

## Chemistry Courses

### **CHE 151 The Chemical Basis of Everyday Phenomena (3 credits)**

An introduction to the basic concepts of chemistry intended for students with relatively little previous experience with the field, or who need to improve basic chemical and mathematical skills before undertaking CHE 210-215. Chemistry can be described as “the central science” and as such; the course will focus on the underlying concepts of chemistry, how they were discovered, and how they are applied in everyday circumstances. There will be an emphasis on the quantitative/problem solving applications of topics covered. This class cannot be taken Pass/Fail.

### **CHE 151L Chemistry Connections Laboratory (1 credit)**

This laboratory experience is designed to allow for all the practical application of materials covered in CHE 151. The laboratory allows the students to experience a hands-on exploration of topics so that students connect chemistry and the world around them. This class cannot be taken Pass/Fail. Corequisite: CHE 151.

### **CHE 165 Introduction to Environmental Science and Analysis (3 credits)**

Introduction to the basic scientific concepts behind selected timely environmental issues. Students will be introduced to topics such as global warming, air quality issues such as smog, acid rain, ozone depletion, and ground water contamination. The class lectures will lead students through the underlying critical chemical and physical processes. This is an interdisciplinary study of the human relationship with the Earth’s environment and how we study it. This class is intended to be an introduction to environmental science and its relationship to chemistry. The class was designed for students with relatively little previous experience with the chemistry or environmental science. The course will focus on applying quantitative and qualitative skills to exploring environmental issues and the methods we use to explore them. Throughout the class, we will be exploring the question of “What do you know and how do you know it?”

### **CHE 210 Essential Concepts of Chemistry (3 credits)**

(General Chemistry I)

An introduction to the basic concepts of chemistry. It includes aspects of the history of chemistry and accounts of the contributions of some of the important chemists of the past. Modern concepts considered are the structure of matter, atomic theory, chemical bonding, molecular shape, chemical reactivity, stoichiometry, thermodynamics and equilibria. Three hours of lecture per week. Prerequisite: Math 075 or equivalent.

### **CHE 210L Essential Concepts of Chemistry Laboratory (1 credit)**

A laboratory experience designed to complement the Essential Concepts of Chemistry lecture course. Emphasis is on quantitative as well as qualitative methodology. Experiments are chosen to illustrate concepts from the lecture. Three hours of laboratory per week. Corequisite: CHE 210.

### **CHE 215 Introduction to Structural Inorganic Chemistry (3 credits)**

(General Chemistry II)

An introduction to the chemistry of inorganic compounds. It includes an introduction to coordination compounds, nuclear chemistry, complexation equilibrium, redox chemistry, and the cosmic origins of the elements. Three hours of lecture per week. Prerequisite: CHE 210.

### **CHE 215L Introduction to Structural Inorganic Chemistry Laboratory**

(1 credit)

A companion laboratory for the Introduction to Inorganic Chemistry lecture. Experiments are chosen to illustrate concepts from the lecture. Three hours of laboratory per week. Prerequisite: CHE 210, 210L.

### **CHE 220 Introductory Organic Chemistry I (3 credits)**

Introduction to molecular structure, bonding, and reactivity primarily of aliphatic molecules. This course will include the study of kinetics and selected spectroscopic techniques. Three hours of lecture per week. Prerequisite: CHE 210.

### **CHE 220L Introductory Organic Chemistry I Laboratory (2 credits)**

Students will apply a selection of separation and analytical techniques to problems of the resolution of mixtures and to the determination of patterns or reactivity. Students will work primarily in groups. Four hours of laboratory per week. Prerequisites: CHE 210L, and Corequisite CHE 220.

**CHE 315 Analytical Chemistry** (4 credits)

Mastering laboratory and instrumental techniques to obtain reliable quantitative measurements of chemical systems; the “how” and “why” of designing experimental approaches to break free of laboratory manuals. How analyses and instruments work, and how to get the most out of them. Three hours of lecture and three hours of lab per week. Prerequisites: CHE 215, 215L.

**CHE 340 Advanced Inorganic Chemistry** (4 credits)

This course offers a more sophisticated treatment of chemical periodicity, bonding (including elementary quantum mechanics), solids, organometallics, group theory and its relationship to molecular spectroscopy, inorganic acid-base reactivities, and redox/electrochemistry is developed. This course is an integrated laboratory/lecture experience allowing for the practical application of lecture material. Three hours of lecture and three hours of lab per week. Prerequisites: CHE 215, 215L.

**CHE 350 Introductory Organic Chemistry II** (3 credits)

An integral continuation of CHE 220, using reactions and concepts to build the chemistry of aromatic systems and of carbonyl-containing molecules. Three hours of lecture per week. Prerequisite: CHE 220.

**CHE 350L Introductory Organic Chemistry II Laboratory** (2 credits)

Using previously learned and new selections of techniques, students will explore reactivities along with single and sequence synthesis of molecules containing polyalkene, aromatic and carbonyl-based functional groups. Work in this lab will be primarily individual, but comparing results will be included in some experimental write-ups. Four hours of lab per week. Prerequisites: CHE 220L, Corequisite CHE 350.

**CHE 365 Biochemistry I: Biomolecules** (3 credits)

An introduction to the chemistry and biochemistry of amino acids, sugars, lipids and nucleosides with selected inclusion of topics in protein, carbohydrate and membrane chemistry. Three hours of lecture per week. Prerequisite: CHE 350.

**CHE 365L Biomolecules Laboratory** (1 credits)

This laboratory will focus on the application of chemical and analytical techniques to the determination of selected properties of biomolecules. Three hours of lab per week. Corequisites: CHE 365.

**CHE 345/445 Applied Topics in Chemistry** (3 credits)

These courses examine chemical issues, topics and techniques in an applied manner that is not fully addressed in the general chemistry, organic chemistry or analytical sequence. While the focus will vary with each offering, the courses emphasize detailed work with primary sources, equipment, data and specific techniques. The course will be offered singularly at the 300 or 400 level as appropriate to the topic as opposed to a split level course. Topics range from Spectroscopic Analysis of Organic Compounds, Intermediate Techniques in Organic Chemistry, Advanced Bonding and Structure, to Advanced Topics in Environmental Analysis.

**CHE 401 Thermodynamics and Kinetics** (3 credits)

Elementary thermodynamics and kinetics are approached through a study of energy and entropy changes for macroscopic phenomena, rate laws, and reaction mechanisms. Three hours of lecture per week. Prerequisites: CHE 215, PHY 201 or PHY 211, Corequisite MAT 222.

**CHE 401L Physical Chemistry Techniques** (1 credit)

The use of instruments to investigate the physicochemical properties of chemical systems will be studied in the laboratory. Experiments illustrating thermodynamic and kinetic principles will be performed. The relationship of physical chemical theory and practice will be developed. Three hours of lab per week. Prerequisites: CHE 315. Corequisite: CHE 401.

**CHE 410 Biochemistry II: Enzymes and Primary Metabolism** (3 credits)

An introduction to the chemistry and activity of enzymes and the application of that knowledge to the energy generating primary metabolism of glucose to carbon dioxide and water and the preparation of sugar by photosynthesis. Three hours of lecture per week. Prerequisite: CHE 365.

**CHE 455 Senior Seminar** (2 credits)

This course is open only to and is required of all senior Chemistry Department Majors. Topics for class discussion will include the philosophy, history and profession of modern science. Students will develop a working resume, letters of recommendation, and/or graduate/professional entrance materials. Each student will be required to complete a final project involving review and analysis of primary literature, development of a research based proposal, and a written paper and oral presentation of their proposal. (Open to students with senior standing.)

## Chinese Courses

### **Chinese 125 Spoken Chinese** (4 credits)

This course is offered only at Capital Normal University in Beijing, China. It is open to students who have not studied Chinese previously. It is an intensive introduction to spoken Chinese, including one-on-one oral drill sessions, and focuses on Mandarin phonetics.

### **Chinese 155 Chinese Listening Comprehension** (4 credits)

This course is offered only at Capital Normal University in Beijing, China. It is open to students who have not studied Chinese previously. It is an intensive introduction to listening comprehension in Chinese and focuses on Mandarin phonetics.

### **Chinese 175 Chinese Grammar** (4 credits)

This course is offered only at Capital Normal University in Beijing, China. It is open to students who have not studied Chinese previously. It is an intensive introduction to Chinese grammar, beginning with the pinyin style of Chinese romanization and progressing quickly to the study and use of traditional Chinese characters.