



Program of Study: Bachelor of Science in Biology: Pre-Pharmacy

Program Description

The Bachelor of Science in Biology: Pre-Pharmacy tract is designed for students preparing for pharmacy school. It includes courses required or recommended by graduate professional schools, preparation for the pharmacy college admission test (PCAT), and specialized coursework focused on preparing students for success in their graduate studies. These students will also have a Pre-Pharm faculty mentor to ensure that all pharmacy school questions are answered and that proper progress is being made toward completion of the Pre-Pharm designated curriculum. The Pre-Pharm advisor will also assist students in choosing pharmacy schools and advocating on behalf of students for a selection of pharmacy schools.

Course Number	Course Title	Course Description	Credits
UNV 101	University Success	This course provides positive re-enforcement of successful learning strategies and assistance with adaptation to the academic environment.	3
COM 101	Intro to Human Communication [^]	This course focuses on how people use messages to generate meanings within and across various contexts, cultures, channels, and media. The course readings and discussions seek to increase understanding of relevant communication theories and their application in the practice of effective and ethical human communication in both personal and professional life.	3
ENG 101	Academic Writing	A course in writing academic prose, including various types of essays, arguments, and constructions. A writing intensive course. Prerequisite: UNV 105.	3
PSY 101	General Psychology [^]	A foundation course in the science of behavior. Includes a study of the origin and development of behavior patterns, motivation, emotional behavior sensory functions, perception, intelligent behavior, and adjustment. Simple experiments constitute a basic part of the course.	3
HIS 107	World Civilization Before 1500 [^]	A survey of the major events, personalities, movements, and ideas in world civilization from the prehistoric era to 1500 CE. This course focuses on the key political, intellectual, scientific, social, economic, and cultural changes that occurred in world civilization. Students will gain an understanding of the social forces and trends in social, religious, political, and philosophic thought that laid the foundations of the modern world.	3
ENG 102	Research Writing	A course exploring various types of research writing, with a focus on constructing essays, arguments, and research reports based on primary and secondary sources. A writing-intensive course. Prerequisite: ENG 101.	3
BIO 181	General Biology I	A study of biological concepts emphasizing the interplay of structure and function, particularly at the molecular, cellular, and organismal levels of organization. Co-requisite: BIO 181L.	3
BIO 181L	General Biology I Lab	A laboratory course designed to complement and support the principles being learned in Biology 181 lecture. Co-requisite: BIO 181.	1
MAT 121	College Algebra	A precalculus course on algebraic topics and the properties of basic functions. Prerequisite: MAT 120.	3

Choose one of the following courses:

INT 463	World Religions [^]	A study of the major contemporary religions of the world including both historical background and development, and current beliefs and practice with emphasis on basic religions: Hinduism, Jainism, Buddhism, Sikhism, Taoism, Confucianism, Shinto, Zoroastrianism, Judaism, Islam, and Baha'i.	3
BIB 113	Old Testament History [^]	An introductory and historical survey of the Old Testament. Attention is given to the study of the Bible itself, its institutions, literature, and history of the national life of the Hebrew people from earliest times to close of the Old Testament period	3
PHI 101	Introduction to Philosophy [^]	An introduction to the discipline of philosophy through a study of representative philosophic problems.	3
BIB 123	New Testament History [^]	A general historical survey of the New Testament, beginning with the inter-biblical period, with the main emphasis given to the Gospels and Acts.	3

UNV 200	Western Ideas and Aesthetics	An examination of ideas that shaped Western thought, and aesthetics. Students will have opportunities to identify and analyze instances of these ideas literature, film, and art.	4
BIO 182	General Biology II	A study of the characteristics of the major groups of plant and animal life, and the ecological interaction of organisms with each other and their environment. Prerequisite: BIO 181 and BIO 181L. Co-requisite: BIO 182L.	3
BIO 182L	General Biology II Lab	A laboratory course designed to complement and support the principles being learned in Biology 182 lecture. Prerequisite: BIO 181 and BIO 181L. Co-requisite: BIO 182.	1
HLT 322	Medical Ethics	An introduction to medical ethics which examines several approaches to ethics within the interrelated contexts of medicine, health care and the law. Topics investigated may include: professional patient relationships; institutional and social settings of care delivery; informed consent, confidentiality, and truth-telling; abortion; critically ill neonates; death and dying; mental illness; human experimentation; resource allocation; and justice and health care.	3

[^] Campus students may choose an alternative course from the Grand Experience. See the current Academic Catalog for details.

Total General Education Credits: 39

Pre- Pharmacy Core:

HLT 110	Introduction to the Health Professions	Introduction to the roles and responsibilities of medical and allied healthcare professionals. Focus is also placed on the teamwork necessary to effectively provide the highest quality patient care.	2
CHM 113	General Chemistry I	An exploration of the principles and practice of modern chemistry. Topics include the chemical and physical properties of elements and compounds, reaction stoichiometry, energetics, and atomic and molecular structure. Prerequisites: MAT 121 or equivalent. Co-requisites: CHM 113L.	3
CHM 113L	General Chemistry I Lab	A laboratory course designed to complement and support the principles being learned in CHM 113 lecture. Prerequisite: MAT 121 or equivalent. Co-requisites: CHM 113.	1
CHM 115	General Chemistry II	Continuation of CHM 113. Topics include thermodynamics, kinetics, descriptive chemistry, analytical chemistry, electrochemistry, and nuclear chemistry. Prerequisites: CHM 113 and CHM 113L. Co-requisites: CHM 115L.	3
CHM 115L	General Chemistry II Lab	A laboratory course designed to complement and support the principles being learned in CHM 115 lecture. Prerequisites: CHM 113 and CHM 113L. Co-requisites: CHM 115.	1
PHY 111	General Physics I	Survey of physical principles and concepts using mathematical descriptions based on algebra and trigonometry. Topics covered include force and motion, physical properties of materials, and thermodynamics. Prerequisites: PHY 101, PHY 101L, and MAT 121, or instructor's approval. Co-requisites: PHY 111L.	3

PHY 111L	General Physics I Lab	Laboratory experiments demonstrating the physical principles in the PHY 111 lecture. Prerequisites: PHY 101, PHY 101L, and MAT 121, or instructor's approval. Co-requisites: PHY 111.	1
PHY 112	General Physics II	Continuation of PHY 111. Topics covered include wave motion, electrostatics, optics, and magnetism. Prerequisite: PHY 111 and PHY 111L. Co-requisites: PHY 112L.	3
PHY 112L	General Physics II Lab	Laboratory experiments demonstrating the physical principles in the PHY 112 lecture. Prerequisites: PHY 111 and 111L. Co-requisites: PHY 112.	1
BIO 317	Science Communication	Also PHY 317 and CHM 317. A study of how to gather, analyze, and communicate scientific information. Topics covered include various forms of written communication, publishing research results, and oral presentation techniques. A Writing-Intensive course. Prerequisite: BIO 182 and BIO 182L.	3
BIO 304	Applied Nutrition	Applied Nutrition provides a foundation of basic nutrition theory. The focus is on assessment, food components, exercise, nutrition, weight control, community programs, and resources. Application of these aspects is used to promote health and prevent illness.	3
HLT 315	Interview/ Admission needs/ professionalism	Development of interviewing and professional presentation skills through the study of various principles and practice within the class. Students will also investigate the admission requirements related to graduate level studies and prepare a quality resume or CV.	1
BIO 363	Biostatistics	Introduction to experimental design, and basic concepts of descriptive and inferential statistics including descriptive methods and graphing, binomial and Gaussian probability theory, estimation, confidence intervals, hypothesis testing, correlation, and regression. One-, two- and multi-group parametric and nonparametric methods will be introduced. Sampling distributions covered include the Z, t, F, and Chi-squared distributions. Prerequisite: MAT 121 or higher.	3
BIO 360	Basic Physiology	A study of the functions of cells, organs, and systems of vertebrates, with emphasis on humans. Prerequisite: BIO 182	3
BIO 360L	Basic Physiology Lab	A laboratory course designed to complement and support the principles being learned in Medical Physiology. Prerequisites: BIO 182 and BIO 182L. Co-requisite: BIO 360	1
BIO 352	Developmental Anatomy	A comprehensive examination of human anatomical development from fertilization through birth including genetic regulation, molecular pattern formation, teratology, and developmental anomalies. Prerequisites: BIO 182 and BIO 182L.	4
CHM 331	Organic Chemistry I	A systematic study of the chemistry of carbon compounds. Topics include nomenclature, structure, synthesis, reactions, and analysis of aliphatic and aromatic compounds. Prerequisite: CHM 115 and CHM 115L. Co-requisites: CHM 331L.	3
CHM 331L	Organic Chemistry I Lab	Laboratory course to develop basic laboratory skills useful for synthesis of compounds, isolation of natural products, and study of reaction mechanisms. Prerequisites: CHM 115 and CHM 115L. Co-requisites: CHM 331.	1
CHM 332	Organic Chemistry II	Continuation of CHM 331. Topics include reaction mechanisms, kinetics, approaches to chemical synthesis, and qualitative analysis of organic compounds. Prerequisites: CHM 331 and CHM 331L. Co-requisites: CHM 332L.	3
CHM 332L	Organic Chemistry II Lab	Continuation of CHM 331L involving more complicated techniques for synthesis, instrumental analysis, and structure elucidation. Prerequisites: CHM 331 and CHM 331L. Co-requisites: CHM 332.	1
BIO 340	Genetics	A comprehensive examination of the principles of heredity and variation, including Mendelian genetics, molecular genetics, and population genetics. Prerequisites: BIO 182 and BIO 182L.	3

BIO 451	Pharmacology I	This course presents the foundational concepts of pharmacology emphasizing basic mechanisms of drug action such as pharmacokinetics, pharmacodynamics and pharmacotherapeutics. Drug classes illustrated using prototypic drugs. Examples drawn from various body systems, i.e., neuromuscular, respiratory and so forth. The course will also briefly introduce concepts in modern drug design such as gene and cell therapy and application of pharmacogenomics. Prerequisites: CHM 332 and CHM 332L.	3
BIO 452	Pharmacology II	This course details the development of our current understanding of receptor signal transduction in mammalian systems. The course will focus on the molecular biochemistry of receptor structure; mass action considerations governing ligand-receptor binding interactions; molecular pharmacology of transduction of the receptor signal and specific considerations of receptors as pharmaceutical targets. Intended for students pursuing a specialization in pharmacology. Prerequisites: BIO 451.	3
BIO 268A	Pathophysiology I	The first of a two course sequence designed to the bridge the gap between basic preclinical science courses and the clinical requirements of healthcare professionals. Systematic studies focus on the etiology, pathogenesis, morphology, and clinical manifestations associated with various altered health states and diseases. Material presentation in clinically relevant terminology enhances accurate and effective communication through extensive vocabulary expansion. Upon completion of this course, the student should be able to accurately discuss with both other health care professionals and patients: <ul style="list-style-type: none"> • What is actually happening at the physiological level that causes the signs and symptoms of a given condition or disease; • How these physiological effects correlate to mechanisms of accurate diagnoses; • Why one treatment method might be more beneficial than another; • How different systems intricately interrelate to cause a clinical picture and complications. Prerequisites: BIO 202 and BIO 202L or BIO 360 and BIO 360L	2
BIO 268B	Pathophysiology II	The second of a two course sequence designed to the bridge the gap between basic preclinical science courses and the clinical requirements of healthcare professionals. Systematic studies focus on the etiology, pathogenesis, morphology, and clinical manifestations associated with various altered health states and diseases. Material presentation in clinically relevant terminology enhances accurate and effective communication through extensive vocabulary expansion. Upon completion of this course, the student should be able to accurately discuss with both other health care professionals and patients: <ul style="list-style-type: none"> • What is actually happening at the physiological level that causes the signs and symptoms of a given condition or disease; • How these physiological effects correlate to mechanisms of accurate diagnoses; • Why one treatment method might be more beneficial than another; and • How different systems intricately interrelate to cause a clinical picture and complications. Prerequisites: BIO 268A	2
BIO 461	Epidemiology	Topics include basic concepts, principles, and methods of chronic and infectious disease epidemiology, including study designs and basic measures of disease frequency and exposure-disease associations, relating prevalence and incidence, analysis of clustering and seasonality; measures of effect, sources of bias, estimation and hypothesis testing in epidemiology; models for risk and rates; cohort analysis. Prerequisites: BIO 363 and either BIO 201 and BIO201L, BIO 205 and BIO 205L, or BIO 455.	3
BIO 205	Microbiology	An introduction to the principles and applications of microbiology, with a study of the general characteristics of microorganisms and their relationship to humans. Co-requisite: BIO 205L.	3

BIO 205L	Microbiology Lab	A lab course designed to complement and support the principles being learned in Biology 205 lecture. Co-requisite: BIO 205.	1
BIO 353	Calculus for the Biological Sciences	This course focuses on the study and mathematical modeling of biological systems. Through a host of biological and medical applications, the rudiments of calculus are developed. Concepts include measuring the slope of a curve, writing equations of tangent lines, maximizing and minimizing a function, determining the rate of change of a function, and measuring the area under a curve. Solution techniques, both analytic and numeric, for difference and differential equations are utilized. Modeling activities are heavily emphasized. Qualitative analysis of solutions of differential equations is incorporated in modeling activities. Application areas include mathematical physiology, pharmacology, cell biology, and population biology. Prerequisites: MAT 121 or satisfactory placement exam results.	3
CHM 461	Biochemistry I	Study of the chemical basis for biological functions in living organisms. Topics include structure and function of proteins, carbohydrates, lipids, and nucleic acids. Prerequisite: CHM 332 and CHM 332L. Co-requisite: CHM 463L (either semester).	3
CHM 462	Biochemistry II	Continuation of CHM 461. Topics covered include molecular mechanism of genetics, biological energy production, and regulation of cell growth. Prerequisite: CHM 461. Co-requisite: CHM 463L (either semester).	3
CHM 463	Biochemistry Lab	Practical introduction to lab techniques used in biological preparations, analysis, and functional studies of proteins, carbohydrates, lipids, and nucleic acids. Prerequisites: CHM 332 and CHM 332L. Co-requisite: either CHM 461 or CHM 462.	1

Total Pre-Pharmacy Core Credits: 74

Total General Education Credits: 39

Total Elective Credits: 7

Total Bachelor of Science in Biology: Pre-Pharmacy Credits: 120