

School	School of Arts & Science
Major	Chemistry

Major Requirements			
Code	Title	Credits	Description
CHEM490	Modern Topics in Chemistry	2	This course gives an integrated approach to the synthesis, structure, and function of macromolecular biomolecules, including proteins, carbohydrates, DNA, and RNA. Energetics of catalysis, protein structure and folding, enzyme kinetics and mechanism, protein engineering, and DNA structure and synthesis are also covered. Prerequisite: Senior Standing.
CHEM465	Environmental Chemistry	3	This course deals with chemical pollutions of the environment. The chemistry of Air, soil and water pollutions will be covered. Topics include: the carbon cycle, VOC's, inorganic wastes, the effect of pollution on drinking water and air quality and some special topics such as acid rain. Prerequisite: CHEM 250.
CHEM430	Instrumental Chemistry	3	After a brief review of the statistical treatment of data, sample preparation techniques, and basic electronics. We then consider the design and operating principles of a wide variety of analytical instruments. The spectroscopic techniques that will be examined include optical, UV-Visible, infra-red, NMR and mass spectrometry. Electrochemical analysis, electrophoresis and chromatography will also be covered. Prerequisite: CHEM 260.
CHEM420	Industrial Chemistry	3	This course will cover a few major topics of the chemical industry: a review of Petrochemicals synthesis and usage, polymer chemistry and technology of large volume polymers: such as polyethylene, polypropylene, polyvinyl chloride and polyethers. Chemistry and technology of some large volume catalytic processes. Prerequisite: CHEM 250 and CHEM 310.
CHEM410	Structure Determination of Compounds	3	This course will cover the theory and practice of separation and purification of organic compounds. Identification of organic compounds and reaction intermediates, structure elucidation and mechanistic study by spectroscopic methods. Prerequisite: CHEM 300
CHEM350L	Organic Chemistry Lab III Lab	1	Organic Chemistry Lab III Lab

CHEM400	Inorganic Chemistry II	3	This course deals with modern inorganic chemistry from both the descriptive and theoretical points of view. Topics discussed include: molecular geometry and symmetry, crystal- and ligand-field and MO theories, mechanisms and reactions of coordination and organometallic chemistry and the chemistry of a selection of representative elements and transition metals. The importance of inorganic (and particularly transition metals) species in many organic reactions, in biochemical processes, catalytic homogeneous reactions, and high technology materials. Prerequisite: CHEM 370
CHEM350	Organic Chemistry III	3	Free radical chemistry and applications, strategic approaches for organic chemistry synthesis, theory and practice of separation and purification of organic compounds, identification of organic compounds and reaction intermediates, structure elucidation and mechanistic study by spectroscopic methods. Prerequisite: CHEM 300
CHEM480	Senior Project in Chemistry	3	Senior Project in Chemistry

Core Requirements			
Code	Title	Credits	Description
MATH210	Calculus II	3	The course material includes hyperbolic functions and their inverses and their derivatives integration techniques, improper integrals, sequences, infinite series, power series, Taylor and Maclaurin series and application of power series. The mathematical software Maple will be introduced and used in support of the comprehension of the material. Prerequisites: MATH160
BMKT300	Marketing Theory and Principles	3	The course introduces the concepts and principles of marketing, including the marketing of service and nonprofit organizations. Topics cover the marketing concepts, including relationship marketing, product development, pricing, promotion, marketing research, consumer behavior, international marketing, distribution, and internal marketing to employees. Practical case studies and research work constitute an integral part of the learning methodology.
PHYS250	Thermodynamic and Waves	3	Temperature, heat, laws of thermodynamics, heat engines, waves, sound waves, geometrical optics, interference and diffraction. Prerequisite(s): PHYS 200
PHYS280	Electricity and Magnetism	3	Electricity, electric field and electric potential, Electric current, Gauss law, capacitors, resistance, Ohm's law, Kirchoff's laws, magnetism, Ampere's law, Biot-Savart law, Faraday's law, and RLC circuits. Prerequisite(s): ENGL 150
MATH270	Ordinary Differential Equations	3	First-order equations, linear and non-linear differential, linearization, numerical and qualitative analysis, second-order equations, existence-uniqueness theorem, series solutions, Bessel s and Legendre s functions, Laplace transforms, systems of differential equations, applications and modeling of real phenomena. Prerequisite: MATH 220.
MATH245	Statistics for Health Sciences	3	General introduction to statistical methods used in the health, biological, biomedical sciences, pharmacy and medical sciences. Topics include research methods and design, descriptive statistics, performance characteristics of diagnostic tests, graphical methods, probability, estimation, hypothesis testing, p-values, regression and correlation, and clinical trials. Prerequisite: ENGL 150
CHEM370L	Inorganic Chemistry I Lab	1	The laboratory part of this course includes: Preparation of inorganic and organometallic compounds illustrating special and advanced techniques, including characterization by vibrational spectroscopy, electronic absorption spectroscopy and other modern spectroscopic techniques.

CHEM370	Inorganic Chemistry I	3	This course dwells into the structure and bonding energetics and kinetics of inorganic compounds. Topics include a survey of the chemistry of both non-metal and metal elements, group theory, coordination compounds and organometallic compounds. Definitions of diamagnetism, paramagnetism, magnetization and magnetic susceptibility; survey of the properties of the transition metals with emphasis on common oxidation levels, valency, metal-ligand multiple bonding, metal-metal bonds and coordination clusters. Prerequisite: CHEM 200
CHEM360	Physical Chemistry II	3	Topics include: The relationship between cohesion, structure and properties of fluids. Thermodynamics laws, free energy and chemical potentials, gases and dilute solutions, phase transitions, colligative properties, chemical equilibria, ionic solutions, chemical kinetics and transport processes. Prerequisite: CHEM 310.
CHEM310L	Physical Chemistry I Lab	1	The laboratory experiments illustrate physical chemistry principles and their application in the laboratory. Data acquisition, analysis, and report preparation is emphasized. Experiments in molecular weight determination, chemical equilibrium, and physical properties of gases, liquids and solids will be conducted.
CHEM310	Physical Chemistry I	3	This course will lay the foundations for a sequence of physical chemistry taken by all B.S. chemistry majors and others interested in obtaining a background in elementary theoretical chemistry. It will be taken with thermodynamic and waves (PHYS 250). The sequence is essential for students who plan to do graduate work in chemistry, topics include, an in depth analysis of atomic and molecular structure, the states of matter, phase equilibria, chemical equilibrium and kinetics. Prerequisite: CHEM 200
CHEM300L	Organic Chemistry Lab	2	Basic experimental techniques in organic chemistry such as melting points, boiling points, distillation, extraction, chromatography; synthesis, separation and purification of some organic compounds. Co-requisites: CHEM 300
CHEM300	Organic Chemistry II	3	This course is the bulk of under graduate organic chemistry. Mechanism in organic chemistry such as SN1, SN2, E1 and E2 and free radical chemistry will be the key focus of this course combined with comprehensive study of structure and reactivity of functional groups: the chemistry of alcohols, phenols, aromatics, ethers, aldehydes, ketones, amines, carboxylic acids, and their derivatives such as esters and amides. The strategic approach for organic chemistry synthesis, structure elucidation, and mechanistic study by spectroscopic methods will also be investigated. Prerequisite: CHEM 250.

CHEM260L	Analytical Chemistry Lab	1	This laboratory course stresses the use of methods and instrumental techniques for quantitative chemical analysis.
CHEM260	Analytical Chemistry	3	This course provides theory and methods associated with gravimetric and volumetric analysis and simple instrumentation. It includes an introduction to statistical evaluations of analytical data. It emphasizes the quantitative determination of substances using spectroscopic analysis, analytical separations, chromatography, and electrochemical methods: potentiometry, voltammetry, and coulometry. Prerequisite: CHEM 200
CHEM250	Organic Chemistry I	3	Organic Chemistry will be classified into families, and the physical and chemical properties of each family will be discussed. Organic reactions will be viewed for their synthetic value, and Mechanistic Theory of Reactions and Structural Theory will be applied. A review of basic concepts of molecular structure, chemical bonding, molecular geometry, electronic and atomic structure, and acid-base chemistry, in addition to basic chemistry of alkanes, alkenes and alkyne families will be a main focus in this course. The value of stereochemical isomers will be stressed including conformational, geometrical and optical isomers. Prerequisite: CHEM 200.
CHEM200L	General Chemistry Lab	1	The laboratory work involves hands-on experience with chemical systems. Experiments include basic calorimetry, a limited qualitative and quantitative analysis scheme, properties of gases, acid-base and redox titrations. Co-requisites: CHEM 200
CHEM200	General Chemistry	3	Basic principles of chemistry, electronic structure of the atom, chemical periodicity, molecular structure and bonding, acids and bases and the states of matter, rates of chemical reactions, and chemical equilibrium are covered in this course. Prerequisites: ENGL 150; CHEM, or S grade on the Chemistry Placement Test Prerequisites: CHEM160, ENGL101. Co-requisites: CHEM200L.

General Education Requirements			
Code	Title	Credits	Description
ENGL251	Communication Skills	3	The objectives of this course are to improve students' writing skills for academic purposes by developing effective use of grammatical structures; analytical and critical reading skills; a sensitivity to rhetorical situation, style, and level of diction in academic reading and writing; and competence in using various methods of organization used in formal writing.
ENGL201	Composition and Research Skills	3	This course focuses on the development of writing skills appropriate to specific academic and professional purposes; the analysis and practice of various methods of organization and rhetorical patterns used in formal expository and persuasive writing; the refinement of critical reading strategies and library research techniques; and the completion of an academically acceptable library research paper. Prerequisites: ENGL150, ENGL151.
CULT200	Introduction to Arab - Islamic Civilization	3	The purpose of this course is to acquaint students with the history and achievements of the Islamic civilization. Themes will include patterns of the political and spiritual leadership; cultural, artistic, and intellectual accomplishments Prerequisites: ENGL051, ENGL101, ENGL151.
CSCI200	Introduction to Computers	3	The course aims at making students competent in computer-related skills. It is supposed to develop basic computer knowledge by providing an overview of the computer hardware and basic components as well as hands-on practice on common software applications such as Word, Excel, Power Point, Internet and Email. The student will learn how to use the new features of Microsoft Office 2010 mainly Word documents, Excel spreadsheets and PowerPoint presentations. On the surface, MS Office 2010 looks a lot different than previous versions (no more menus or toolbars!), but by learning to understand the dramatically changed, Ribbon-based interface, you'll quickly get back on the road to productivity.
ARAB200	Arabic Language and Literature	3	This course is a comprehensive review of Arabic Grammar, Syntax, major literature and poetry styles, formal and business letters.