

COURSE CODE	22UBIOA01	Course title : BIOCHEMISTRY I (60 HOURS)	Syllabus version-2022
SEMESTER-I			HRS/WK-4
ALLIED -I			CREDIT-4
COURSE OBJECTIVES: ❖ To acquire knowledge on the structure and classification of bio molecules ❖ To gather information about the characteristic features of bio molecules ❖ To analyse the role of carbohydrate in the cell wall ❖ To study about the bonds in the stabilisation of bio molecules. ❖ To gain knowledge about the functions of bio molecules.			
EXPECTED COURSE OUTCOMES			
At the end of the course, the student will be able to			
CO1	Understand the structure, classificaion and function of carbohydrates		
CO2	Recognize the structure, classification and properties of amino acids.		
CO3	Grasp proteins structure,shape and size		
CO4	Analyze lipid structure, classification, composition and function		
CO5	Apprehend the components, structure, types and functions of DNA and RNA		
UNIT -I	CARBOHYDRATES		12Hrs
Definition and Classification of carbohydrate. Monosaccharides–Glucose, Fructose and Arabinose, Linear and ring forms (Haworth formula)for glucose and fructose. Anomer, epimer and enantiomers- Definition with examples. Disaccharides –Definition- Sucrose, maltose and Lactose occurrence, structure and functions. Polysaccharides –Homopolysaccharides -Starch -Structure and functions. Heteropolysacharides-Aminosugars and sugar acids.			
UNIT- II	AMINO ACIDS		12Hrs
Definition and classification of amino acids. Reaction of amino acids with ninhydrin, Color reactions of amino acids (Xanthoproteic test, Morners test, Millons test, Sakaguchi test, Lead acetate test and Pauly’s test), Amphoteric nature, isoelectric pH and Zwitter ion			
UNIT-III	PROTEINS		12Hrs
Proteins-Definition. Peptide bond formation. Classification of proteins based on solubility, shape and size. Denaturation. Structure of protein: primary, secondary, tertiary and quaternary structure.			
UNIT-IV	LIPIDS		12Hrs
Definition, classification and functions of lipids. Occurrence, chemistry and biological functions of simple lipids, compound lipids (e.g. phospholipids) and derived lipids:steroids (e.g. cholesterol). Physical property-emulsification. Chemical property-saponification. Functions of bile acids and bile salts.			
UNIT-V	NUCLEIC ACIDS		12Hrs
Nucleic acid- Composition of nucleic acid. Definition - nucleoside, nucleotide and polynucleotide. Double helical model of DNAand its biological functions. Chargaff’s rule. RNA-Structure, types and functions of RNA: tRNA, mRNAand rRNA. Differences between DNA and RNA			

Text Books	
1	Jain J. L., Nitin Jain, Sunjai Jai., (2016) <i>Fundamentals of Biochemistry</i> (7 th ed). Chand @ Co.Ltd .,
2	Satyanarayanan U.(2017) <i>Biochemistry</i> Elseiver
Supplementary Readings	
1	David.L.Nelson, Michael. M.CoxLehninger (2017) <i>Principles of Biochemistry</i> (7 th ed) Freeman. W.H. and Company
2	Victor Rodwell Harper's (2018) <i>Illustrated Biochemistry</i> McGrew. Hill

MAPPING WITH PROGRAMME OUTCOMES (POS)					
COs	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	2
CO2	2	2	2	3	2
CO3	2	3	2	2	2
CO4	3	2	3	3	2
CO5	3	3	3	2	3

3 – Strong;2 – Medium;1 – Low;

COURSE CODE	22UBIOA02	Course title :BIOCHEMISTRY II (60 HOURS)	Syllabus version-2022
SEMESTER-II			HRS/WK-4
ALLIED -I			CREDIT-4
COURSE OBJECTIVES: ❖ To acquire a wide knowledge on metabolism ❖ To gain knowledge about disorders of metabolism ❖ To study the biological functions of vitamins and minerals ❖ To gather information about enzyme structure and function. ❖ To analyse the importance of vitamins and minerals			
EXPECTED COURSE OUTCOMES			
At the end of the course, the student will be able to			
CO1	Understand the reactions involved in various metabolic pathways		
CO2	Recognize the metabolic disorders		
CO3	Grasp enzymes classification and their functions		
CO4	Analyse the source, classification and function of vitamins		
CO5	Comprehend the sources, RDA and functions of minerals		
UNIT -I	METABOLISM		12 Hrs
Metabolism-Catabolism and anabolism-Definition. Reactions of glucose oxidation- Glycolysis, TCA cycle and its energetics, HMP shunt and its significance. Amino acid- transamination and Deamination, reaction, Urea cycle- Formation of urea.			
UNIT- II	METABOLIC DISORDERS		12Hrs
Diabetes mellitus- definition. Types and symptoms. Glycogen storage diseases-Types, Renal Glycosuria-Definition and causes. In born errors of amino acid metabolism- Phenylketonuria, Alkaptonuria (Black urine syndrome) and albinism			
UNIT-III	ENZYMES		12Hrs
Enzymes-Definition, IUB system of classification with one example. Mechanism of enzyme action- Lock and key mechanism, Induced Fit theory. Michaleis-Menton equation. Coenzymes- Vitamins as coenzymes (Tabulation of Coenzymes with functions in metabolism)			
UNIT-IV	VITAMINS		12Hrs
Vitamins- fat soluble (Vitamin A, D, E and K) and water soluble vitamins (Vitamin B1, B2, B3 and B12), Vitamin C - sources, RDA, biological function and deficiency of the above mentioned vitamins			
UNIT-V	MINERALS		12Hrs
Minerals- sources, RDA, biological functions and deficiency of Calcium, Iron, Phosphorous, Sodium and potassium. Examples of minerals as cofactors in metabolism.			

Text Books	
1	Jain J. L., Nitin Jain, Sunjai Jai., (2016) <i>Fundamentals of Biochemistry</i> (7 th ed). Chand @ Co.Ltd .,
2	Satyanarayanan U.(2017) <i>Biochemistry</i> Elseiver
Supplementary Readings	
1	David.L.Nelson, Michael. M.CoxLehninger (2017) <i>Principles of Biochemistry</i> (7 th ed) Freeman. W.H. and Company
2	Victor Rodwell Harper's (2018) <i>Illustrated Biochemistry</i> McGrew. Hill

MAPPING WITH PROGRAMME OUTCOMES (POS)					
COs	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	2	2
CO2	2	2	2	3	2
CO3	2	3	2	2	2
CO4	2	2	3	3	2
CO5	2	3	3	2	2

3 – Strong; 2 – Medium; 1 – Low;

COURSE CODE	22UBIOAP1	Course title : ALLIED BIOCHEMISTRY PRACTICAL - I (45 Hours)	Syllabus version-2022
SEMESTER-I			HRS/WK-3
ALLIED PRACTICAL- I			CREDIT-4
COURSE OBJECTIVES: ❖ To acquire a wide knowledge on the qualitative analysis ❖ To gain information in quantitative analysis ❖ To study the function groups in biomolecules ❖ To analyse the biological substance by titremetric method. ❖ To differentiate the carbohydrateby microscopic examination of the crystal structure.			
EXPECTED COURSE OUTCOMES			
At the end of the course, the student will be able to			
CO1	Quantify the biomolecules by titration method		
CO2	Qualitatively analyze the biomolecules		
CO3	Differentiate the carbohydrates through crystal formation		
I .VOLUMETRIC ESTIMATION			[15Hrs]
• Estimation of Glucose by Benedict’s method. • Estimation of Ascorbic acid by 2, 6 dichlorophenol indophenols dye method. • Estimation of Glycine by Sorenson’s formal titration.			
II. QUALITATIVE ANALYSIS OF CARBOHYDRATES			[15Hrs]
• Qualitative analysis of Glucose, • Qualitative analysis of Fructose, • Qualitative analysis of Sucrose • Qualitative analysis of Maltose, • Qualitative analysis of Starch			
III. QUALITATIVE ANALYSIS OF AMINO ACIDS			[15Hrs]
• Qualitative analysis of Arginine, • Qualitative analysis of Cysteine, • Qualitative analysis of Tryptophan • Qualitative analysis of Tyrosine • Qualitative analysis of Histidine			

Text Books	
1	Jayaraman J., (2011) <i>Laboratory Manual in Biochemistry</i> New Age International Pvt Ltd Publishers
Supplementary Readings	
1	SawhneyRandhir Singh S. K., (2005) <i>Introductory Practical Biochemistry</i> Alpha Science International, Ltd,2 edition,
2	Irwin H.Saegal (1991) <i>Biochemical calculations</i> Liss, Newyork

MAPPING WITH PROGRAMME OUTCOMES (POS)					
COs	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	2	2
CO2	3	3	2	3	2
CO3	3	3	2	2	2

3 – Strong; 2 – Medium; 1 – Low;