

## BIO-100 BIOCHEMISTRY

**Credit Hours:** 3-1

**Pre-requisites:** None

### **Course Objectives:**

- Biochemistry draws on its major themes from many disciplines. For example from organic chemistry, which describes the properties of biomolecules; from biophysics, which applies the techniques of physics to study the structures of biomolecules; from medical research, which increasingly seeks to understand disease states in molecular terms and also from nutrition, microbiology, physiology, cell biology and genetics. Biochemistry draws strength from all of these disciplines but is also a distinct discipline, with its own identity. It is distinctive in its emphasis on the structures and relations of biomolecules, particularly enzymes and biological catalysis, also on the elucidation of metabolic pathways and their control and on the principle that life processes can, at least on the physical level, be understood through the laws of chemistry.

### **Course Contents:**

- Introduction of biochemistry
- **Biomolecules**
  - The Molecules and Chemical Reactions of Life
  - Amino Acids and Proteins
  - Simple and Complex Carbohydrates
  - Lipids and Membranes
  - Nucleotides and Nucleic Acids
  - Vitamins and Cofactors
- **Biochemical Reactions**
  - Enzymes
  - Metabolic Pathways
  - Carbohydrate Metabolism
  - Lipid Metabolism
  - Amino Acid Metabolism
- **Molecular Genetics**
  - DNA and RNA
  - Translation and the Genetic Code

### **Course Outcomes:**

- This course will train graduate students to become proficient and successful investigators who are able to demonstrate a basic knowledge of central concepts in the biomedical sciences, understand the current concepts in biochemistry and critically evaluate the scientific literature.

#### **Lab Work:**

- Introduction of biochemistry lab and biosafety
- Units of measurements
- Buffer solution preparation
- Determination of  $pH$  and  $pOH$
- Numerical problems of  $pH$  and  $pOH$
- Test on carbohydrates
- Test on proteins
- Test on lipids

#### **Recommended Books:**

- ***Fundamentals of Biochemistry: Life at the Molecular Level*** by Voet, Donald, Judith G. Voet, and Charlotte W. Pratt.
- **Concepts in biochemistry** by Rodney Boyer. 3<sup>rd</sup> Edition.
- **Lippincott's illustrated reviews:** Lippincott Williams & Wilkins.
- **Biochemistry** by Geoffrey Zubay McGraw-Hill.
- **Biochemistry** by Donald Voet, Judith G. Voet 4, illustrated John Wiley & Sons.
- **Basic concepts in biochemistry: a student's survival guide** by Hiram F. Gilbert
- **Principles of biochemistry** by Albert L. Lehninger, David L. Nelson, Michael M. Cox
- **Concepts in biochemistry** by Rodney F. Boyer.