of chemistry beyond the basics offered in their regular courses. By arrangement with the instructor, students can pursue a special topic of interest, design and carry out a project, or participate in undergraduate research (either alone or with other students) in the areas of natural product chemistry, or organic analytical chemistry. Note: credits earned in this course cannot be used as a substitute for required credits in other CBC chemistry courses. \$25 science fee. **Prerequisite: Instructor permission and completion of CHEM& 140 with a grade of 2.0 or better or high school chemistry with a grade of B or better.**

## CHEM 283

### Undergraduate Research, Special Topics [M/S] • 1.0–3.0 Credits

Designed for students who want to expand their knowledge of chemistry beyond the basics offered in their regular courses. By arrangement with the instructor, students can pursue a special topic of interest, design and carry out a project, or participate in undergraduate research (either alone or with other students) in the areas of natural product chemistry, or organic analytical chemistry. Note: credits earned in this course cannot be used as a substitute for required credits in other CBC chemistry courses. \$25 science fee. **Prerequisite: Instructor permission and completion of CHEM& 140 with a grade of 2.0 or better or high school chemistry with a grade of B or better.**

## CHEM 284

### Undergraduate Research, Special Topics [M/S] • 1.0–3.0 Credits

Designed for students who want to expand their knowledge of chemistry beyond the basics offered in their regular courses. By arrangement with the instructor, students can pursue a special topic of interest, design

