

RESEARCH AND SPECIALIZED STUDIES

BIOL405

Topics in _____

Investigates various specialties of biology. Repeatable in different areas.

(1-5)

BIOL495

Independent Readings/Research

Independent readings or research in biology under the direction of the instructor. Consent of instructor required.

(5)

Halenz Hall, Room 225
(616) 471-3247 or 471-3248
chemistry@andrews.edu
<http://www.andrews.edu/CHEM/>

BIOL590

Topics in _____

Investigates various specialties of biology. Repeatable in different areas.

(1-5)

Faculty

G. William Mutch, *Chair*
David E. Alonso
Desmond H. Murray
D. David Nowack
Steven E. Warren
Robert A. Wilkins
Peter A. Wong

BIOL648

Workshop

(variable)

BIOL691,692,693

Research Methods and Biology Seminar

Use of biological literature and methods in current research. Reports are made by each student to the group on topics from current literature and on specific problems in biology. Participation once per week for 3 quarters is required.

(1, 1, 1)

| Academic Programs | Credits |
|--------------------|---------|
| BS: Chemistry | 60 |
| BS: Biochemistry | 51 |
| Minor in Chemistry | 30 |

Students who plan to major in chemistry or

BIOL697

Research in Biology

Repeatable to 5 credits.

(1-5)

BIOL699

Master's Thesis

Repeatable to 8 credits.

(4)

- BCHM412** \$ (1) **Biochemistry Laboratory**
Introduction to quantitative and qualitative methods for determining protein, glycogen, and lipids in fresh tissue. Weekly: 4 hours lab. Prerequisite: BCHM401.
- BCHM413** \$ g (1) **Biochemistry Laboratory**
Additional methods for the quantitative and qualitative determination of protein, glycogen, and lipids in fresh tissue. Methods for determining the kinetics of enzyme catalytic activity. Weekly: 4 hours lab. Prerequisite: BCHM401.
- BCHM423** (3) **Neurochemistry**
Study of the 4 principal neurotransmitter systems—acetylcholine, catecholamines, serotonin, and gamma-aminobutyric acid—with an emphasis on biosynthesis, excitation-secretion coupling, interaction with receptor, and degradation. Weekly: 3 lectures and 1 recitation. Prerequisite: BCHM402.
- CHEM111,112** \$ (5,5) **Introductory Chemistry**
General Education course for liberal arts students and for prospective nurses covering principles of inorganic, organic, and biological chemistry. Weekly: 4 lectures and 3 hours lab. Not applicable toward a major or minor in chemistry.
- CHEM121,122,123** \$ (4,4,4) **General Chemistry**
Stoichiometry, atomic and molecular structure, bonding, periodicity, states of matter, solutions, equilibrium, oxidation-reduction, electrochemistry, kinetics, thermodynamics, acid-base, descriptive, and nuclear chemistry. Weekly: 3 lectures, 2 recitations, and 3 hours lab. Prerequisites: High-school algebra I and II; high-school chemistry and physics recommended.
- CHEM200** \$ (5) **Quantitative Analysis**
Equilibrium problems, gravimetric, volumetric, and redox analysis. Weekly: 3 lectures and 8 hours lab. Prerequisite: CHEM123.
- CHEM211,212,213** \$ (4,4,4) **Organic Chemistry**
The chemistry of carbon-containing compounds with emphasis on molecular structure, spectra-structure relationships, and a mechanistic approach to organic reactions. Weekly: 3 lectures, 1 recitation, and 4 hours lab. Prerequisite: CHEM123.
- CHEM300** Alt \$ (3) **Laboratory Glassblowing**
Practice of fundamental glassblowing skills common to both scientific and creative glassblowing. Two projects are required. The student may choose between scientific and creative projects. Weekly: 1 lecture demonstration and 6 hours lab. Not applicable toward a major or minor in chemistry nor toward the General Education requirement in science.
- CHEM320** (3) **Inorganic Chemistry I**
Unified approach to descriptive inorganic chemistry and principles. Includes periodicity, ionic solids, aqueous and redox chemistry, coordination compounds, hard and soft acid/base principle, halides, nitrides, sulfides, and hydrides. Weekly: 3 lectures. Prerequisite: CHEM123.
- CHEM341,342** \$ (4, 4) **Environmental Chemistry**
A survey of environmental and energy-related problems. Topics include air and water pollution, energy and other resources, solid wastes and recycling, and toxic chemicals. Weekly: 3 lectures and 4 hours lab. Not applicable towards a major in chemistry or biochemistry. Prerequisites: CHEM123; CHEM 213 or 200 recommended.
- CHEM400** \$ g (4) **Chemical Separations and Analysis**
Theory of analytical separations by solvent extraction, counter current distribution, and various chromatographies. After separation, the components of mixtures are analyzed by a variety of spectroscopic techniques. Weekly: 2 lectures and 8 hours lab. Prerequisites: CHEM200, 213; PHYS153 (or 253, 263).
- CHEM401,402,403** (1,1,1) **Seminar in Chemistry**
Autumn quarter: Introduction to the use of chemical literature as a source of information. Winter and Spring quarters: Presentation by the student of at least one lecture on a topic of current chemical interest. Staff and off-campus visitors also contribute to the lecture series. Prerequisite: CHEM213. Open to majors only.
- CHEM410** \$ g (3) **Forensic Chemistry**
Principles of chemistry as applied to the methods of analysis and identification of drugs. Rules of evidence as they apply to testimony in court. Observation of drug-related court procedures. Weekly: 1 lecture and 6 hours lab. Participation must be arranged with the instructor at least 2 months prior to beginning of course. Prerequisites: CHEM200, 213; 400 recommended.
- CHEM420** \$ g (5) **Inorganic Chemistry II**
Atomic and molecular structure and symmetry; structure, bonding, spectra and reaction mechanisms of d-metal complexes, organometallic compounds, solid state and bioinorganic chemistry. Weekly: 4 lectures and 4 hours lab. Prerequisites: CHEM213, 320, 422 or 435.
- CHEM421,422** \$ g (4,4) **Physical Chemistry**
Fundamental concepts in chemical thermo-dynamics, free energy, and chemical equilibria; phase changes, solutions, kinetic theory, chemical dynamics, and electrochemistry. Weekly: 3 lectures and 4 hours lab. Prerequisites: CHEM200, MATH173; PHYS153 (or 253, 263).
- CHEM430** \$ g (4) **Instrumental Analysis**
Chemical analysis by optical and electrochemical methods. Introduction to interface of instruments with microcomputers. Instruments and devices used include UV-visible, fluorescence, and atomic absorption spectrophotometers, D.C. and A.C. polarographs, microcomputers, operational amplifiers, and other integrated circuits. Weekly: 2 lectures and 8 hours lab. Prerequisites: CHEM200; MATH173; PHYS153 (or 253, 263); PHYS400 is recommended.
- CHEM435** \$ g (4) **Biophysical Chemistry**
Application of Gibb's free energy and chemical equilibria to biochemical systems, mass transport phenomena, membrane potentials, properties of electrolytes, kinetics of enzyme-catalyzed reactions, spectroscopic and other methods in struc-