# BS in Biotechnology Course Description

**BIOL 095 Introductory Biology (3:0:0) 3 Semester Credit Hours**

This course is offered for new science students without high school science backgrounds. The course provides an introduction to basic concepts in biology, cell energetics, genetics, diseases and biotechnology. This course is not for degree credit.

**BIOL 100 Humankind in a Biological World (3:0:0) 3 Semester Credit Hours**

In this course, students will learn how human beings interact with, affect, and are affected by other living organisms. Ways in which human activities have had an impact on other life on earth, humankind and disease, and the development of scientific thought how we could solve this issue are examined.

**BIOL 112 University Biology I (3:0:0) 3 Semester Credit Hours**

**Co-requisite: BIOL 113**

University Biology I Laboratory Introduction to cell chemistry, metabolism, and genetics.

**BIOL 113 University Biology I Lab. (0:3:0) 1 Semester Credit Hour**

**Corequisite: BIOL 112**

Introduction to Cell Structure & Function and Basics on plant biology.

**BIOL 114 University Biology II (3:0:0) 3 Semester Credit Hours**

**Corequisite: BIOL 115**

This course is intended for science majors and pre-professionals in life sciences and provides an introduction to Genetics, Microbiology and animal form and function.

**BIOL 115 University Biology II Lab. (0:3:0) 1 Semester Credit Hour**

**Corequisite: BIOL 114**

This course encompasses the basic techniques in Biology for science majors and pre-professionals in life sciences that accompany

**BIOL 114. BIOL 230 General Microbiology (3:0:0) 3 Semester Credit Hours**

**Prerequisite(s): BIOL 114 Corequisite: BIOL 231**

This course covers the classification of microorganisms, microbial metabolism, microbial growth, microbial genetics, structure of eubacteria, archaea, bacteria, fungi, and viruses, specific defenses, and diseases.

**BIOL 231 General Microbiology Lab (0:3:0) 1 Semester Credit Hour**

**Corequisite: BIOL 230**

This course focuses on laboratory techniques involved in culturing, staining, and identifying microorganisms.

**BIOL 240 Ecology (3:0:0) 3 Semester Credit Hours**

**Prerequisite(s): BIOL 114**

This course introduces students to concepts and issues related to physical environment, energy flow, structure and function of populations, dynamics of communities, and succession.

**BIOL 250 Biochemistry I (3:0:0) 3 Semester Credit Hours**

**Prerequisite(s): CHEM 111 or CHEM 120 Corequisite: BIOL 251**

Structure and chemical behavior of biochemical compounds, levels of protein structure, steady state enzyme kinetics and activities, protein purification, protein functions. Structure and functions of Carbohydrates, Nucleotides and Nucleic Acids, DNA-Based Information Technologies. Lipids and Biological Membranes and Transport.

**BIOL 251 Biochemistry I Lab (0:3:0) 1 Semester Credit Hour**

**Corequisite: BIOL 250**

This experimental course will introduce students with hand practice of some major biochemistry techniques. This course has two parts, part A is wet lab where students learn and practice separation, identification, and quantization techniques that exploit properties of biological molecules. To analyze results, data and write reports to develop analytical reasoning and problem-solving skills. The second part B is dry/computer lab where students will use Geneious to study the 3D structures of biological macromolecules from PDB files (Protein Data Bank).

**BIOL 270 General Genetics (3:0:0) 3 Semester Credit Hours**

**Prerequisite: BIOL 112 or BIOL 114**

This course focuses on the basic concepts of heredity and modern developments in Genetics.

**BIOL 271 General Genetics Lab. (0:3:0) 1 Semester Credit Hour**

**Corequisite: BIOL 270**

This course covers basic laboratory techniques in Genetics that accompany the course BIOL 270.

**BIOL 322 Microbial Genetics (3:0:0) 3 Semester Credit Hours**

**Prerequisite(s): BIOL 270**

This course covers the basic concepts of microbial genetics including gene structure, gene expression and its control, and evolution of bacterial genetic diversity. The emphasis will be on topics such as mechanisms of genetic exchange, recombination, plasmids, analysis of bacteria and phage genomes, mutagenesis, and DNA repair. The course will also discuss the common methods using bacteria in gene cloning and identification and isolation of mutants

**BIOL 330 Applied and Industrial Microbiology (3:0:0) 3 Semester Credit Hours**

**Prerequisite(s): BIOL 230 Corequisite: BIOL 331**

This course covers the biology of microorganisms of ecological and industrial significance and includes topics such as food production, spoilage and preservation, fermentation technology, waste disposal, water purification, biodeterioration, and decomposition.

**BIOL 331 Techniques in Applied and Industrial Microbiology Lab. (0:3:0) 1 Semester Credit Hour**

**Corequisite: BIOL 330**

This course includes laboratory exercises that illustrate applied methodologies in microbiology, including isolation of commercially useful strains, and discusses the production and purification of industrial products.

**BIOL 350 Biochemistry II (3:0:0) 3 Semester Credit Hours**

**Prerequisite(s): CHEM 250**

This course covers the bioenergetics, Glycolysis, Gluconeogenesis, the Citric Acid Cycle and the oxidative phosphorylation and photophosphorylation. Lipid, amino acids and nucleotides Biosynthesis. DNA and RNA metabolism and gene expression regulation.

**BIOL 354 Biophysics (3:0:0) 3 Semester Credit Hours**

**Prerequisite(s): BIOL 114 Corequisite: BIOL 355**

This course introduces students to the use of physical methods in the study of biological systems including macromolecules, membranes, nerves, muscle, photosynthetic systems and visual systems.

**BIOL 355 Biophysics Lab. (0:3:0) 1 Semester Credit Hours**

**Corequisite: BIOL 354**

This course introduces students to common laboratory techniques used in Biophysics.

**BIOL 356 Virology (3:0:0) 3 Semester Credit Hours**

**Prerequisite(s): BIOL 230**

This course provides an overview of the characteristics of major families of viruses; the intrinsic properties of viruses that cause disease, their development, and life cycles; interaction with host cells; genetics; and tumor-inducing properties and epidemiology.