HENDRIX

Catalog 2008-2009

CATALOG FOR THE ONE HUNDRED THIRTY-SECOND YEAR

CHEMISTRY

Professors Goodwin, Hales (chair), and Kopper
Associate Professor Gron
Assistant Professors Caro and Hatch
Visiting Assistant Professor Dequeant

MAJOR

13 courses distributed as follows:

Chemistry (8)

- CHEM 110 *General Chemistry I: Chemical Structure and Properties*
- CHEM 120 *General Chemistry II: Chemical Analysis and Reactivity*
- CHEM 240 *Organic Chemistry I*
- CHEM 250 *Organic Chemistry II*
- CHEM 310 *Physical Chemistry: Quantum Mechanics and Spectroscopy*
- CHEM 320 *Physical Chemistry: Thermodynamics and Chemical Kinetics*
- CHEM 340 *Advanced Inorganic Chemistry*
- One course from

CHEM 330 *Biological Chemistry*
CHEM 350 *Advanced Analytical Chemistry*
CHEM 410 *Advanced Physical Chemistry*

Mathematics (2)

- MATH 130 *Calculus I*

and

- MATH 140 *Calculus II*

Physics (2)

- PHYS 230 and 240 *General Physics I* and *II (Calculus-based)* (recommended)

or

PHYS 210 and 220 *General Physics I* and *II*

Biology (1)

- BIOL 150 *Cell Biology* (or equivalent)

All majors must also take two semesters of CHEM ATC *ATEC Laboratory*, and two semesters of CHEM 497 *Chemistry Seminar*. These do not carry course credit.

Senior Capstone Experience

The Senior Capstone Experience for the chemistry major consists of two parts. The first part is the Major Field Test (MFT) in Chemistry. The second part is a literature-based research paper written under the direct supervision of a faculty member and presented as a seminar. The grade for the Senior Capstone Experience is the average of grades based on the two parts of the experience.

American Chemical Society Certified Degree in Chemistry:

Requirements for the chemistry major plus

- CHEM 330 *Biological Chemistry*
- CHEM 350 *Advanced Analytical Chemistry*
- CHEM 450 *Directed Research*

MINOR

6 courses distributed as follows:

- CHEM 110 *General Chemistry I: Chemical Structure and Properties*
- CHEM 120 *General Chemistry II: Chemical Analysis and Reactivity*
- CHEM 240 *Organic Chemistry I*
- CHEM 250 *Organic Chemistry II*
- two additional courses in chemistry numbered above 250

Courses

CHEM 100 *Concepts of Chemistry* (NS)
The theories, models, structures, and reactions of modern chemistry are introduced to the nonscience major. Historical antecedents in the development of current concepts of matter are explored. Mathematical problem-solving in a chemistry context is included.

CHEM 101 *Chemistry of the Environment* (NS-L)
Environmental issues are used as a basis to introduce the theories, models, structures, and reactions of modern chemistry to the non-science major. The states of matter are studied in the contexts of air pollution, ozone depeletion, global warming, acid rain, and energy sources and consumption. Mathematical problem solving in a chemical context is included.

CHEM 110 *General Chemistry I: Chemical Structure & Properties* (NS-L)
Theories of matter with emphasis on environmental applications. Laboratory includes separations and spectroscopy.

CHEM 120 *General Chemistry II: Chemical Analysis & Reactivity*
Reactions and equilibria of environmental significance. Laboratory involves analysis of environmental samples. *Prerequisite: CHEM 110.*

CHEM 240 *Organic Chemistry I*
The compounds of carbon with an emphasis on structure, nomenclature, and stereochemistry. Laboratory course. *Prerequisite: CHEM 120.*

CHEM 250 *Organic Chemistry II*
The compounds of carbon with an emphasis on reaction mechanisms and spectroscopy. Laboratory course. *Prerequisite: CHEM 240.*

CHEM 310 *Physical Chemistry: Quantum Mechanics and Spectroscopy* (W2)
Application of physical principles and mathematical descriptions to chemical systems: quantum theory, atomic structure, molecular structure and bonding, interactions of matter with electromagnetic radiation. *Prerequisites: MATH 140, PHYS 220 or 240, and CHEM 250 or consent of instructor. Corequisite: CHEM ATC.*

CHEM 320 *Physical Chemistry: Thermodynamics and Chemical Kinetics*
Application of physical principles and mathematical descriptions to chemical systems: chemical and statistical thermodynamics, chemical kinetics and dynamics. *Prerequisites: MATH 140, PHYS 210 or 230, and CHEM 250 or consent of instructor. Corequisite: Students taking CHEM 320 after CHEM 310 must take both sections of CHEM ATC lab. Students taking CHEM 320 but not CHEM 310 must take CHEM 320L.*

CHEM 330 *Biological Chemistry*
Fundamental biochemistry with emphasis on cellular constituents and molecular structure and function. Laboratory course. *Prerequisite: CHEM 250.*

CHEM 335 *Advanced Biological Chemistry*
Advanced Biological Chemistry will demonstrate how biomolecules interact with one another through various metabolic pathways. The course will cover metabolism of carbohydrates, fatty acids, amino acids and nucleotides, metabolic integration of major biochemical pathways, and hormones and signal transduction. *Prerequisite: CHEM 330.*

CHEM 340 *Advanced Inorganic Chemistry*
The elements and the periodic table with emphasis on modern structural theory. *Prerequisite: CHEM 310.*

CHEM 350 *Advanced Analytical Chemistry*
Theory and practice of modern instrumental techniques, including chromatographic, spectroscopic and electroanalytical methods, sample handling, and organic structural analysis. *Prerequisite: CHEM 240 and PHYS 220 or 240, or consent of instructor.*

CHEM 410 *Advanced Physical Chemistry* (NS-L, QS, W2)
The course will focus on current topics in physical chemistry. Laboratory course. *Cross-listed as PHYS 315 Modern Physics. Prerequisite: CHEM 320.*

CHEM 430 *Integrated Biochemical Topics*
Current topics in biochemistry, biochemical reactions and mechanisms, and macromolecular structure and function will be discussed. *Prerequisite: CHEM 330.*

CHEM 450 *Directed Research* [UR]
Independent laboratory research conducted in conjunction with a specific faculty member. Research topics are selected on an individual basis. The results of the research are typically presented at a national scientific meeting in the spring and a final research report is written.

CHEM 497 *Seminar*
No credit. Seminars by invited speakers, students, and faculty. *Prerequisite: senior standing.*

CHEM ATC *Advanced Techniques in Experimental Chemistry* (ATEC Lab)
No Credit. Unified laboratory experience combining physical, inorganic, and analytical chemistry techniques, including data analysis and computational modeling. *Corequisite: CHEM 310 or 320.*