2009

Chemistry (CHEM)

Montclair State University

		School. Students should take CHAD 699 if they don't complete CHAD 698 within the semester.
CHAD699	Title	Master's Thesis Extension.
	Prerequisites	CHAD 698.
	Course Description	Continuation of Master's Thesis Project. Extension will be graded as IP (in progress) until thesis is completed, at which time a grade of Pass or Fail will be given.
CHEM100	Title	Introductory Chemistry.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	An introductory lecture and laboratory course in modern chemistry for non-science majors intended to make chemistry understandable, accessible and applicable. Topics include atomic theory, stoichiometry, bonding, molecular shapes, acid-base theory, ploymers, medicine, and nutrition. Meets Gen Ed 2002 - Natural/Physical Science, Laboratory or Non-Laboratory Science.
CHEM105	Title	Basic Chemistry.
	Prerequisites	Restricted to students of the Health Careers Program.
	Number and type of credits	3 hours lecture.
	Course Description	This course will introduce the basic concepts of chemistry.
CHEM106	Title	Principles of Chemistry.
	Prerequisites	Score of 14 or less on the Chemistry Readiness test.
	Number and type of credits	3 hours lab, 2 hours lecture.
	Course Description	A one-semester introductory lecture and recitation course in the fundamental concepts of chemistry. This course is suitable for students who have a poor background in chemistry. All students who do not get a satisfactory score on department's General Chemistry Readiness Test must complete this course before they can enroll in General Chemistry I (CHEM 120). This course does not meet any General Education requirements.
CHEM113	Title	Fundamentals of Chemistry.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 3 hours laboratory.
	Course Description	A one semester introductory lecture and laboratory course in the fundamental concepts of chemistry. This course is suitable for students who have no prior background in chemistry. It is intended for students majoring in Food and

		Nutrition and other non-science majors. Some aspects of the course are quantitative, and a background in algebra is assumed. This course prepares students to proceed to CHEM 130 Fundamentals of Organic Chemistry.
CHEM120	Title	General Chemistry I.
	Prerequisites	Satisfactory score on the Mathematics readiness test OR a grade of C- or better in MATH 100 or MATH 111 or MATH 112 or MATH 116 or MATH 122 or MATH 221 or MATH 222 OR concurrent enrollment in MATH 100. Satisfactory score on the
CHEM120	Prerequisites	Chemistry readiness test OR a grade of C- or better in CHEM 105 or CHEM 106.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 3 hours lab.
	Course Description	Introductory lecture and laboratory course for science majors, prerequisite for all advanced chemistry courses. Introduction to atomic and molecular structure, bonding, stoichiometry, states of matter, solutions, and selected topics in descriptive inorganic chemistry. Laboratory stresses techniques and data treatment and their use in examining chemical systems.
CHEM121	Title	General Chemistry II.
	Prerequisites	CHEM 120 with a grade of C- or better.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 3 hours lab.
	Course Description	Introductory lecture and laboratory course for science majors, prerequisite for all advanced chemistry courses. Introduction to thermochemistry, kinetics; general acid base, precipitation, redox equilibria, electrochemistry and selected topics in descriptive inorganic chemistry. Laboratory stresses techniques and data treatment and their use in examining chemical systems.
CHEM130	Title	Fundamentals of Organic Chemistry.
	Prerequisites	CHEM 113 with a grade of C- or better.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture, 2 hours lab.
	Course Description	Survey of organic chemistry covering all major classes, nomenclature, and characteristic class reactions.
CHEM190	Title	Freshman Seminar in Chemistry.
	Number and type of credits	1 hour seminar.

	Course Description	An experience for freshmen majoring in chemistry and biochemistry that will help them to succeed in their major by learning study skills and becoming acquainted with the culture of higher education. Meets Gen Ed 2002 - New Student Seminar.
CHEM195	Title	Problem Solving-General Chemistry.
	Number and type of credits	1 hour lecture.
	Course Description	Course designed to help students in application of mathematics in chemistry with emphasis on individual needs.
CHEM199	Title	Laboratory Project.
	Prerequisites	CHEM 120 or equivalent and permission of department.
	Special Fee	Special fee.
	Number and type of credits	2 hours lab.
	Course Description	Independent laboratory work in chemistry under the guidance of a faculty mentor.
CHEM220	Title	Descriptive Inorganic Chemistry.
	Prerequisites	CHEM 121 with a grade of C- or better.
	Number and type of credits	3 hours lecture.
	Course Description	Introduction to the descriptive inorganic chemistry of the chemical elements and selected compounds excluding hydrocarbons and their derivatives. The periodic table and periodic relationships among the elements will be used as an organizing tool to explore the sources, properties, compounds, reactions, and industrial uses of the chemical elements. The primary emphasis will be on the main group elements, but transition metal chemistry will also be described. Selected applications of inorganic substances in biochemistry, environmental chemistry, industrial chemistry, material science, and medicine will be discussed.
CHEM230	Title	Organic Chemistry I.
	Prerequisites	CHEM 121 with a grade of C- or better.
	Number and type of credits	3 hours lecture.
	Course Description	Structure and bonding in organic compounds: nomenclature, reactions,
CHEM230	Course Description	properties, and aromatic compounds: stereochemistry; structure analysis by IR, NMR, UV, and MS; introduction to molecular orbital theory.

CHEM231	Title	Organic Chemistry II.
	Prerequisites	CHEM 230 with a grade of C- or better.
	Number and type of credits	3 hours lecture.
	Course Description	Nomenclature, reactions, properties, and synthesis of ethers, epoxides, alcohols, amines, and carbonyl compounds; carbohydrates; amino acids, peptides and proteins; pericyclic reactions; synthetic polymers.
CHEM232	Title	Experimental Organic Chemistry I.
	Prerequisites	CHEM 230 is a prerequisite or corequisite.
	Special Fee	Special fee.
	Number and type of credits	4 hours lab.
	Course Description	A laboratory course to be taken concurrently with CHEM 230. Basic techniques for the separation, analysis and synthesis of organic compounds: recrystallization, distillation, extraction, GC, HPLC, TLC, GC/MS, IR, H/C13-NMR, chemical safety methods and regulations.
CHEM233	Title	Experimental Organic Chemistry II.
	Prerequisites	CHEM 231 and 232 with a grade of C- or better. CHEM 231 may be taken as a prerequisite or corequisite.
	Special Fee	Special fee.
	Number and type of credits	4 hours lab.
	Course Description	A laboratory course to be taken concurrently with CHEM 231 and after completion of CHEM 232. Basic techniques for organic synthesis, mechanistic studies, separation and analysis, and chemical safety: multistep syntheses, spectral data-base searching, phase-transfer catalysis, anhydrous procedures, analysis of unknowns by wet-chemical and spectral methods.
CHEM270	Title	Fundamentals of Biochemistry.
	Prerequisites	CHEM 130 with a grade of C- or better.
	Special Fee	Special fee.
	Number and type of credits	4 hours lecture, 3 hours lab.
	Course Description	Structure and function of the biomolecules and the metabolic interrelationships in the cell. Primarily for foods and nutrition majors.
CHEM310	Title	Analytical Chemistry.
	Prerequisites	CHEM 230 with a C- or better OR concurrent enrollment in CHEM 230 OR concurrent enrollment in CHEM 220.
	Special Fee	Special fee.

	Number and type of credits	3 hours lecture, 4 hours lab.
	Course Description	Introduction to concepts of classical analytical chemistry including evaluation of data and apparatus, theory and application of volumetric and gravimetric methods and redox equilibrium, and introduction to electrical methods.
CHEM311	Title	Instrumental Analysis.
	Prerequisites	CHEM 310 and CHEM 340 with a grade of C- or better in both courses.
	Special Fee	Special fee.
	Number and type of credits	2 hours lecture, 6 hours lab.
	Course Description	Introduction to application of instrumental methods of analytical chemistry. Instrument techniques studied will include spectrophotometry, electroanalytical chemistry, chromatography, nuclear magnetic resonance and mass spectrometry. Theory and application will be examined in lecture and laboratory.
CHEM320	Title	Environmental Chemical Analysis.
	Prerequisites	CHEM 230 and CHEM 232 with a grade of C- or better.
	Special Fee	Special fee.
	Number and type of credits	2 hours lecture, 2 hours lab.
	Course Description	A study of the sources, reactions, transport, effects, and fates of chemical
CHEM320	Course Description	species in the environment. Lecture and lab will stress the theory, methodology, techniques, and instrumentation for air, water and soil analysis for contaminants.
CHEM325	Title	Atmospheric Chemistry.
	Prerequisites	CHEM 230 and CHEM 232 with a grade of C- or better.
	Number and type of credits	3 hours lecture.
	Course Description	Atmospheric chemistry of the major pollutants of concern in today's environment, the emission sources, air/water and air/soil partitioning and exchange, atmospheric transport pathway, transformation processes (biological degradation, hydrolysis, photochemical transformations), deposition processes, pollutant chronic and acute health impacts, prevention and regulation. Course requirements: 2 field trips.
CHEM330	Title	Green Chemistry.

	Prerequisites	CHEM 231 with a grade of C- or better.
	Number and type of credits	3 hours lecture.
	Course Description	The focus of the course will be on the principles and applications of Green Chemistry, and its potential role in the minimization or elimination of negative impacts on the environment by the chemical industry, and the establishment of safe chemical practices. Topics such as, catalysis, development of more environmentally friendly and sustainable chemical processes and industrial case studies will be discussed.
CHEM340	Title	Physical Chemistry I.
	Prerequisites	CHEM 231 and PHYS 192 and MATH 221 with a grade of C- or better in all courses.
	Number and type of credits	3 hours lecture.
	Course Description	Thermodynamics, homogeneous and heterogeneous equilibria, gases, electrochemistry, solutions, colligative properties.
CHEM341	Title	Physical Chemistry II.
	Prerequisites	CHEM 340 with a grade of C- or better.
	Number and type of credits	3 hours lecture.
	Course Description	Kinetics, photochemistry, molecular physical chemistry.
CHEM343	Title	Experimental Physical Chemistry.
	Prerequisites	CHEM 340 with a grade of C- or better.
	Corequisites	CHEM 341.
	Special Fee	Special fee.
	Number and type of credits	4 hours lab.
	Course Description	A laboratory course to be taken concurrently with CHEM 341. Application and experience with experimental techniques of physical chemistry. Students will perform experiments in calorimetry, measurement of thermodynamic variables, electro-chemical phenomena and kinetics. Analysis of experimental data, statistics and applications of microcomputers will be included. Meets the University Writing Requirement for majors in Chemistry.
CHEM347	Title	Biophysical Chemistry.
	Prerequisites	CHEM 370 and CHEM 340 with a grade of C- or better in both courses.
	Number and type of credits	3 hours lecture.
	Course Description	Thermodynamics, equilibria, transport processes, kinetics, and electrochemistry as applied to biomolecules and cellular processes. Previous

		course CHEM 447 effective through Spring 2011.
CHEM370	Title	Biochemistry I.
	Prerequisites	CHEM 231 with a grade of C- or better.
	Number and type of credits	3 hours lecture.
	Course Description	Organization of the living cell; structure, function and chemistry of proteins, carbohydrates and lipids; bioenergetics and oxidation.
CHEM371	Title	Biochemistry II.
	Prerequisites	CHEM 370 with a grade of C- or better.
CHEM371	Number and type of credits	3 hours lecture.
	Course Description	The second semester of a two semester course in biochemistry. The course continues the coverage of the chemistry of proteins, carbohydrates, lipids, and nucleic acids, and their role in cellular function and processes. Topics such as the chemistry of hormones, recombinant DNA, mechanisms of enzyme action, protein synthesis, immunoglobulins and membranes are included.
CHEM372	Title	Experimental Biochemistry I.
	Prerequisites	CHEM 231 and CHEM 232 with a grade of C- or better in both courses. CHEM 370 may be taken as a prerequisite or corequisite.
	Special Fee	Special fee.
	Number and type of credits	1 hour lecture, 3 hours lab.
	Course Description	A lecture and laboratory course of experimental methods in biochemistry. Biochemical applications of spectroscopy, chromatographic methods, enzyme kinetics, DNA and protein purification and electrophoretic techniques.
CHEM373	Title	Experimental Biochemistry II.
	Prerequisites	CHEM 370 and CHEM 372 with a grade of C- or better in both courses.
	Corequisites	CHEM 371.
	Special Fee	Special fee.
	Number and type of credits	6 hours lab.
	Course Description	A second-semester laboratory in modern techniques in experimental biochemistry to include important applications of major instrumentation. Primarily intended for Biochemistry majors.
CHEM420	Title	Advanced Inorganic Chemistry.
	Prerequisites	CHEM 340 is a prerequisite or corequisite.

	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	Physical basis of bonding and reactivity of inorganic compounds. Electronic structure of atoms, ionic and covalent bonding, symmetry properties, chemistry and structure of transition metal compounds, organometallic chemistry, introduction to solid-state structures.
CHEM421	Title	Experimental Inorganic Chemistry.
	Prerequisites	CHEM 310.
	Corequisites	CHEM 420.
	Special Fee	Special fee.
	Number and type of credits	1 hour lecture, 4 hours lab.
	Course Description	Experience utilizing a broad selection of modern techniques for the synthesis, characterization and chemistry of inorganic compounds. Subjects covered will include catalysis, reaction mechanisms, and use in organic synthesis.
CHEM430	Title	Advanced Organic Chemistry.
	Prerequisites	CHEM 340 or 370.
	Number and type of credits	3 hours lecture.
	Course Description	Consideration of structural and electronic theories which form the basis of organic chemistry.
CHEM440	Title	Advanced Physical Chemistry.
	Prerequisites	MATH 420 and CHEM 341.
	Number and type of credits	3 hours lecture.
	Course Description	Quantum mechanics, bonding theory, atomic structure, statistical thermodynamical calculations.
CHEM490	Title	Selected Topics in Chemistry.
	Prerequisites	CHEM 340 or 370.
	Course Description	In-depth study of a modern aspect of chemistry. May be repeated once for a maximum of 6.0 credits as long as the topic is different.
CHEM491	Title	Honors Seminar in Chemistry.
	Prerequisites	Admission to the honors program in chemistry or permission of the chemistry honors committee.
CHEM491	Number and type of credits	2 hours seminar.

	Course Description	Seminars and discussions on selected areas in chemistry under faculty guidance for students enrolled in the honors program in chemistry.
CHEM492	Title	Honors Thesis in Chemistry.
	Prerequisites	CHEM 491.
	Number and type of credits	2 hours lecture.
	Course Description	Preparation and oral presentation of a comprehensive written thesis in chemistry under guidance of a faculty mentor for completion of the honors program in chemistry.
CHEM495	Title	The Chemical Literature.
	Prerequisites	CHEM 340 or CHEM 370 may be taken as prerequisite or corequisite.
	Special Fee	Special fee.
	Number and type of credits	3 hours lab.
	Course Description	Introduction to web-based searching of the chemical and biochemical literature databases, including Scifinder Sholar, Science Citation Index, Science Direct, and ACS Search. Course requirements include a literature search paper and a brief seminar. Meets the University Writing Requirement for majors in Chemistry.
CHEM496	Title	Biochemistry Literature.
	Prerequisites	CHEM 370.
	Corequisites	CHEM 371.
	Number and type of credits	2 hours lab.
	Course Description	Introduction to searching the biochemistry literature including computerized searches and exploration of on-line journals and interesting internet sites. After becoming familiar with modern methods of information retrieval, students will conduct individual literature searches and do a group presentation.
CHEM498	Title	Senior Laboratory.
	Prerequisites	CHEM 311, and 341, and 343.
	Special Fee	Special fee.
	Number and type of credits	1 hour lecture, 4 hours lab.
	Course Description	Multi-disciplinary laboratory study of the synthesis, separation, and characterization of chemical compounds.
CHEM499	Title	Undergraduate Research.
	Prerequisites	CHEM 233, Experimental Chemistry II, and departmental approval.
	Special Fee	Special fee.

	Course Description	Laboratory research on a specific problem in chemistry under guidance of a faculty mentor.
CHEM501	Title	Teaching Chemistry in the Secondary School.
	Prerequisites	16 semester hours in chemistry.
	Number and type of credits	3 hours lecture.
	Course Description	Study of objectives, recent trends, methods of presentation, courses of study, lesson planning, instructional aids, and subject matter of high school chemistry.
CHEM510	Title	Hazardous Materials Management.
	Prerequisites	CHEM 230 or equivalent. For majors in College of Sciences and Mathematics or instructor's permission.
	Number and type of credits	3 hours lecture.
	Course Description	Exploration of the physical and chemical characteristics of hazardous chemicals, hazardous waste, and mixed waste materials. Their sources, handling, transportation, storage, disposal, and regulation.
CHEM520	Title	Advanced Inorganic Chemistry.
	Prerequisites	CHEM 420 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Major topics include: Covalent, ionic and metallic bonding; molecular structure and polarity; Bronsted-Lowry, Lewis, and hard/soft acid and base
CHEM520	Course Description	theory; symmetry and group theory; periodic trends; structures, isomers, ligand field theory, spectra, and reactions of transition metal coordination compounds; bonding and reactions of organometallic compounds; and the biological and medicinal roles of metal ions. Previous course CHEM 521 effective through Spring 2014.
CHEM525	Title	Bioinorganic Chemistry.
	Prerequisites	CHEM 341 (Physical Chemistry II) or instructor's permission.
	Number and type of credits	3 hours lecture.
	Course Description	Exploration of the vital roles that metal atoms play in biochemical processes. Transition metal interactions with proteins will be emphasized. The course will focus on the structural, regulatory, catalytic, transport, and oxidation-reduction functions of metal containing biomolecules.

CHEM530	Title	Advanced Organic Chemistry.
	Prerequisites	CHEM 430 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Structure, reactivity and mechanisms in organic chemistry: Topics include bonding, stereochemistry, aromaticity, study of reaction mechanisms and reactive intermediates, linear free energy relationships, pericyclic reactions and organic photochemistry. Previous course CHEM 531 effective through Spring 2014.
CHEM532	Title	Organic Synthesis.
	Prerequisites	CHEM 430 (Advanced Organic Chemistry).
	Number and type of credits	3 hours lecture.
	Course Description	Detailed study of the art, methods, and the philosophy of organic synthesis beginning with a review of classical and modern synthetic methods, followed by the planning theory of synthesis and culminating in a study of elegant syntheses in the literature.
CHEM533	Title	Biosynthesis of Natural Products.
	Prerequisites	CHEM 430 (Advanced Organic Chemistry) or equivalent.
	Number and type of credits	3 hours lecture.
	Course Description	A study of natural products with emphasis on the biosynthesis of primary and secondary metabolites.
CHEM534	Title	Separation and Analysis.
	Prerequisites	CHEM 310 (Analytical Chemistry) and CHEM 311 (Instrumental Analysis) or equivalents.
	Number and type of credits	3 hours lecture.
	Course Description	Theory and practice of major chromatographic and spectroscopic methods; including GC, HPLC, GC-MS, LC-MS/MS, FTIR, DAD- UV-VIS, and NMR.
CHEM536	Title	Nuclear Magnetic Resonance: Theory and Practice.
	Prerequisites	CHEM 310 (Analytical Chemistry) and 311 (Instrumental Analysis) or equivalents.
	Number and type of credits	3 hours lecture.
	Course Description	A combination lecture/hands-on course utilizing the department's FT-NMR's to provide students with theoretical background and practical experience in modern 1-D and 2-D FT-NMR.
CHEM538	Title	Drug Design in Medicinal Chemistry.

	Prerequisites	Matriculation into the graduate program or permission of instructor.
	Number and type of credits	3 hours lecture.
	Course Description	A comprehensive course covering the design and action of pharmaceutical agents.
CHEM540	Title	Advanced Physical Chemistry.
	Prerequisites	CHEM 341 (Physical Chemistry II) or instructor's permission.
	Number and type of credits	3 hours lecture.
	Course Description	In-depth covering of thermodynamic concepts such as state functions and chemical equilibrium, calorimetry, molecular interactions, activities.
CHEM540	Course Description	Introduction to quantum chemistry.
CHEM542	Title	Quantum Chemistry and Spectroscopy.
	Prerequisites	CHEM 540 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	Theoretical development of quantum mechanics as applied to chemistry. Application of theoretical procedure to atomic and molecular structure and bonding. Introduction to the theory of molecular spectroscopy.
CHEM544	Title	Chemical Thermodynamics and Electrochemistry.
	Prerequisites	CHEM 540 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	In-depth study of classical thermodynamics. Development of thermodynamic functions describing chemical systems in equilibrium, with emphasis on systems of variable composition. Principles and application of electrochemistry, relationship of electrochemical principles to classical thermodynamics, and practical applications of electrochemistry.
CHEM546	Title	Chemical Spectroscopy.
	Prerequisites	CHEM 341 (Physical Chemistry II).
	Number and type of credits	3 hours lecture.
	Course Description	Introduction to the theory of molecular spectroscopy.
CHEM548	Title	Chemical Kinetics.
	Prerequisites	CHEM 341 (Physical Chemistry II).
	Number and type of credits	3 hours lecture.
	Course Description	Kinetics in its role of elucidating reaction mechanisms. Discussion of recent

		problems from the chemical literature including fast reactions and enzyme kinetics.
CHEM550	Title	Organometallic Chemistry.
	Prerequisites	CHEM 420 and CHEM 430 or equivalents.
	Number and type of credits	3 hours lecture.
	Course Description	The course will introduce students to organometallic chemistry, mainly involving transition metals, but also including some main group metals. The material covered will focus on the unique chemistry of these compounds and their uses in organic synthesis, material science, and as catalysts.
CHEM560	Title	Advanced Analytical Chemistry.
	Prerequisites	CHEM 310 and CHEM 311 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	This course builds on existing knowledge of analytical chemistry to develop a deeper understanding of how quality and quantity of data, propagation of errors, and instrumentation and laboratory protocols affect the uncertainty in measurements. This will be tied into the relevance and importance of validation of equipment and protocols and standard laboratory practices, which are discussed in light of requirements from regulatory agencies.
CHEM570	Title	Advanced Biochemistry.
	Prerequisites	CHEM 370 or instructor's permission.
	Number and type of credits	3 hours lecture.
	Course Description	Structure, function, and chemistry of proteins, carbohydrates, nucleic acids, and lipids. Analytical methods biochemists use to study metabolism, regulation, binding, and catalytic activity of biomolecules.
CHEM574	Title	Protein Structure.
	Prerequisites	One semester of introductory Biochemistry or similar background.
	Special Fee	Special fee.
	Number and type of credits	3 hours lecture.
	Course Description	Primary, secondary and tertiary structure of proteins, protein structural motifs and protein structural families. Globular proteins, DNA binding proteins, membrane proteins, signal transduction systems, immune system protein structure, methods used for determination of protein structure.

CHEM575	Title	Enzyme Kinetics and Mechanisms.
	Prerequisites	CHEM 370 or equivalent.
	Number and type of credits	3 hours lecture.
	Course Description	The following properties of enzymes are considered: structure, specificity, catalytic power, mechanism of action, multienzyme complexes, kinetics, regulation, and multienzyme systems.
CHEM576	Title	Lipid Biochemistry.
	Prerequisites	CHEM 370 or equivalent.
	Number and type of credits	3 hours lecture.
	Course Description	Chemistry of plant and animal lipids, their occurrence, metabolism, and industrial uses.
CHEM577	Title	Nucleic Acid Biochemistry.
	Prerequisites	CHEM 370 or equivalent.
	Number and type of credits	3 hours lecture.
	Course Description	This course will present fundamental aspects of nucleic acid biochemistry including structure and biological function and will be organized according to a systematic consideration of techniques used in the study of nucleic acids. Current literature and key topics such as protein-DNA, protein-drug complexes and nucleic acid repair mechanisms will be considered.
CHEM578	Title	Biochemistry Laboratory Techniques.
	Prerequisites	CHEM 370 or equivalent.
	Number and type of credits	2 hours lecture, 3 hours lab.
	Course Description	Fundamental techniques used to isolate, characterize, and study nucleic acids, proteins, carbohydrates, and lipids. Theory and application of buffers, spectrophotometry, tissue fractionation, centrifugation, extraction, chromatographic separations, electrophoresis, radioactivity, enzyme purification and dinetics, enzymatic assays, NMR and MS structure determination.
CHEM579	Title	Biomolecular Assay Development.
	Prerequisites	CHEM 370 or instructor's permission.
	Special Fee	Special fee.
	Number and type of credits	2 hours lecture, 3 hours lab.
	Course Description	This course will provide the student with hands-on experience of state of the art techniques used for drug discovery research in the pharmaceutical

		industry. These techniques include assay development for high throughput screening and molecular docking methods for lead discovery. Using these techniques will allow the student to understand the drug discovery process, which includes a dialogue between crystallographers, medicinal chemists, biochemists, and biologists.
CHEM582	Title	Biochemical Pharmacology.
	Prerequisites	CHEM 370 and CHEM 371.
	Number and type of credits	3 hours lecture.
	Course Description	How drugs interact with, and influence biochemical pathways relevant to disease in the whole organism. Topics covered in this course deal with a review of fundamental concepts in biochemistry relevant to drug discovery, the process of drug discovery and specific examples of drug interactions with biochemical pathways and how they impact human disease.
CHEM590	Title	Selected Topics-Advanced Chemistry.
	Prerequisites	CHEM 341 (Physical Chemistry II) or instructor's permission.
	Number and type of credits	3 hours lecture.
	Course Description	An in-depth study of selected areas in either analytical, inorganic, organic or physical chemistry, with special emphasis upon recent developments in the field. May be repeated three times for a maximum of 12 credits as long as the topic is different each time.
CHEM595	Title	Graduate Research.
CHEM595	Prerequisites	Completion of 12 semester hours in this graduate program; instructor's permission.
	Course Description	Directed individual laboratory investigation under guidance of faculty advisor. May be elected once or twice, maximum credit allowed is 3 semester hours.
CHEM598	Title	Graduate Literature Search.
	Prerequisites	Completion of 18 semester hours of 500-level courses in the graduate program.
	Number and type of credits	2 hours independent study.
	Course Description	Development of and investigation of a topic from the current chemical literature. Selection and refinement of a topic. Collection and preparation of resources and materials and development of an outline in preparation of

		writing a literature report and giving a formal seminar on the literature search. This course cannot be taken by students electing the Research/Thesis option for their graduate program. This course may be repeated once for a maximum of 2 credits.
CHEM599	Title	Graduate Seminar.
	Prerequisites	CHEM 598.
	Number and type of credits	1 hour lecture.
	Course Description	An individual, non-experimental investigation and a formal presentation of scientific literature.
CHEM698	Title	Master's Thesis.
	Prerequisites	Departmental approval.
	Course Description	Independent research project done under faculty advisement. Students must follow the MSU Thesis Guidelines, which may be obtained from the Graduate School. Students should take CHEM 699 if they don't complete CHEM 698 within the semester.
CHEM699	Title	Master's Thesis Extension.
	Prerequisites	CHEM 698.
	Course Description	Continuation of Master's Thesis Project. Thesis Extension will be graded as IP (in Progress) until thesis is completed, at which time a grade of Pass or Fail will be given.
CHEN210	Title	Contemporary Chinese Cinema and Society.
	Prerequisites	CHIN 132 or departmental approval.
	Number and type of credits	3 hours lecture.
	Course Description	"Contemporary Chinese Cinema and Society" is an advanced language and cultural course on Chinese cinema and society since the 1980s. It introduces students to contemporary Chinese society in term of politics, economy, and art by focusing on representative works of both Chinese art films and mainstream popular films and the transformation of Chinese film industry in the age of globalization. Cross-listed with CHIN 210: students enrolling in CHIN 210 will do the written work in Chinese, and students enrolling in CHEN 210 will do the written work in English. Meets Gen Ed 2002 - Non Western Cultural Perspectives.
CHEN367	Title	Selected Topics in Chinese.
	Prerequisites	Departmental approval.