School	Arts and Sciences
Major	Bachelor of Science in Biology

Course Descriptions

Code	Title	Description
BIOL160	Freshman Biology II	This course introduces the fundamental principles of biology, including the characteristics of life, evolution, and the scientific method. It examines the structure and functions of prokaryotic and eukaryotic cells, with emphasis on cell membranes, cellular transport, and cellular organization. The course explores cellular energy transformations, enzyme-mediated reactions, and photosynthesis. It also examines mitosis and meiosis, their stages, outcomes, and significance in growth, reproduction, and genetic variation. The course concludes with an introduction to human physiology, focusing on homeostasis, body organization, circulation, respiration, and digestion, and how these systems work together to maintain life.
CHEM160	Freshman Chemistry II	This course introduces the fundamental principles of chemistry. It covers atomic structure, the classification of atoms and ions, and the naming of chemical compounds. Students apply stoichiometry to chemical reactions. They determine enthalpy changes through thermochemistry. They also examine precipitation, acid–base, and redox reactions in aqueous solutions, including concentration and titrations. The course concludes with chemical equilibrium and Le Châtelier's principle. Emphasis is placed on quantitative problem-solving throughout.
BIOC250	Biochemistry I (General)	This course examines the relationship between protein structure and function, enzyme kinetics and inhibition, and the central pathways of energy metabolism, including glycolysis, gluconeogenesis, glycogen metabolism, the citric acid cycle, fatty acid oxidation, ketone-body metabolism, and amino acid catabolism with the urea cycle. Emphasis is placed on pathway regulation and on inherited metabolic disorders and their clinical relevance.
BIOL200	General Biology I	General Biology I introduces the fundamental principles of biology, with emphasis on the chemical characteristics and biological roles of carbohydrates, lipids, proteins, and nucleic acids and their relevance to everyday-life situations. It examines the structural organization and functions of prokaryotic and eukaryotic cells, mechanisms of transport across biological membranes, and enzyme function and regulation in cellular metabolism, including aerobic respiration. The course also explores the structures and biological roles of nucleic acids, with emphasis on their involvement in the regulation of gene expression.
BIOL200L	General Biology I Lab	General Biology I Laboratory develops fundamental competencies in biological laboratory practice through hands-on investigations. The course emphasizes safe and responsible laboratory practices, appropriate use of laboratory techniques, interpretation of experimental observations and data, and examination of fundamental biological structures and processes. Students also develop scientific communication skills through the presentation of laboratory procedures, results, and conclusions using appropriate biological terminology.
BIOL250	General Biology II	This course provides an overview of plant diversity, structure, growth, reproduction, and development, with emphasis on seedless and seed plants, plant tissues and organs, and the functions of leaves, stems, and roots. It examines vascular transport, mineral nutrition, flowering plant reproduction, and the physiological processes underlying plant growth, differentiation, and development.
BIOL250L	General Biology II Lab	This laboratory course introduces the comparative morphology and anatomy of plants. Students study representative members of the four major plant groups (bryophytes, seedless vascular plants, gymnosperms, and angiosperms), focusing on their reproductive structures and life cycle stages. They then examine plant cells and tissues and the primary structure of the leaf, stem, and root in monocots and dicots. Through hands-on work with live and preserved specimens, dissections, and prepared microscope slides, students develop skills in observation, identification, and comparison of plant structures. Students also practice scientific reporting and safe laboratory practice. Assessment is based on laboratory reports and two practical examinations.
BIOL275	Cell and Molecular Biology	This course provides an overview of fundamental principles and concepts in cell and molecular biology. It focuses on the structure, organization, and functions of cellular components, with particular emphasis on the endomembrane system and the mechanisms involved in intracellular trafficking. The course also explores cell–cell and cell–environment interactions, cellular communication and signaling, and the role of the cytoskeleton in maintaining cellular structure and mediating cellular processes. Current experimental techniques and approaches used in cell and molecular biology are also introduced.

BIOL275L	Cell and Molecular Biology Lab	This course introduces students to laboratory techniques and procedures used in cellular and molecular biology, with an emphasis on their practical application and interpretation of experimental results. Students develop hands-on experience in cell fractionation, nucleic acid isolation, purification and quantification, protein extraction and quantification, agarose gel electrophoresis, and SDS-PAGE. The course emphasizes the safe use of laboratory equipment and materials, the analysis of experimental findings, and basic troubleshooting of laboratory procedures. Students also develop scientific reporting skills through the preparation of laboratory reports using standard scientific conventions. The course is designed for students majoring in the sciences who seek to develop practical laboratory skills in cellular and molecular biology.
BMED205	Biophysics	This course introduces the physical principles underlying biological structures, physiological processes, and biomedical technologies. Across seven topics, the course examines the physics of waves and light, the operating principles of common medical imaging modalities, the physical basis of radiation therapy and radiobiology, the fluid mechanics of blood circulation, the thermodynamics of the human body, and the physics of vision and hearing. Through lectures, problem-solving, and applied examples drawn from clinical and diagnostic contexts, students build the quantitative and conceptual foundation needed to understand how physical laws govern living systems and underpin modern biomedical instrumentation.
CHEM200	General Chemistry	This course is designed for students who wish to acquire the basic principles of chemistry. The emphasis of the course will be on the fundamental principles of general chemistry, which include terminology, qualitative concepts and quantitative skills. The general topics included in this course are: Quantum Theory of the Atom; Electrons and Periodicity; Bonding; Molecular Geometry; Hybridization; Acid-base Chemistry; equilibrium and Kinetics.
CHEM200L	General Chemistry Lab	This course lab covers the principles of general chemistry, emphasizes laboratory applications of these concepts, and prepares students for lab work. Moreover, in this course lab, you will be introduced to the world of chemistry through solution preparation, experimentation, and data analysis. You will also have the chance to become familiar with lab materials and equipment, and to learn about chemical substances, material storage and mixing, as well as their applications in the chemical and pharmaceutical fields.
CHEM255	Basic Organic Chemistry	CHEM255 introduces the basic concepts of organic chemistry, emphasizing electronic structure, chemical bonding, and the relationship between molecular structure and physicochemical properties. Students will explore systematic IUPAC nomenclature, stereochemistry, conformational stability, and the reactivity of hydrocarbons, aromatic systems, and oxygen-containing functional groups.
CHEM255L	Basic Organic Chemistry Lab	CHEM 255L is a basic organic chemistry laboratory course designed to introduce students to fundamental organic chemistry techniques. Emphasis is placed on experimental precision and accurate results as well as safe laboratory procedures. This laboratory course teaches students several techniques on identification, isolation and purification of organic compounds, as well as selected basic organic reactions.
CHEM260	Analytical Chemistry	CHEM 260 Analytical Chemistry covers fundamental principles and quantitative methods of analytical chemistry, including solution stoeichiometry, statistical treatment of analytical data, chemical equilibria, acid–base systems and titrations, complexation and precipitation equilibria, and electrochemical systems. Emphasis is placed on quantitative problem-solving, interpretation of analytical data, and evaluation of chemical systems relevant to chemical, biological, and biochemical applications.
CHEM260L	Analytical Chemistry Lab	CHEM 260L is a laboratory course that complements CHEM 260 by applying its fundamental concepts through hands-on experimental work. Students learn common analytical techniques for the quantitative determination of analytes in samples relevant to everyday life, such as bleach, milk, and water, including acid–base and pH measurements, redox and EDTA complexometric titrations, spectrophotometry, and electrochemical methods. Working in line with good laboratory practice, including safe handling of chemicals and responsible waste management, students collect and analyze experimental data, evaluate its accuracy and reliability, and interpret their findings. They communicate their results in structured laboratory reports that use and cite reliable sources, developing the independent learning skills that support lifelong learning.

MATH245	Statistics for Health Sciences	This course introduces students to the basic principles of Epidemiology and Biostatistics. The course covers the basic principles of research design, and the statistical methods and tools used in quantitative data analysis in the domain of health sciences. The first part of the course focuses on epidemiology and covers the design of epidemiological studies, epidemiological measures of the frequency of vital events (health, disease, disability and death), measures of association. The second part of the course focuses on biostatistics and covers the methods of data collection and analysis, and probability distribution of different outcomes. It also covers the concept of estimation (confidence intervals, hypothesis testing).
BIOL315	Animal Behavior	This course examines how animals develop, control, and adapt their behavior in response to their physical and social environments. Students explore the roles of genes, learning, sensory systems, neural mechanisms, and hormones, alongside evolutionary explanations for behavior. Topics include communication, biological rhythms, predator avoidance, feeding strategies, sexual selection, and mating behavior. The course emphasizes evaluating scientific evidence and comparing alternative explanations for observed behaviors.
BIOL315L	Animal Behavior Project	This course provides practical experience in studying animal behavior through a student-designed research project. Working in groups, students select a research question, develop a testable hypothesis, and design and conduct an ethical, feasible study. They collect and analyze behavioral data, interpret their findings in light of relevant scientific literature, and communicate their results through a scientific poster and/or oral presentation.
BIOL335	Ecology	Ecology is the study of the interactions between the organisms and their environment. This course explains ecological concepts at different levels of ecological organization namely organismal ecology, population ecology and community ecology. It also describes patterns of population growth, dynamics and regulation, population interactions, species diversity in addition to geographic and global ecology.
BIOL335L	Ecology Lab	This course is the lab component that accompanies BIOL335. It provides hands-on experience of some of the concepts discussed in the latter course. It includes field trips and discusses basic methods for estimating population size, species diversity, and population growth. It also covers topics related to plant competition, predator response, and effects on physical environment on species survival and distribution as well as the method used for constructing life tables.
BIOL360	Human Physiology & Anatomy	This course is designed to teach students human physiology and anatomy. Physiology is the study of the process or function of living things. The major goals of physiology are to understand the response of the body to stimuli and understand how the body maintains conditions within homeostasis in various environmental conditions. The study of physiology consists of many different levels including cell physiology, organ physiology and systemic physiology. Students will be exposed to all of these levels starting at the cellular level and eventually moving up to the system level. Physiology and anatomy are closely related subjects. Anatomy is the scientific discipline that investigates body structures. Often to fully appreciate the physiology of a given system it is necessary to first examine its anatomy. A true understanding and appreciation of physiology can only occur if structure and function are concurrently learned.
BIOL360L	Human Physiology & Anatomy Lab	This laboratory course introduces the structure and function of the human body, with emphasis on the tissue, skeletal, muscular, nervous, and cardiovascular systems. Students examine histological specimens using light microscopy, identify anatomical structures through models and diagrams, and perform dissections of the heart, brain, and spinal cord. Laboratory activities integrate theoretical concepts with hands-on investigation, enabling students to develop skills in anatomical identification, microscopic observation, and specimen handling. The course also emphasizes adherence to laboratory safety regulations and ethical specimen-handling practices.
BIOL365	Genetics	This course introduces students to fundamental and recent concepts in molecular genetics, including the molecular organization, transmission of genetic information and the regulation of gene expression in prokaryotic and eukaryotic organisms. The course examines the genetic consequences of DNA mutations and defects in DNA repair, with emphasis on their roles in genetic disorders and cancer development. It also covers genetic linkage, recombination, genetic mapping, and the analysis of genetic-cross data. In addition, the course explores genomic data and functional genomics approaches used to investigate genome organization, gene function, and global patterns of gene expression.
BIOL375	Plant Physiology	This course provides an overview of plant structure and cell architecture, water relations, mineral nutrition, photosynthesis, phloem translocation, and the physiological regulation of plant growth and development. It also addresses plant responses to environmental factors, with emphasis on phytochrome-mediated light responses and the roles of phytohormones in plant development.

BIOL375L	Plant Physiology Lab	This laboratory course provides students with hands-on experience in applying the fundamental concepts and principles of plant physiology. Through a series of laboratory experiments, students investigate plant pigment composition, water and osmotic potentials in plant tissues, cell membrane chemical composition and selective permeability, mineral nutrition, gravitropism and phototropism, and seed viability. The course emphasizes the application of experimental techniques, quantitative analysis, observation, interpretation of results, and scientific discussion of plant physiological processes. Students also practice scientific reporting and safe laboratory practice. Assessment is based on laboratory reports, and midterm and final examinations
BIOL385	Microbiology	This course covers principles of microbiology with emphasizing on the diversity and structural characteristics of microorganisms, impact of microbes on everyday life and the role of microbes in the host-pathogen interactions. Moreover, in this course, you will be introduced to the world of microbiology in terms of isolation, identification and classification. Also, you will have the chance to discover examples of different groups and species of microorganisms that have direct impact on human health, mechanism of causing diseases and the beneficial effects on the biotechnology sector as applications in the food industry.
BIOL385L	Microbiology Lab	This laboratory course introduces students to the core practical skills of microbiology. Students learn to prepare and sterilize culture media, dispose of biological waste safely, and use aseptic techniques to inoculate bacterial cultures. They apply staining and microscopy techniques to classify bacteria by cellular morphology and staining characteristics, and use enumeration methods to calculate bacterial concentrations in samples. They also evaluate the effectiveness of antimicrobial agents in controlling bacterial growth and classify unknown bacteria using biochemical tests. The course also develops students' skills to communicate their experimental findings by writing scientific laboratory reports that include data, analysis, interpretation, and evidence-based conclusions.
BIOL425	Immunology	This course introduces the fundamental principles of immunology, including the cellular and molecular components of the immune system and the mechanisms of innate and adaptive immune responses. It examines lymphocyte activation, immune regulation, and antigen recognition and presentation. The course also addresses immune pathologies resulting from dysfunction of the immune system.
BIOL435	Developmental Biology	This course introduces the fundamental principles of developmental biology and embryology. It explores the molecular and cellular mechanisms underlying the development of a multicellular organism from a single cell. Students examine key events in animal development, from fertilization and embryogenesis to tissue differentiation and organ formation. The course emphasizes how specialized cells and tissues develop and function in an integrated manner. Students are introduced to the genetic and cellular regulation of developmental processes. Experimental approaches in developmental biology and embryology are also explored. Emphasis is placed on hypothesis formulation, experimental design, and the application of appropriate techniques to investigate developmental mechanisms.
BIOL435L	Developmental Biology	This course examines embryonic development through laboratory study of sea urchins, frogs, and chicks. Students compare these animal models and learn anatomical terminology and the stages of cleavage, blastula formation, gastrulation, and neurulation. They observe prepared slides and live chick embryos under a microscope, identify key developmental features, and record and present their findings in laboratory reports.
BIOL450	Modern Topics in Biology	BIOL450 focuses on the analysis and interpretation of primary biological research articles to understand how biological questions are investigated and explained through experimental evidence. Emphasis is placed on analyzing research findings, constructing scientific texts, assessing biological investigations, and connecting the different parts of a primary research article. Students also develop autonomous learning skills through self-directed investigation of biological questions using diverse scientific sources

BIOL485	Neurobiology	This course introduces the fundamental principles of nervous system structure and function, with emphasis on the mechanisms by which neurons generate, transmit, and integrate information. It begins with an overview of the nervous systems of humans and other animals and examines the cellular and molecular basis of neuronal function, including electrical signaling, membrane permeability, ion channels, transporters, and synaptic transmission. The course then explores selected functions of the nervous system, focusing on the neural mechanisms underlying vision and hearing, as well as the regulation of sleep and wakefulness. Finally, it examines higher nervous system functions, with particular emphasis on the neural mechanisms involved in memory. Together, these topics provide an integrated understanding of how electrical and chemical signals are generated and communicated within the nervous system and how neural circuits support sensory processing, physiological states, and complex brain functions.
BIOL490	Seminar	This course develops undergraduate students' foundational skills in finding, evaluating, and communicating scientific research in the biological and biochemical sciences. Designed for advanced undergraduate students, the course guides learners through structured literature database searching, step-by-step critical analysis of primary research papers, and clear visual and oral communication. Through guided research-based activities, a formal oral presentation, structured peer discussions, and brief reflective exercises on their own research and presentation process, students build the self-directed literature-inquiry habits essential for post-graduation lifelong learning.
BIOL405	General Virology	This course provides a comprehensive study of viruses, subviral agents, and their interactions with host organisms. The covered topics include viral architecture, classification according to genome structure, molecular mechanisms of viral replication, host immune response and evasion tactics, as well as viral pathogenesis. Additionally, the course explores medically important human pathogens, emerging zoonoses, antiviral therapeutics, and modern viral biotechnology applications.
BIOL460	Human Physiology and Anatomy II	This course is a continuation of BIOL360 (Human Anatomy and Physiology). It extends students' understanding of the relationship between human body structure and function through the study of the integumentary, nervous, sensory, vascular, respiratory, urinary, and reproductive systems, together with metabolism and fluid, electrolyte, and acid-base homeostasis. Emphasis is placed on the physiological mechanisms that maintain homeostasis, the functional integration of body systems, and the interpretation of physiological findings. Students apply previously acquired anatomical and physiological principles to analyze regulatory mechanisms, interpret clinical and physiological data, and evaluate selected disturbances of normal function. Systems covered in detail in BIOL360 or other required courses are not repeated unless they are needed to explain integration among systems.
BIOL455	Environmental Biology	This course describes the concepts and terminology related to the broad range of environmental disciplines and their applications. In addition, while emphasizing the environmental theme, the course introduces all facets of the discipline of biology, including cell biology, evolution, ecology, conservation and restoration. A comprehensive coverage of scientific method, including field experimentation and field techniques, is also an important part covered by this course. It will also presents how living organisms interact with their environment and the impact of human activities on ecosystems.
BIOL415	Endocrinology	This course provides students with a broad understanding of the hormonal regulation of physiological processes in humans. It examines major endocrinological methods, general endocrine mechanisms, and the interactions between the hypothalamic–pituitary axes and their target glands, hormones, and physiological functions. Topics include hormone classification, sources and synthesis, secretion and transport, receptors and target tissues, mechanisms of action, and feedback regulation. The course also explores endocrine function under normal physiological conditions and the disorders that may arise when hormonal regulation and homeostasis are disrupted.
ARAB200	Arabic lamguage and Literature	This course develops critical knowledge and practical skills in Arabic language and literature for non-specialists through three interconnected areas: literature, rhetoric, and textual analysis; grammar, morphology, and spelling; and techniques of academic and professional expression and communication. Students read texts from different literary periods and schools, analyze their structure, ideas, and stylistic and rhetorical features, and apply rules of grammar, morphology, and correct writing in the production of coherent functional and academic texts. The course also develops the capacity for responsible linguistic and cultural judgment and for accurate, informed use of Arabic in university and professional contexts. Learning is assessed through attendance, participation, classroom activities, the midterm examination, and the final examination.

CULT200	Introduction to Arab-Islamic Civilization	This course develops a critical understanding of the concept, formation, and interaction of civilizations, with a focus on Arab-Islamic civilization in its historical, social, intellectual, scientific, and artistic contexts. Students study examples of ancient civilizations, the conditions of the Arabs before the prophetic mission, the foundations and values of Arab-Islamic civilization, the experience of al-Andalus, and the contributions of scholars and thinkers to history, geography, philosophy, medicine, science, art, and architecture. They also analyze channels of interaction between East and West and the effects of knowledge transfer, and develop the capacity for responsible, evidence-based cultural judgment with respect for diversity and openness. Learning is assessed through an analytical project, a comparative civilization task, the midterm and final examinations, participation, and classroom activities.
ENGL201	Composition and Research Skills	This course builds upon students' previous knowledge of language and writing skills to develop advanced academic composition, source-evaluation, and research-writing competencies. Students engage with a variety of texts from different disciplines, applying critical reading and research strategies to evaluate, integrate, and synthesize information in their writing. The course emphasizes the composition of clear, coherent, and well-supported academic essays through the effective use of rhetorical strategies, academic language, and evidence from multiple sources. Students also develop proficiency in summarizing, paraphrasing, synthesizing, and citing source material accurately and ethically. Through guided practice, revision, and editing, students strengthen their ability to communicate ideas effectively and independently in research-based academic writing. Learning is assessed through written assessments, midterm examination and final examination.
ENGL251	Communication Skills	Communication Skills prepares students to communicate clearly, ethically, and professionally in contemporary academic and workplace contexts shaped by artificial intelligence, digital platforms, hybrid work, and multicultural collaboration. In the course, students study audience, purpose, tone, context, culture, and channel while applying a three-phase writing process of planning, drafting, and revising. They practice essential forms of workplace communication, including emails, memos, short digital messages, positive and neutral messages, bad-news messages, persuasive and sales messages, presentation materials, teamwork and meeting communication, résumés/CVs, cover messages, interview responses, and follow-up messages. The course also teaches students to evaluate and use AI tools responsibly as support for brainstorming, revision, preparation, design awareness, rehearsal, and reflection without replacing human judgment, accuracy, empathy, or academic integrity. Through lectures, discussion, message analysis, writing workshops, peer review, presentations, and practical assignments, students develop the communication competence needed for professional credibility, career readiness, and ethical participation in AI-supported workplaces.