

**CHOICE BASED CREDIT SYSTEM SCHEME AT UNDER-GRADUATE LEVEL**

PROGRAMME: BACHELOR OF SCIENCE (BSc)

SUBJECT: BIO-TECHNOLOGY**Programme Specific Outcomes (PSOs) of Biotechnology**

**PSO1:** Biotechnology provides the basic platform to acquaint the students in the areas of biochemistry, immunology, genetics, microbiology, and molecular biology and hence expands their sphere of thinking and makes them more sensitive and responsible towards society and environment.

**PSO2:** Since most of the theory topics dealt in the biotechnology can be proved experimentally, students will be able to comprehend them in a better way which in turn improves their analytical power and creative thinking.

**PSO3:** Being interdisciplinary in nature and as innovation is almost inbuilt in many of the core subjects, it offers more possibilities and opportunities for the students to explore the world.

**PSO4:** Biotechnology and skill development goes hand in hand which means by the time students' pass-out, they have enough skill behind them which in turn enhances their employability.

**DSC & DSE COURSES FOR THE STUDENTS OF B. Sc. WITH BIO-TECHNOLOGY AS A DISCIPLINE**

SEMESTER	COURSE CODE	TYPES OF COURSE	TITLE OF COURSE	CREDITS		
				THEORY (4)	PRACTICAL (2 or 0)	TUTORIAL (0 or 2)
I	BT120C	DSC-1 (6 Credits)	FUNDAMENTALS OF BIOCHEMISTRY	4	2	0
II	BT220C	DSC-2 (6 Credits)	CELL BIOLOGY, MICROBIOLOGY AND IMMUNOLOGY	4	2	0
III	BT320C	DSC-3 (6 Credits)	MOLECULAR BIOLOGY AND GENETIC ENGINEERING	4	2	0
IV	BT420C	DSC-4 (6 Credits)	PLANT BIOTECHNOLOGY AND ANIMAL CELL SCIENCE	4	2	0
VA OR VB	BT520DA	DSE-I (6 Credits)	BIO-TECHNIQUES	4	2	0
	BT520DB	DSE-II (6 Credits)	BIOPROCESS ENGINEERING	4	2	0
VIA OR VIB OR VIC	BT620DA	DSE-I (6 Credits)	ELEMENTARY BIostatISTICS AND BIOINFORMATICS	4	2	0
	BT620DB	DSE-II (6 Credits)	ENVIRONMENTAL BIOTECHNOLOGY	4	2	0
	BT620DC	DSE-III (6 Credits)	CELL CYCLE, SIGNALING AND CANCER	4	2	0

**Head of Department  
Convener BOUGS in Biotechnology**

## BACHELOR OF SCIENCE

### 1<sup>st</sup> SEMESTER

#### DISCIPLINE SPECIFIC COURSE - 1 (CORE-1)

#### BT120C: BIO-TECHNOLOGY: FUNDAMENTALS OF BIOCHEMISTRY

CREDITS: THEORY - 4, PRACTICAL - 2 (4+2)

THEORY (4 CREDITS: 60 HOURS)

MAXIMUM MARKS: 60, MINIMUM MARKS: 24

**Objective:** *This course is aimed to introduce students to basic concepts of life through the coordination of different biomolecules.*

#### Unit - 1 (15 Hours)

Physicochemical properties of water; Concept of pH, pK, pI & buffers; Structure, classification, physical and chemical properties of amino acids; Levels of protein structure- primary, secondary, tertiary and quaternary; Structure and function of fibrous and globular proteins; Forces stabilizing protein structure.

#### Unit - 2 (15 Hours)

Nomenclature and classification of enzymes; Basic principles of enzyme catalysis; Concept of active site; Enzyme activity and its measurement, factors affecting enzyme activity; Michaelis- Menten kinetics; Lineweaver-Burk plot; Enzyme inhibition with special focus on the types and mechanism of reversible inhibitors.

#### Unit - 3 (15 Hours)

General structure, classification and function of carbohydrates; Stereoisomerism in monosaccharides with special reference to the concepts of configuration and conformation; Carbohydrate metabolism - glycolysis, TCA cycle, electron transport chain, oxidative phosphorylation.

#### Unit - 4 (15 Hours)

Nomenclature and properties of fatty acids; Structure and functions of major types of lipids - triglycerides, phospholipids, sphingolipids, sterols; Transport of fatty acids across the mitochondrial membrane,  $\beta$  oxidation of saturated and unsaturated fatty acids; Biosynthesis of fatty acids and triglycerides. Structure and classification of nitrogenous bases, composition and bonding in nucleotides and polynucleotides.

#### PRACTICAL (2 CREDITS)

1. Preparation of molar, molal, normal solution and buffers.
2. Qualitative and quantitative estimation of carbohydrates in a given solution.
3. Qualitative and quantitative estimation of proteins in a given solution.
4. Enzyme activity assay: Acid/Alkaline Phosphatase.
5. Effect of temperature and pH on enzyme activity.

#### BOOKS RECOMMENDED

1. *Lehninger Principles of Biochemistry*: Nelson, D. L. and Cox, M. M. - Worth Publishers, New York.
2. *Biochemistry (Latest Edition)*: Stryer, L. - W. H. Freeman and Company, New York.
3. *Biochemistry (Latest Edition)*: Voet, D. and Voet, J. G. - John Wiley and Sons Inc. New York.
4. *Understanding Enzymes*: Palmer, T. - Ellis Horwood Limited, UK.
5. *Enzymology*: Devasena, T. - Oxford University Press.

#### Expected Learning Outcomes:

1. *Understanding of structure, classification, function and physio-chemical properties of different bio-molecules.*
2. *Understanding of nature, classification and mode of action of enzymes along with study of kinetics and energetics of enzyme catalyzed reactions.*
3. *Hands on training on enzyme assay and estimation of different bio-molecules.*