

Course Code	Course Name	Credits
26CH108	BIOCHEMISTRY	04

Course Objectives

- To understand the structure of biomolecules.
- To understand the behaviour of biomolecules.
- To gain insight into the properties of biomolecules.
- To develop foundational knowledge of biomolecular functions.

Learning Outcomes

Upon successful completion of this course it is intended that a student will be able to:

- Understand the structure, classification, and biological importance of carbohydrates, lipids, and polysaccharides.
- Explain the chemistry, functions, and clinical significance of vitamins and essential minerals.
- Apply knowledge of biomolecular structure to explain functions of fats, phospholipids, glycolipids, and bile salts.
- Analyze nucleic acid structure, properties, and biological roles of DNA and RNA in living systems.

Unit-1 – Carbohydrates (12 Hrs.)

Classification; chemical structure and properties of pentoses and hexoses; disaccharides, trisaccharides and tetrasaccharides; biological importance and clinical significance; polysaccharides – classification; chemical structure and properties of starch and glycogen (clinical significance); cellulose; hemicellulose; inulin; mucopolysaccharides; glycosaminoglycans.

Unit 2 -Lipids (12 Hrs.)

Introduction; classification; nomenclature; structure and properties of fatty acids; structure and functions of prostaglandins; triacylglycerols; phospholipids; sphingomyelin; plasmalogens; glycolipids; cholesterol; bile salts and their functions.

Unit 3 – Fats (12 Hrs.)

Fat-soluble vitamins – A, D, E and K; structure, chemistry and functions; water-soluble vitamins – B-complex (riboflavin, niacin, pyridoxine, folic acid, cyanocobalamin, pantothenic acid); vitamin C (ascorbic acid); clinical significance; deficiency and excess.

Unit 4 – Minerals (12 Hrs.)

Introduction; classification of minerals; calcium; phosphorus; iodine; fluorine; manganese; iron; magnesium; potassium; requirements; deficiency; excess; physiological role in humans.

Unit 5 - Nucleic acids (12 Hrs.)

Introduction; nucleosides; nucleotides; polynucleotides; double helical structure of DNA and its biological function; structure of RNA – tRNA, mRNA and rRNA; occurrence; chemistry and biological functions; differences between DNA and RNA; properties – melting temperature (T_m), hypochromicity and hyperchromicity.

Reference Books:

1. Roger L. Lundblad, Fiona M. Macdonald, Handbook of biochemistry and molecular biology, 2018 CRC Press, Taylor & Francis, New York.
2. Donald Voet, Judith G. Voet, Charlotte W. Pratt Fundamentals of Biochemistry life at the molecular level, 2008 John Wiley & Sons.
3. David L. Nelson, Michael M. Cox, Lehninger Principles of biochemistry, W.H. Freeman and Company, New York.
4. S.C. Rastogi, Biochemistry, 1993 Tata McGraw Hill Publishing Co.
5. K. Rober, Murray, K. Dary, Grammer, Harper's Biochemistry – Mc GrawHill, Lange Medical Books
6. J.L. Jain, Nitin Fundamentals of Biochemistry - Jain, S. Chand & Company.

Websites and eLearning Sources:

1. <https://nptel.ac.in/courses/104103121>
2. <https://youtu.be/jQi84TnstI4?si=vUD4jGcgBdnabO6C>

COs and Bloom's Taxonomy Mapping – 26CH108

Course Outcomes	On completing U.G. program the students will be able to	BTL
CO1	Understanding and remembering the different class of carbohydrate, polysaccharides, cellulose and Glycosamoglycans etc	K1, K2
CO2	Explain the nomenclature, structure of lipids and their functions.	K3
CO3	Explore the fat-soluble vitamins and their function, their uses toward different significance and deficiency.	K4
CO4	Evaluate the minerals requirement toward human sustenance and normal functions and give awareness regarding their deficiency and need for human wellbeing.	K5
CO5	Creating different approaches toward extraction of DNA and their significance toward biological function.	K6

BTL K1 and K2 – remembering and understanding, K3- Applying, K4 – Analyse, K5- Evaluate and K6- Create

Relationship Matrix – 26CH108

Course Outcomes	Programme Outcomes (POs)						Programme Specific Outcomes (PSOs)						Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	
CO1	3	2	2	2	1	1	3	2	2	2	1	1	1.83
CO2	3	2	2	2	2	1	3	2	2	1	1	1	1.83
CO3	3	3	2	2	2	1	3	3	2	2	1	1	2.08
CO4	3	3	3	2	2	1	3	3	2	2	1	1	2.16
CO5	3	3	3	3	1	1	3	3	3	3	1	2	2.41
Total													2.06

Mean Score: 3- High, 2- Medium/Moderate, 1-Low

