

Graduate Course Descriptions Effective Fall 2007

https://www.banweb.mtu.edu/pls/owa/stu_ctg_utils.p_online_all_courses_gr

Chemistry

CH 5210 - Analytical Separations

Covers theory and applications of modern gas chromatography, high performance liquid chromatography, and ion chromatography as well as instrumentation for these techniques. Studies trace organic analysis and environmental problems.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: Spring

Restrictions: May not be enrolled in one of the following Class(es): Freshman, Sophomore, Junior

CH 5221 - Mass Spectroscopy and Fluorescence

Fundamentals and applications of gas chromatography-mass spectroscopy, liquid chromatography-mass spectroscopy and fluorescence spectroscopy.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: On Demand

Restrictions: Permission of instructor required; May not be enrolled in one of the following Class(es): Freshman, Sophomore, Junior

CH 5310 - Advanced Inorganic Chemistry

Covers the organometallic chemistry of the transition elements, beginning with a historical overview of the subject, as well as basic ideas in complex and transition metal chemistry.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: Fall

Pre-Requisite(s): CH 4320

CH 5410 - Advanced Organic Chemistry I

Advanced study of mechanistic organic and physical organic chemistry intended to bring the student to the level of current research activity. Topics may include methods for determining organic reaction mechanisms, chemical bonding as it applies to organic compounds, structure-reactivity relationships, molecular rearrangements, and molecular orbital theory.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: Fall

Restrictions: Must be enrolled in one of the following Level(s): Graduate

CH 5420 - Advanced Organic Chemistry II

Advanced study of organic reactions and synthetic organic chemistry intended to bring the student to the level of current research activity. Topics may include retrosynthetic analysis and synthesis design, synthons, protecting groups, and analysis of syntheses from recent literature.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: Spring

Restrictions: Must be enrolled in one of the following Level(s): Graduate

CH 5509 - Transport and Transformation of Organic Pollutants

Assessment of factors controlling environmental fate, distribution, and transformation of organic pollutants. Thermodynamics, equilibrium, and kinetic relationships are used to quantify organic pollutant partitioning and transformations in air, water, and sediments. Use of mass balance equations to quantify pollutant transport.

Credits: 3.0

Lec-Rec-Lab: (0-3-0)

Semesters Offered: Fall - Offered alternate years beginning with the 2005-2006 academic year

Pre-Requisite(s): CE 4501 or CH 3510

CH 5510 - Classical and Statistical Thermodynamics

Principles of classical chemical thermodynamics from the viewpoint of Gibbs and DeDonder; principles of applications of statistical mechanics to thermodynamics, including the properties of gases, liquids, electrolytic solutions, solutions of high polymers, and other systems of chemical interest.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: On Demand

Pre-Requisite(s): CH 3520

CH 5515 - Atmospheric Chemistry

Study of the photochemical processes governing the composition of the troposphere and stratosphere, with application to air pollution and climate change. Covers radical chain reaction cycles, heterogeneous chemistry, atmospheric radiative transfer, and measurement techniques for atmospheric gases.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: Spring

Restrictions: Must be enrolled in one of the following Level(s): Graduate

Pre-Requisite(s): CH 3520 or CE 4501

CH 5520 - Chemical Kinetics

An advanced study of chemical reaction rates, including methods of analysis of reaction rate data and the theory of rate processes.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: On Demand

Pre-Requisite(s): CH 3520

CH 5530 - Molecular Spectroscopy

An introduction to molecular spectroscopy and molecular structure. Topics include infrared and Raman spectroscopy, electronic spectroscopy, fluorescence, phosphorescence, and resonance techniques.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: On Demand

Pre-Requisite(s): CH 3520

CH 5540 - Applications of Group Theory in Chemistry

The predictive power of group theory in chemistry is developed through theory and detailed applications. Emphasizes group theoretical applications to molecular orbital theory, orbital symmetry, ligand field theory, and vibrational spectroscopy.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: On Demand

Pre-Requisite(s): CH 3520

CH 5550 - Solid State Chemistry

Introduces principles of solid state chemistry and the application to produce compounds with the desired physical and chemical properties. Discusses reactivity, preparation techniques, structure, impurity or dopant effects, phase transformations, electric and magnetic properties, and point defect chemistry.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: On Demand

Pre-Requisite(s): CH 3520

CH 5560 - Computational Chemistry

Focuses on the theory and method of modern computational techniques applied to the study of molecular properties and reactivity through lecture and computer projects. Covers classical mechanical as well as quantum mechanical approaches.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: Fall

Pre-Requisite(s): CH 3520

CH 5570 - Advanced Biophysical Chemistry

A discussion of experimental techniques and applications of physical chemistry principles to the study of the structure, dynamics, and chemical reactions of proteins, nucleic acids, and other biopolymers.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: On Demand

Pre-Requisite(s): CH 3520

CH 5900 - Chemistry Seminar

Graduate seminar in chemistry.

Credits: 1.0; May be repeated

Lec-Rec-Lab: (0-1-0)

Semesters Offered: Fall, Spring

Restrictions: Must be enrolled in one of the following Level(s): Graduate

CH 5990 - Graduate Research in Chemistry

An original investigation in chemistry for students seeking an MS degree.

Credits: variable to 12.0; May be repeated; Graded Pass/Fail Only

Semesters Offered: Fall, Spring, Summer

Restrictions: Must be enrolled in one of the following Level(s): Graduate

CH 6290 - Special Topics in Analytical Chemistry

Discussion of current research developments at an advanced level. A list of possible topics might include chromatography, magnetic resonance, surface analysis, mass spectrometry, or environmental analysis.

Credits: variable to 3.0; Repeatable to a Max of 9

Semesters Offered: On Demand

Restrictions: Must be enrolled in one of the following Level(s): Graduate

CH 6390 - Special Topics in Inorganic Chemistry

Discussion of recent developments in inorganic chemistry.

Credits: variable to 3.0; Repeatable to a Max of 9

Semesters Offered: On Demand

Pre-Requisite(s): CH 4320

CH 6490 - Special Topics in Organic Chemistry

Advanced study in special areas of organic chemistry. Topics could include organic synthetic methods, production and reactions of enolate ions, heterocyclic, carbohydrate, bioorganic, or free-radical chemistry.

Credits: variable to 3.0; Repeatable to a Max of 9

Semesters Offered: On Demand

Restrictions: Must be enrolled in one of the following Level(s): Graduate

CH 6590 - Special Topics in Physical Chemistry

A discussion of recent research developments at an advanced level. Topics could include atomic and molecular structure, kinetic theory of gases, solid-state chemistry, thermodynamics, electrochemistry, and molecular spectroscopy.

Credits: variable to 3.0; Repeatable to a Max of 9

Semesters Offered: On Demand

Restrictions: Must be enrolled in one of the following Level(s): Graduate

CH 6690 - Special Topics in Polymer Science

Advanced study in special areas of polymer science. Topics could include thermal analysis, polymer surface science, advanced polymerization processes, scaling laws, etc. Some topics may include a laboratory component.

Credits: variable to 3.0; Repeatable to a Max of 9

Semesters Offered: On Demand

Restrictions: Must be enrolled in one of the following Level(s): Graduate

CH 6790 - Special Topics in Biochemistry

Advanced study in special areas of biochemistry and molecular biology. Topics could include bioorganic chemistry, signal transduction or transcriptional control.

Credits: variable to 3.0; Repeatable to a Max of 9

Semesters Offered: On Demand

Restrictions: May not be enrolled in one of the following Class(es): Freshman, Sophomore, Junior

CH 6800 - Current Topics in Graduate Chemistry

Discussion of recent topics in chemistry at a graduate level.

Credits: variable to 3.0; Repeatable to a Max of 12

Semesters Offered: On Demand

Restrictions: Permission of instructor required; Must be enrolled in one of the following Level(s): Graduate

CH 6990 - Chemistry Doctoral Research

Laboratory research in preparation of the PhD thesis. Requires permission of the student's advisory committee and the graduate faculty.

Credits: variable to 12.0; May be repeated; Graded Pass/Fail Only

Semesters Offered: Fall, Spring, Summer

Restrictions: Must be enrolled in one of the following Level(s): Graduate

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