

# CHEMISTRY (CHEM)

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**CHEM 805 – Chemical Management & Safety 1 credit hour**

This course addresses chemical management and safety issues that are commonly encountered in chemical laboratories and stockrooms.

**CHEM 810 – Principles of Environmental Chemistry 3 credit hours**

A study of the fate of chemicals in the air, water, and soil, and their impact on human health and the natural environment. Topics will include water pollution and water treatment, greenhouse gases and ozone-layer destruction, sources and management of hazardous wastes.

**CHEM 820 – Principles of Inorganic Chemistry 3 credit hours**

This course emphasizes topic areas that are typically introduced in General Chemistry, such as atomic, molecular, and solid-state structure, periodic trends, and acid-base concepts, but in much greater depth. Three lecture credits without laboratory.

**CHEM 822 – Transition Metal Chemistry 2 credit hours**

This course emphasizes advanced topics in Inorganic Chemistry pertaining to the structure and properties of transition metals and the complexes they form. Credit will not be granted for both this course and CHEM 821.

Prerequisite: CHEM 820 or department permission. Enrollment not allowed in CHEM 822 if CHEM 821 has been completed.

**CHEM 823 – Fundamentals of Nanoscience 1 credit hour**

This course provides an introduction to the preparation and properties of nanoscale materials in connection to current and future scientific applications. Specific materials systems discussed will be influenced by the publicity of recent research breakthroughs and may include quantum dots, gold and silver nanosensors, semiconductor nanoparticles, and carbon nanotubes.

Prerequisite: Enrollment not allowed in CHEM 823 if CHEM 821 has been completed.

**CHEM 840 – Advanced Principles of Organic Chemistry 3 credit hours**

This course is designed to introduce modern technologies to identify structures of organic molecules. CHEM 840 emphasizes principles, applications and case study. Nuclear Magnetic Resonance (NMR) Spectrometry, Mass Spectrometry (MS), Infrared Spectroscopy (IR), and Ultraviolet-Visible Spectroscopy (Uv-Vis) will be covered. A strong undergraduate organic chemistry background is required.

**CHEM 855 – Principles of Biochemistry 3 credit hours**

Chemistry of fats, protein, carbohydrates, hormones, vitamins, and other biologically important compounds. A solid background in organic chemistry is needed for success in this course.

**CHEM 864 – Principles of Analytical Chemistry 2 credit hours**

The following topics will be covered in-depth; laboratory equipment and techniques, accuracy and precision, QA and QC, solubility, acid-base equilibrium, titrations, electrochemical methods, and spectroscopy. Students should have a strong background in general chemistry topics prior to enrolling in this course.

**CHEM 866 – Analytical Instrumentation 1 credit hour**

The following topics will be covered in-depth: laboratory equipment and techniques with a focus on advanced electrochemical methods, chromatography, and spectroscopy. Students should have a strong background in general chemistry topics prior to enrolling in this course.

**CHEM 883 – Chemical Kinetics 2 credit hours**

This course emphasizes the following topic areas: reaction rates, rate laws, integrated rate law, reaction mechanisms, parallel reaction, temperature dependent rate constants, reversible reactions, potential energy surfaces, activated complex theory, transition state theory, catalysis, radical-chain reactions, and photochemistry. This course is offered for 2 credits without laboratory.

Prerequisite: Enrollment not allowed in CHEM 883 if CHEM 882 has been completed.

**CHEM 889 – Problems in Chemistry 1-3 credit hours**

Independent investigations of chemistry problems. Three hours of laboratory work each week for each hour credit.

Department Consent Required

Total Credits Allowed: 3.00

**CHEM 890 – Directed Research 1-3 credit hours**

Independent original research of a selected topic in chemistry under the direction of a chemistry graduate faculty member.

Total Credits Allowed: 9.00

**CHEM 896 – Thesis 6 credit hours****CHEM 899 – Special Topics 1-3 credit hours**

This course will cover topics not addressed in other courses offered by the department. Most topics will consist of a highly specialized area of study or revolve around issues or recent trends and innovations related to high school chemistry teaching.

Total Credits Allowed: 10.00