Course Code	Course Name	L-T-P-Credits	Year of Introduction
BT208	**Principles of Biochemistry**	**3-0-0-3**	**2016**

Prerequisite : Nil

Course Objectives

- To provide an understanding of the principles and topics of Biochemistry in an introductory level
- To develop the key transferable skills required in scientific work.
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Syllabus

Biochemistry and biomolecules, buffers, Henderson – Hasselbalch equation, carbohydrates, aminoacids, protein and their function and structures, enzymes, Michaelis – Menten kinetics, lipids, nucleic acids function and structure, signal transduction, metabolic pathways, fatty acids, DNA replication, electron transport chain and phosphor relation

Expected outcome

Upon successful completion of this course, the students will be able to

- Describe the role of cellular chemicals and their functions.
- Describe the key aspects of metabolism.
- Understand the behaviour of enzymes and their kinetics.
- Describe biosynthetic pathways.
- Explain cellular energy requirement and how energy is utilised by a cell.

Reference Books

1. Lehninger A. L, Nelson D.L and M.M. Cox, *Principles of Biochemistry*, Palgrave MacMillan, 2002.
2. Stryer L, Berg J.M and Tymoczko J.L, *Biochemistry*, Fifth edition, W.H. Freeman and Co., 2002.
3. Zubay G, *Biochemistry*, Fourth edition, McGraw Hill Publishers, 1999.
4. Donald Voet and Judith G. Voet., *Biochemistry*, John Wiley and Sons, 2011.
5. Reginald H. Garrett, Charles M. Grisham, *Biochemistry*, Cengage Learning, 2016.

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	Introduction to biochemistry and biomolecules, biochemistry of water, acid and base chemistry, importance of buffers in cellular mechanism and pH regulation, Henderson – Hasselbalch equation, Membrane transport mechanisms.	5	15%
II	Role of carbohydrates, proteins, lipids and nucleic acids in cellular functions; Chemical Properties and reactions of carbohydrates, proteins, lipids and nucleic acids.	5	15%
FIRST INTERNAL EXAM			

III	Introduction to enzymes, Properties of enzymes, Introduction to enzyme kinetics, Michaelis – Menten kinetics, Concepts of ligand - enzyme interactions, classification, reaction rates, activation energy; Mechanism of action of selected enzymes and co enzymes.	7	15%
IV	Urea cycle, biosynthetic pathways of selected amino acids; biosynthesis of fatty acids; Control of level of glucose in blood, hormonal integration of metabolism, signal transduction cascades of glucose mobilization, genetic disorders of metabolism.	8	15%
SECOND INTERNAL EXAM			
V	Carbohydrates- simple sugars to polysaccharides, complex polymers and glycoproteins; fatty acids structure and chemistry, lipids, cholesterol, steroids; amino acids structure, nomenclature; ploy nucleotides - DNA, RNA and their primary, secondary, tertiary structure, chemical synthesis, DNA replication.	8	20%
VI	Cellular energy requirement for vital functions, vitamins, energy conversions, techniques used in the study of metabolism. Transcription, RNA processing, translational events in protein synthesis; Glycolysis and TCA cycle, Proton pump, mitochondrial shuttles. Electron transport chain, chemiosmotic coupling.	9	20%
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN:

Maximum Marks: 100 Exam Duration: 3 hours

The question paper consists of Part A, Part B and Part C.

Part A consists of three questions of 15 marks each uniformly covering Modules I and II. The student has to answer two questions (15×2=30 marks).

Part B consists of three questions of 15 marks each uniformly covering Modules III and IV. The student has to answer two questions (15×2=30 marks).

Part C consists of three questions of 20 marks each uniformly covering Modules V and VI. The student has to answer two questions (20×2=40 marks).

Note : Each question can have a maximum of 4 subparts, if needed.