CHEM - CHEMISTRY (CHEM)

CHEM 111 - General Chemistry I 3 Credits

Hours: 3R-0L-3C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: CHEM 111L (may be taken concurrently)
Corequisites: CHEM 111L

Topics include stoichiometry, nomenclature, phases, and writing balanced chemical equations. Quantum theory is introduced in relation to chemical applications. Atomic structure is introduced. Bonding principles and molecular structure are discussed in terms of Lewis Dot Structures, Valence Bond Theory, VSEPR Theory, Hybridization, and Molecular Orbital Theory.

CHEM 111L - General Chemistry I Lab 1 Credit

Hours: 0R-3L-1C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: None

Fundamental chemistry laboratory skills are introduced along with data analysis in support of topics presented in CHEM111 recitation.

CHEM 112 - General Chemistry Honors 5 Credits

Hours: 4R-3L-5C
Term Available: F
Graduate Studies Eligible: No
Prerequisites: CHEM HONRS

An accelerated course covering topics in CHEM 111 and CHEM 113. Upon successful completion of this course, an additional 3 credits will be awarded. Enrollment is limited to those students who complete the Rose-Hulman online Chemistry Advanced Placement Examination given prior to the freshman orientation period.

CHEM 113 - General Chemistry II 3 Credits

Hours: 3R-0L-3C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: (CHEM 111 and CHEM 111L) or CHEM 112 or CHEM RA100 or CHEM RA10
Corequisites: CHEM 113L

Topics in this course include the fundamentals of thermodynamics and kinetics. The fundamentals of chemical equilibrium are introduced. Definitions of acid and bases are discussed utilizing the Bronsted-Lowry and Lewis models. Nuclear chemistry is also included.

CHEM 113L - General Chemistry II Laboratory 1 Credit

Hours: 0R-3L-1C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: (CHEM 111 and CHEM 111L) or CHEM 112 or CHEM RA10

Fundamental chemistry laboratory skills are introduced along with data analysis in support of topics presented in CHEM113 recitation.

CHEM 115 - General Chemistry III 3 Credits

Hours: 3R-(0 - 3)L-3C
Term Available: W,S
Graduate Studies Eligible: No
Prerequisites: (CHEM 113 and CHEM 113L) or CHEM 112
Corequisites: CHEM 115L

Topics in this course include acid-base reactions, electrochemistry, and coordination chemistry.

CHEM 115L - General Chemistry III Laboratory 1 Credit

Hours: 0R-3L-1C
Term Available: W,S
Graduate Studies Eligible: No
Prerequisites: (CHEM 113 and CHEM 113L) or CHEM 112

Fundamental chemistry laboratory skills are introduced along with data analysis in support of topics presented in CHEM113 recitation.

CHEM 199 - Professional Experience 1 Credit

Hours: 1R-0L-1C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: None

The professional experiences course captures the practical work experiences related to the student's academic discipline. Students are required to submit a formal document of their reflections, which communicates how their employment opportunity reinforced and enhanced their academic studies.

CHEM 200 - Career Preparation 1 Credit

Hours: 1R-0L-1C
Term Available: W
Graduate Studies Eligible: No
Prerequisites: None

This course is for chemistry and biochemistry majors to be taken in the second year. The course addresses career choices, summer opportunities, employment and graduate school preparation, and curriculum vitae and resumes preparation. Cross-listed with MA200, and SV200.

CHEM 210 - Chemistry of Poisons & Potions 2 Credits

Hours: 2R-0L-2C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: CHEM 111 and CHEM 111L

CHEM 211 - Chemistry of Food and Cooking 2 Credits

Hours: 2R-0L-2C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: (CHEM 111 and CHEM 111L) or CHEM 112 or CHEM RA10

CHEM 212 - Chemistry of Sport 2 Credits

Hours: 2R-0L-2C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: CHEM 111 and CHEM 111L

CHEM 213 - Chemistry of Art 2 Credits

Hours: 2R-0L-2C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: CHEM 111 and CHEM 111L

CHEM 225 - Analytical Chemistry 3 Credits

Hours: 3R-0L-3C
Term Available: F,S
Graduate Studies Eligible: No
Prerequisites: (CHEM 115 and CHEM 115L)

This laboratory-driven course is an introduction to classical and modern quantitative analysis with emphasis on calculations, separations, and precise and accurate measurements. Theoretical and practical perspectives of chemical analysis are considered. Chemical instrumentation includes recording pH/mV meters, constant rate burets, colorimeters, spectrophotometers, high performance liquid chromatographs and gas-liquid chromatographs.

CHEM 225L - Analytical Chemistry Laboratory 1 Credit

Hours: 0R-3L-1C
Term Available: F,S
Graduate Studies Eligible: No
Prerequisites: CHEM 115 and CHEM 115L

This course represents the laboratory component of analytical chemistry.Practicums are part of the grade along with reports.

CHEM 251 - Organic Chemistry I 3 Credits

Hours: 3R-0L-3C
Term Available: F,W
Graduate Studies Eligible: No
Prerequisites: (CHEM 113 and CHEM 113L) or CHEM 112

Organic Laboratory techniques are developed along with appropriate spectroscopic methods. Assessment is in part via practicums. Computational chemistry methods and green chemistry approaches are also introduced.

CHEM 251L - Organic Chemistry I Laboratory 1 Credit

Hours: 0R-3L-1C
Term Available: F,W
Graduate Studies Eligible: No
Prerequisites: (CHEM 113 and CHEM 113L) or CHEM 112

Organic Laboratory techniques are developed along with appropriate spectroscopic methods. Assessment is in part via practicums. Computational chemistry methods and green chemistry approaches are also introduced.

CHEM 252 - Organic Chemistry II 3 Credits

Hours: 3R-0L-3C
Term Available: W,S
Graduate Studies Eligible: No
Prerequisites: CHEM 251 and CHEM 251L

Continuation of Organic Chemistry I with greater emphasis on reaction mechanisms and synthesis, and an introduction to the methods used to determine structure, including IR and NMR spectroscopy and mass spectrometry.

CHEM 252L - Organic Chemistry II Laboratory 1 Credit

Hours: 0R-3L-1C
Term Available: W,S
Graduate Studies Eligible: No
Prerequisites: CHEM 251 and CHEM 251L

A continuation of CHEM251L where additional, more complicated synthetic techniques and methods along with additional spectroscopic techniques are introduced. Assessment is in part via practicums.

CHEM 253 - Organic Chemistry III 3 Credits

Hours: 3R-0L-3C
Term Available: S
Graduate Studies Eligible: No
Prerequisites: CHEM 252 and CHEM 252L

Study of carbanions, classical and non-classical carbocations, polyfunctional compounds, heterocyclics, orbital symmetry and more advanced reaction mechanisms, molecular rearrangements and syntheses.

CHEM 253L - Organic Chemistry III Laboratory 1 Credit

Hours: 0R-4L-1C
Term Available: S
Graduate Studies Eligible: No
Prerequisites: CHEM 252 and CHEM 252L

Project based laboratory where techniques and skills developed in the previous organic laboratories are applied to more open-ended problems.

CHEM 270 - Special Topics in Chemistry 1-4 Credits

Hours: (1 - 4)R-0L-(1 - 4)C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: CHEM 111 or CHEM 112

Studies in topics of current chemical interest not addressed in other named courses.A maximum of 4 total credit hours of CHEM270 and CHEM276 can be counted towards a chemistry major.

CHEM 276 - Special Topics in Chemistry with Laboratory 1-4 Credits

Hours: 0R-0L-(1 - 4)C
Term Available: S
Graduate Studies Eligible: No
Prerequisites: None

Studies in topics of current chemical interest not addressed in other named courses.This course will have a laboratory component.A maximum of 4 total credit hours of CHEM270 and CHEM276 can be counted towards a chemistry major.

CHEM 290 - Chemical Research 0-4 Credits

Hours: 0R-0L-(0 - 4)C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: None

Research performed under the direction of a faculty member selected by mutual agreement. This course is designed for research performed before taking CHEM291. Students may register for 1 to 2 credit hours per quarter.

CHEM 291 - Introduction to Chemical Research 3 Credits

Hours: 2R-4L-3C
Term Available: W
Graduate Studies Eligible: No
Prerequisites: (CHEM 113 and CHEM 113L) or CHEM 112

Students will be introduced to skills necessary for conducting chemical research. Students will gain proficiency in: (1) literature searching of primary, secondary, and tertiary sources emphasizing the use of online databases; (2) laboratory skills involving synthesis, characterization, analysis, and keeping a notebook; (3) safety practice including MSDS interpretation; and (4) ethical conduct in collecting and reporting data and results. Students will also discuss research projects with at least three faculty members and be required to attend all seminars during the quarter.

CHEM 326 - Bioanalytical Chemistry 4 Credits

Hours: 3R-4L-4C
Term Available: W
Graduate Studies Eligible: No
Prerequisites: CHEM 225 and CHEM 225L

Addresses instrumental methods of analysis applicable to biochemistry including instrument design, operating principles, theory and application. Topics include molecular spectroscopic techniques in the infrared, visible and ultraviolet regions, including luminescence and Raman spectroscopy. Separation techniques including liquid chromatography and capillary electrophoresis are also addressed.

CHEM 326L - Bioanalytical Chemistry Lab 0 Credits

Hours: 0R-0L-0C
Graduate Studies Eligible: No
Prerequisites: None

CHEM 327 - Advanced Analytical Chemistry 4 Credits

Hours: 3R-(0 - 4)L-4C
Term Available: S
Graduate Studies Eligible: No
Prerequisites: CHEM 326

Addresses theory, operating principles, and application of instrumental methods for chemical analysis in the areas of atomic spectroscopy, x-ray techniques, gas chromatography and electroanalytical methods.

CHEM 327L - Analytical Chemistry III Lab 0 Credits

Hours: 0R-4L-0C
Graduate Studies Eligible: No
Prerequisites: None

CHEM 330 - Biochemistry I 4 Credits

Hours: 4R-0L-4C
Term Available: F,S
Graduate Studies Eligible: No
Prerequisites: CHEM 251

Includes the structure and function of biological molecules, enzyme kinetics and mechanisms, and the reactions, strategy, and regulation of carbohydrate metabolism.

CHEM 331 - Biochemistry II 4 Credits

Hours: 4R-0L-4C
Term Available: W
Graduate Studies Eligible: No
Prerequisites: CHEM 330 and (AB 210 or BIO 210)

Includes the reactions, strategy, and regulation of the major metabolic pathways in humans and of selected pathways in plants, and the storage, repair, and transmission of genetic information.

CHEM 360 - Introduction to Physical Chemistry for Engineers 4 Credits

Hours: 4R-0L-4C
Term Available: W,S
Graduate Studies Eligible: No
Prerequisites: (CHE 303 and CHE 304 and CHEM 115)

Introduction to quantum chemistry, statistical thermodynamics, electrochemistry, chemical kinetics, surface chemistry and colloid science.

CHEM 360L - Phys Chem for Engr Lab 0 Credits

Hours: 0R-2L-0C
Graduate Studies Eligible: No
Prerequisites: None

CHEM 361 - Physical Chemistry I 4 Credits

Hours: 4R-2L-4C
Term Available: F
Graduate Studies Eligible: No
Prerequisites: CHEM 115 and MA 113 and (MA 223 or MA 381)

Covers the laws of thermodynamics, free energy, gases, phase equilibria and solutions. Emphasizes the applications of differential and integral calculus and includes an introduction to statistical thermodynamics and surface chemistry. The laboratory will meet for 4 hours on alternate weeks and will investigate topics associated with thermodynamics and phase equilibrium.

CHEM 361L - Physical Chemistry Lab I 0 Credits

Hours: 0R-4L-0C
Graduate Studies Eligible: No
Prerequisites: None

CHEM 362 - Physical Chemistry II 4 Credits

Hours: 3R-(0 - 4)L-4C
Term Available: W
Graduate Studies Eligible: No
Prerequisites: CHEM 361

Covers chemical equilibria, statistical mechanics, kinetics and electrochemistry. The laboratory will meet for 4 hours on alternate weeks.

CHEM 362L - Physical Chemistry II Lab 0 Credits

Hours: 0R-(0 - 4)L-0C
Graduate Studies Eligible: No
Prerequisites: None

CHEM 391 - Research Proposal 1 Credit

Hours: 1R-0L-1C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: CHEM 291 and (RH 330 or ENGL H290) and CHEM 490 (may be taken concurrently)

Students will take online lessons related to the generation and communication of research ideas culminating in the production of a research proposal. The research proposal will be written under the direction of a faculty member of record for the student's CHEM490 or by other faculty member selected by mutual agreement.

CHEM 395 - Chemistry Seminar 0 Credits

Hours: 0R-0L-0C
Term Available: F
Graduate Studies Eligible: No
Prerequisites: None

Students will be required to attend and/or present research seminars, the number to be determined by the department. The students will register for the course in the fall of the third year and if all the requirements are met, the students will receive a grade of Satisfactory. Failure to meet the requirements during the fall quarter will result in No Grade and the student must complete the requirements by the end of the third year. If the requirements are not completed by the end of the third year, a grade of Unsatisfactory is assigned and must be rectified to meet graduation requirements.

CHEM 420 - Electronics for Scientists 4 Credits

Hours: 3R-4L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 326 or CHEM 327

A fundamental course on understanding important electronic systems as they pertain to chemical signals and instrumentation. Topics include analog systems (RC circuits, diodes, transistors, and operational amplifiers), digital systems (logic gates, shift registers, and lock-in amplifiers), and signal enhancement and noise reduction modules. The laboratory component will showcase basic circuit design and construction, and will culminate with a student-built chemical instrument.

CHEM 421 - Biochemical Mass Spectrometry 1 Credit

Hours: 1R-0L-1C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

This course will explore the theoretical basis and practical aspects of mass spectrometry, with an emphasis on their use for analysis of biological molecules. Topics include ionization mechanisms and methods for sample preparation and mass spectral analysis, and the course will include a project.

CHEM 422 - Fluorescence Spectroscopy 1 Credit

Hours: 1R-0L-1C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 330

This course will explore the theoretical basis and practical aspects of fluorescence spectroscopy, with an emphasis on their use for analysis of biological molecules. Topics include mechanisms of fluorescence excitation and emission, quenching processes, anisotropy, and time-resolved fluorescence, and the course will include a project.

CHEM 423 - NMR Spectroscopy 1 Credit

Hours: 1R-0L-1C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 252

This course is designed to provide the basic training and tools necessary to operate the 300MHz Bruker NMR and the associated ICON software. Additionally, the focus will be on sample preparation, acquisition, analysis, and processing of 1H NMR, 13C NMR, COSY and HETCOR (2D NMR), DEPT-90, DEPT-135, heteronuclear NMR, and applications of NMR to related fields. The course will consist primarily of basic and practical NMR instruction.

CHEM 424 - Absorption Spectroscopy 2 Credits

Hours: 2R-0L-2C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 326 or CHEM 327

This course looks at absorption spectroscopy from the microwave to x-ray relating spectra to the molecular and/or atomic processes.The course will consist of both instruction and a project of student choice involving absorption process.

CHEM 425 - Raman Spectroscopy 1 Credit

Hours: 1R-0L-1C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 225

CHEM 426 - Microfluidics 1 Credit

Hours: 1R-0L-1C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 225

CHEM 427 - HPLC 1 Credit

Hours: 1R-0L-1C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: CHEM 225

CHEM 428 - Trace Metal Detection 1 Credit

Hours: 1R-0L-1C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 225

This course aims at providing students with fundamental skills and knowledge in trace metal analysis, for environmental and biological samples. The course will enable students to understand, develop and execute analytical protocols involving recent trace metal analysis methodologies and instrumentation using voltammetry. Students will learn by lectures, class activities, and homework assignments and how to optimize conditions to obtain sufficient analytical performance parameters in terms of selectivity, detection limit, cost, and analysis time.

CHEM 430 - Advanced Biochemistry 4 Credits

Hours: 4R-0L-4C
Term Available: S
Graduate Studies Eligible: Yes
Prerequisites: CHEM 330

An in-depth exploration of selected topics from the current biochemistry scientific literature, including molecular mechanisms of infectious diseases and genetic disorders, methods for rational drug design, and relationships between structure and function for biological molecules.

CHEM 433 - Biochemistry Laboratory 1 Credit

Hours: 0R-3L-1C
Term Available: S
Graduate Studies Eligible: Yes
Prerequisites: CHEM 330
Corequisites: CHEM 430

Fundamental techniques employed in isolation, characterization and study of biomolecules, and enzyme kinetics. Techniques used may include homogenization, solvent extraction, centrifugation, salt fractionation, chromatography, and electrophoresis.

CHEM 441 - Inorganic Chemistry I 4 Credits

Hours: 4R-0L-4C
Term Available: F
Graduate Studies Eligible: Yes
Prerequisites: (CHEM 252 and CHEM 362) or (CHEM 252 and CHEM 360)

The chemistry of non-metals. This course consists of a systematic study of the properties and reactions of the elements and their compounds based upon modern theories of the chemical bond, as well as from the viewpoint of atomic structure and the periodic law.

CHEM 442 - Inorganic Chemistry II 4 Credits

Hours: 3R-4L-4C
Term Available: W
Graduate Studies Eligible: Yes
Prerequisites: CHEM 441

The chemistry of metals. Modern theories such as valence bond, molecular orbital, electrostatic and ligand field are used to explain the properties of complex ions. Synthesis and characterization of complexes are done in the lab.

CHEM 451 - Organic Structure Determination 4 Credits

Hours: 2R-8L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 253

Chemical and spectroscopic identification of organic compounds. Study of nuclear magnetic resonance and mass spectrometry, infrared spectroscopy and other techniques applied to structure elucidation and stereochemistry.

CHEM 463 - Quantum Chemistry & Molecular Spectroscopy 4 Credits

Hours: 4R-0L-4C
Term Available: S
Graduate Studies Eligible: Yes
Prerequisites: PH 112 and MA 113 and (CHEM 326 or PH 401)

Covers elementary quantum mechanics with emphasis on applications in molecular structure.

CHEM 470 - Special Topics in Chemistry 1-4 Credits

Hours: (1 - 4)R-(1 - 4)L-(1 - 4)C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

Studies in advanced topics of current chemical interest not addressed in other named courses.

CHEM 476 - Special Topics in Chemistry with Laboratory 1-4 Credits

Hours: 0R-0L-(1 - 4)C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

Studies in advanced topics of current chemical interest not addressed in other named courses.This course will have a laboratory component.

CHEM 490 - Chemical Research 2 Credits

Hours: 1R-4L-2C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: CHEM 291

Open-ended research projects performed as part of a research group.The students will gain proficiency in advanced lab techniques, the scientific method, data management and communication.

CHEM 491 - Senior Thesis 1 Credit

Hours: 1R-0L-1C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: CHEM 490

Students will publish a thesis on their undergraduate research or a literature review of an advanced topic mutually agreed upon with the instructor.

CHEM 495 - Chemistry Seminar 0 Credits

Hours: 0R-0L-0C
Term Available: F
Graduate Studies Eligible: No
Prerequisites: None

Students will be required to attend research seminars. If the requirement is not completed by the end of the quarter, a grade of Unsatisfactory is assigned and must be rectified to meet graduation requirements.

CHEM 496 - Chemistry Seminar 0 Credits

Hours: 0R-0L-0C
Term Available: W
Graduate Studies Eligible: No
Prerequisites: None

Students will be required to attend research seminars. If the requirement is not completed by the end of the quarter, a grade of Unsatisfactory is assigned and must be rectified to meet graduation requirements.

CHEM 497 - Senior Presentation 1 Credit

Hours: 1R-0L-1C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: CHEM 490

Students will deliver a professional seminar on their undergraduate research or a review of an advanced topic mutually agreed upon with the instructor.

CHEM 499 - Independent Chemical Research 1-4 Credits

Hours: 0R-0L-(1 - 4)C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: CHEM 291

Research performed under the direction of a faculty member selected by mutual agreement.Students may register for 1 or 2 credit hours per quarter.

CHEM 520 - Electronics for Scientists 4 Credits

Hours: 3R-4L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 326 or CHEM 327

A fundamental course on understanding important electronic systems as they pertain to chemical signals and instrumentation. Topics include analog systems (RC circuits, diodes, transistors, and operational amplifiers), digital systems (logic gates, shift registers, and lock-in amplifiers), and signal enhancement and noise reduction modules. The laboratory component will showcase basic circuit design and construction, and will culminate with a student-built chemical instrument. For graduate credit there will be an additional project beyond the requirements for CHEM420. A student may not take both CHEM420 and CHEM520 for credit.

CHEM 530 - Advanced Biochemistry 4 Credits

Hours: 4R-0L-4C
Term Available: S
Graduate Studies Eligible: Yes
Prerequisites: CHEM 330

An in-depth exploration of selected topics from the current biochemistry scientific literature, including molecular mechanisms of infectious diseases and genetic disorders, methods for rational drug design, and relationships between structure and function for biological molecules. Students enrolled in CHEM 530 must complete a project not covered in CHEM 430. A student may not receive credit for both CHEM 430 and CHEM 530.

CHEM 531 - Biochemical Instrumentation 4 Credits

Hours: 3R-4L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: AB 210 and CHEM 330

This project-based course includes approaches for the analysis of biochemical experimental problems, experimental design for molecular biology and biochemistry, and the theoretical basis and practical aspects of operating instruments used in biochemical research.

CHEM 532 - Biochemical Pharmacology 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 330

Topics include medicinal chemistry and molecular pharmacology. The topics will also include a survey of potential drug targets, the molecular interactions between drugs and their targets, the drug discovery and development process and case studies of drugs treating diseases such as cancer, bacterial and viral infection, and neurological disorders.

CHEM 534 - Biochemical Physiology 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 330

CHEM 535 - Toxicology for Chemists 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 251

CHEM 545 - Organometallic Chemistry 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 115 and CHEM 252

A survey of the chemistry of main group organometallic compounds and organo-transition metal complexes. Reaction mechanisms and uses in organic synthesis and catalysis are studied.

CHEM 552 - Synthetic Organic Chemistry 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 253

A survey of contemporary methodology in organic synthesis. Retrosynthetic analysis, functional group transformations, condensation chemistry, and organometallic reagents will be stressed. Includes computer assisted synthesis.

CHEM 554 - Theoretical Organic Chemistry 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 253 and (CHEM 360 or CHEM 361)

Study of physical and chemical methods used to investigate organic reaction mechanisms; the chemistry of carbenes; organic photochemistry.

CHEM 555 - Natural Products 4 Credits

Hours: 4R-0L-4C
Graduate Studies Eligible: Yes
Prerequisites: CHEM 253

A study of naturally occurring materials such as carbohydrates, lipids, amino acids, terpenes and steroids. The course also entails a discussion of synthesis, biosynthesis, structure elucidation, selected degradation and other reactions as well as some medicinal characteristics of selected natural products.

CHEM 556 - Green Chemistry 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 252

CHEM 561 - Advanced Physical Chemistry 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 463 and (CHEM 360 or CHEM 362)

Addresses a variety of topics in quantum mechanics, statistical thermodynamics or kinetics.

CHEM 570 - Special Topics in Chemistry 1-4 Credits

Hours: (1 - 4)R-0L-(1 - 4)C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

Studies in advanced topics of current chemical interest not addressed in other named courses. If cross-listed with CHEM470, students in CHEM570 will need to complete an additional project.

CHEM 581 - Polymer Chemistry 4 Credits

Hours: 3R-4L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 252

Polymer synthesis, reactions, and characterization techniques. Structure/property relationships and morphology will be discussed, both for industrially relevant polymers as current topics of from the recent literature. Laboratory sequence consists of polymer synthesis and characterization.

CHEM 582 - Physical Properties of Polymeric Materials 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: CHEM 360 or CHEM 361

In this course the physical properties of polymeric systems will be defined in terms of the models that have been used to characterize them. The behavior of isolated polymers and polymers in solution will be mapped to macroscopic properties of bulk polymeric systems using theories such as Rotational Isomeric State and Flory's Lattice model.Methods of molecular weight determination will be fully developed. Phase transitions will be characterized and related to polymeric and monomeric structural features.Theories of elasticity and viscoelastic behavior will be used to explain macroscopic behaviors of polymeric materials.

CHEM 595 - Chemistry Seminar 0 Credits

Hours: 0R-0L-0C
Term Available: F
Graduate Studies Eligible: Yes
Prerequisites: None

Chemistry graduate students will be required to attend research seminars. If the requirement is not completed by the end of the quarter, a grade of Unsatisfactory is assigned and must be rectified to meet graduation requirements.

CHEM 596 - Chemistry Seminar 0 Credits

Hours: 0R-0L-0C
Term Available: W
Graduate Studies Eligible: Yes
Prerequisites: None

Chemistry graduate students will be required to attend research seminars. If the requirement is not completed by the end of the quarter, a grade of Unsatisfactory is assigned and must be rectified to meet graduation requirements.

CHEM 597 - Chemistry Seminar 0 Credits

Hours: 0R-0L-0C
Term Available: S
Graduate Studies Eligible: Yes
Prerequisites: None

Chemistry graduate students will be required to attend research seminars. If the requirement is not completed by the end of the quarter, a grade of Unsatisfactory is assigned and must be rectified to meet graduation requirements.

CHEM 599 - Thesis Research 1-12 Credits

Hours: 0R-0L-(1 - 12)C
Term Available: F,W,S
Graduate Studies Eligible: Yes
Prerequisites: None

Graduate students only. Credits as assigned; however, not more than 12 credits will be applied toward the requirements of the M.S. degree.

CHEM 699 - Professional Experience 1 Credit

Hours: 1R-0L-1C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

The professional experiences course captures the practical work experiences related to the student's academic discipline. Students are required to submit a formal document of their reflections, which communicates how their employment opportunity reinforced and enhanced their academic studies. The work experiences should be informative or integral to the advancement or completion of the student's program requirements.