

Course Descriptions

CHEM 5314 Advanced Physical Chemistry (3 semester hours) Modern concepts from the three pillars of physical chemistry: quantum mechanics, thermodynamics/statistical mechanics, and kinetics. Prerequisite: CHEM 3411 or equivalent. (3-0) Y

CHEM 5331 (MSEN 5331) Advanced Organic Chemistry I (3 semester hours) Modern concepts of bonding and structure in covalent compounds. Static and dynamic stereochemistry and methods for study. Relationships between structure and reactivity. (3-0) Y

CHEM 5333 (MSEN 5333) Advanced Organic Chemistry II (3 semester hours) Application of the principles introduced in CHEM 5331, emphasizing their use in correlating the large body of synthetic/preparative organic chemistry. Prerequisite: CHEM 5331. (3-0) R

CHEM 5341 (MSEN 5341) Advanced Inorganic Chemistry I (3 semester hours) Physical inorganic chemistry addressing topics in structure and bonding, symmetry, acids and bases, coordination chemistry and spectroscopy. Prerequisite: CHEM 3341, or consent of instructor. (3-0) Y

CHEM 5343 Advanced Inorganic Chemistry II (3 semester hours) Builds on CHEM 5341 to explore the synthesis and reactivity of inorganic/organometallic molecules. Practical applications will be demonstrated by discussing industrial processes catalyzed by metal complexes. Prerequisite: CHEM 5341. (3-0) R

CHEM 5355 (MSEN 5355) Analytical Techniques I (3 semester hours) Study of fundamental analytical techniques, including optical spectroscopic techniques, mass spectrometry, and microscopic and surface analysis methods. (3-0) Y

CHEM 5356 (MSEN 5356) Analytical Techniques II (3 semester hours) Study of chromatography (GC, LC, CZE), statistical methods (standard tests and ANOVA), chemical problem solving, and modern bio/analytical techniques such as biochips, microfluidics, and MALDI-MS. Prerequisite: CHEM 5355 or consent of instructor. (3-0) R

CHEM 5357 Process Analytical Chemistry (3 semester hours) An introduction to process analytical chemistry as practiced in the chemical process and other industries. Includes process control, instrumental techniques, sample and conditioning systems, project integration, and chemometrics. Prerequisite: CHEM 5355 or consent of instructor. (3-0) R

CHEM 5V84 Special Topics in Chemistry/M.A.T. (1-9 semester hours) Various special topics in chemistry of interest to teachers will be discussed. (May be repeated for credit.) (May not be counted as credit toward the M.S. or Ph.D. degrees.) ([1-9]-0) R

CHEM 5V87 Independent Study in Chemistry (1-9 semester hours) In conjunction with a member of the Chemistry faculty, the student will develop a paper or project which emphasizes the ways in which chemical knowledge is confirmed and extended or which leads to improved instruction in chemistry. (May not be counted as credit toward the M.S. or Ph.D. degrees.) May be repeated for credit (9 hours maximum). ([1-9]-0) R

CHEM 6317 Industrial Chemistry (3 semester hours) Survey of chemical industry including commodities, chemical processes, scale-up and process development, environmental concerns, patents. Study of chemical engineering principles. (3-0) R

CHEM 6V19 Special Topics in Physical Chemistry (1-9 semester hours) Subject matter will vary and the course may be repeated for credit. Examples of topics include spectroscopy, quantum mechanics, computational chemistry, and surface chemistry. Prerequisite: Consent of instructor. ([1-9]-0) R

CHEM 6V39 Special Topics in Organic Chemistry (1-9 semester hours) Subject matter will vary and the course may be repeated for credit. Examples of topics include organic photochemistry, organometallic chemistry, homogeneous and heterogeneous catalysis, solid state, polymer chemistry, and advanced NMR techniques. Prerequisite: CHEM 5331 or consent of instructor. ([1-9]-0) R

CHEM 6V49 Special Topics in Inorganic Chemistry (1-9 semester hours) Subject matter will vary and the course may be repeated for credit. Examples of topics include physical methods of inorganic chemistry, and bioinorganic chemistry. Prerequisite: Consent of instructor. ([1-9]-0) R

CHEM 6V59 Special Topics in Analytical Chemistry (1-9 semester hours) Subject matter will vary. Examples of topics include NMR, X-ray crystallography. May be repeated to a maximum of 9 hours. Prerequisite: Consent of instructor. ([1-9]-0) R

CHEM 6V69 Special Topics in Biochemistry (1-9 semester hours) Subject matter will vary. May be repeated for credit (9 hours maximum). Prerequisite: Consent of instructor. ([1-9]-0) R

CHEM 6V79 Special Topics in Materials Chemistry (1-9 semester hours) Subject matter will vary. Examples of topics include polymers, membrane technology, zeolites, nanoscience and technology. May be repeated to a maximum of 9 hours. Prerequisite: Consent of instructor. ([1-9]-0) R

CHEM 6361 Physical Biochemistry (3 semester hours) Protein structure, fundamental metabolism, structures and properties of macromolecules, interactions with electromagnetic radiation, thermodynamics of macromolecular solutions, transport processes, and other topics. Prerequisite: Consent of instructor (3-0). R

CHEM 6372 Materials Science (3 semester hours) Relationship between the properties and behavior of materials and their internal structure. Treatment of the mechanical, thermal and electrical properties of crystalline and amorphous solids including metals, ceramics, synthetic polymers and composites. Prerequisite: Consent of instructor. (3-0) R

CHEM 6383 Computational Chemistry (3 semester hours) The application of computer techniques to the understanding of molecular structure and dynamics: force field, semi-empirical, ab initio, and molecular dynamics techniques. Information retrieval from large structural databases and use of this information. Prerequisite: Consent of instructor. (3-0) R

CHEM 6389 Scientific Literature and Communication Skills (3 semester hours) Acquaints students with techniques for searching the scientific literature using hard copy and electronic approaches. Introduces students to important steps in creating and improving technical communications in both written and oral formats. (3-0) Y

CHEM 6V84 Special Topics in Applied Chemistry (1-9 semester hours) Subject matter will vary and may be repeated for credit to a maximum of 9 hours. Prerequisite: Consent of instructor. ([1-9]-0) R

CHEM 8981 Research Practicum (9 semester hours) Offers training of students in the direct solution of chemical problems through use of the literature; analysis; and the design, construction and performance of experiments. Method of instruction will be

primarily individual direction, questioning, and feedback by the responsible faculty member and/or industrial scientist. Intended for Ph.D. students. May be repeated for credit. (9-0) S

CHEM 8V91 Research in Chemistry (2-9 semester hours) May be repeated for credit. ([2-9]-0) S

CHEM 8398 Thesis (3 semester hours) May be repeated for credit. (3-0) S

CHEM 8399 Dissertation (3 semester hours) May be repeated for credit (3-0) S