

School	School of Arts & Science		
Major	Biochemistry		
Major Requirements			
Code	Title	Credits	Description
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
BMED450L	Clinical Chemistry Lab	1	The course includes direct applications of some clinical tests such as glucose, lipids, enzymes, hormones, etc from blood and urine. Co-requisites: BMED 450
BMED450	Clinical Chemistry	3	The course introduces students to the principles and procedures of various tests performed in Clinical Chemistry. It presents the biochemical and physiological basis for tests, the principle and procedure for the test, and the clinical significance of the test results, including quality control and normal values. It also includes basic chemical laboratory technique, chemical laboratory safety, electrolytes and acid-base balance, proteins, carbohydrates, lipids, enzymes, metabolites, endocrine function and toxicology. Prerequisites: Senior standing
BIOC450	Advanced Lab Techniques in Biochemistry	2	A continuation of BIOC II laboratory techniques in which students are exposed to more of chromatography and electrophoresis techniques in nucleic acids and protein purification and sequencing. It also introduces students to gene amplification, blotting and hybridization techniques. Spectroscopic and immunochemical techniques are also covered. Studies of the processes associated with the scientific methods of hypothesis testing will also be addressed. Emphasis is placed on how to formulate hypotheses, design experiments analyze the data statistically, and use the data to draw conclusions related to the initial hypotheses. Prerequisites: BIOC 400
BIOC445	Biotechnology	3	The applications of the methodologies of cell and molecular biology in the rapidly-evolving biotechnology and biopharmaceutical industries with an emphasis on the major sectors involving human therapeutics, human diagnostics, and genomics. Cell and molecular biology technologies adapted to mass production techniques to produce the products of biotechnology are surveyed. Typical pathways of product development from original basic research, product inception, clinical trials, regulatory approval, and commercialization are covered. Students will examine the current programs of the research and development of selected biotechnology and pharmacological corporations. Prerequisites: BIOL 365 / BIOC 300
BIOC400	Biochemistry III (Protein Structure & Function)	3	An advanced course emphasizing topics such as chemical catalysis, enzyme mechanism, receptors, channels, antibodies, and other functional proteins. Advanced topics on DNA and RNA elements are also discussed. Prerequisites: BIOC 350
BIOC350L	Biochemistry II Lab	1	It acquaints students with basic biochemical laboratory techniques like isolation, purification and identification of proteins, carbohydrates, lipids and nucleic acids using centrifugation, different types of chromatography techniques and electrophoresis. Co-requisite: BIOC 350
BIOC350	Biochemistry II (Intermediary)	3	This course includes a survey of basic principles of biochemistry and molecular biology, emphasizing broad understanding of chemical events in living systems in terms of metabolism, and structure-function relationships of biologically important molecules i.e. the proteins, carbohydrates, and lipids. Brief introduction of DNA replication, RNA transcription, and translation are also covered. Prerequisite: BIOC 300

BIOC375	Enzymology	3	This course provides students with thorough foundation of theoretical and practical approach to understand some functional mechanisms of the active centers of the enzymes with emphasis on experimental methods for enzyme isolation, purification, and measuring activities and kinetics of proteins.
BIOL490	Seminar	1	Selected recent and contemporary advances in the various fields of the biological sciences and affiliated disciplines are introduced. Prerequisites: Senior Standing
BIOC485	Modern Topics in Biochemistry	3	Modern Topics in Biochemistry

### 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_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.

### Core Requirements

Code	Title	Credits	Description
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
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.
BMED205	Biophysics	3	Introduction to the physical sciences, principles and properties, as applied to biology and medicine. The course has a special emphasis on elasticity of the biological system, biomechanics, bioelectricity, physics of heat, lights, blood circulation, hearing and vision, and topics in biomedical imaging and analysis: echography, magnetic resonance, and nuclear radiation. Prerequisite(s): ENGL 150
BIOL385L	Microbiology Lab	1	Sterile techniques, media preparation, streaking, identification, isolation and purification of different bacterial strains are performed. Co-requisites: BIOL 385
BIOL385	Microbiology	3	Characteristics of microorganisms and parasites - emphasizing mechanisms by which they cause disease in humans. Prerequisites: BIOL 200
BIOL365	Genetics	3	Basic concepts of prokaryotic genomics, Mendelian inheritance, pylogenic inheritance, linkage and mapping, population genetics, evolution, DNA replication, gene expression, mutation, gene regulation, extranuclear inheritance, bacterial and viral genetics, and recombinant DNA technology are covered. Prerequisites: BIOL 275
BIOL360L	Human Physiology & Anatomy Lab	1	Human Physiology & Anatomy Lab
BIOL360	Human Physiology & Anatomy	4	Studies the structure and function of the following body systems: blood, lymphatic, cardiovascular, respiratory, digestive, urinary, and reproductive. Prerequisites: BIOL200

BIOL275L	Cell and Molecular Biology Lab	1	Experiments to include cellular fractionation, DNA and RNA isolation, electrophoresis, DNA digestion, plasmid isolation, bacterial transformation, and polymerase chain reaction applications. Co-requisites: BIOL 275
BIOL275	Cell and Molecular Biology	3	The course discusses the basic concepts of cell and molecular biology: macromolecular assembly, biomembrane structure and function, storage and expression of genetic information, biogenesis, traffic, reception and transduction, cytoskeleton and extracellular matrix, and the cell cycle. Basic laboratory methods in Cell & Molecular Biology are also introduced. Prerequisites: BIOL 200
BIOL200L	General Biology I Lab	1	This lab course introduces principles of microscopy with emphasis on viewing different animal tissues and cells. A detailed study of the animal kingdom including evolution, classification, and anatomical morphology. Co-requisites: BIOL 200
BIOL200	General Biology I	3	An introductory level course to energy transfer through living organisms, cell biology, membrane transportations, genetics, human physiology, evolution, and morphology and physiology of organ systems, understanding diversity with emphasis on the animal kingdom and evolution. Protozoans are also studied. Prerequisites: ENGL 150; BIOL 150, or S grade on the Biology Placement Test
BIOC300	Biochemistry I (General)	4	An introduction to the chemistry of biologically important amino acids, proteins, carbohydrates, lipids, vitamins and hormones. Enzyme kinetics and catalysis, protein structure and function, and introduction to intermediary metabolism are also included. Prerequisite: BIOL & CHEM 250 or CHEM 255