

SUBJECT TITLE: ALLIED BIOCHEMISTRY I

Course code	1AC/3AC	Allied Biochemistry I	L	T	P	C
Core/Elective/Supportive	Allied		2	1	-	3
Pre-requisite	Basic knowledge in Biomolecules		Syllabus Version		20-21	
Course Objectives:						
The main objectives of this course are to:						
1. understood the significance of the complex bio-molecules, polysaccharides						
2. understood the biological importance of Lipids and proteins						
3. understood the role of nucleic acids and clinical significance of enzymes						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	a thorough knowledge about the structure, chemistry and function of carbohydrates					K2
2	in depth knowledge about the significance of the complex lipids					K2
3	an understanding about the importance of amino acids and proteins					K2
4	a knowledge about the salient features of nucleic acids					K2
5	a knowledge about the importance of enzymes					K2
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	Carbohydrates					12 hours
Monosaccharides-Definition, classification, structure and properties. Disaccharides-Definition, types, structure and biological importance. Polysaccharides-types and properties.						
Unit:2	Lipids					12 hours
Definition, Classification and properties of lipids. Types of fatty acids -saturated, unsaturated and essential fatty acids. Classification and significance of lipoproteins and phospholipids. Importance of steroids, structure and biological significance of cholesterol.						
Unit:3	Amino acids					12 hours
Classification of amino acids, essential amino acids, reactions of amino and carboxyl groups of amino acids. Proteins: Definition, classification and function of Proteins, structural levels of organization (Preliminary treatment). Denaturation and isoelectric point of Proteins.						
Unit:4	Nucleic acids					11 hours
Components of DNA and RNA. Double helical structure of DNA. Structure and types of RNA. Denaturation and renaturation of DNA. Genetic code. Protein synthesis (an outline)						
Unit:5	Enzymes					11 hours
Classification of enzymes with examples, coenzymes and cofactors (structures not needed). Active site: Lock and Key model, Induced fit hypothesis. Factors affecting enzyme activity. Types of inhibition of enzyme action. Chemical and industrial applications of enzymes.						
Contemporary Issues					2 hours	
Expert lectures, online seminars – webinars(self study)						
Total Lecture hours					60 hours	
Text Book(s)						
1	Deb, A.C., Fundamentals of Biochemistry, New Central Agency, Calcutta, 2016.					

2	Ambika Shanmugam, Fundamentals of Biochemistry for Medical Students, Seventh Edition, Lippincott Williams and Wilkins Publications.
3.	Jain J.L, Fundamentals of biochemistry, S.Chand Publication 7th Edition, 2005
Reference Books	
1	Lehninger, A.L., Nelson, D.L., Cox, M.M., Principles of Biochemistry, CBS Publishers, 7th Edition
2	Harper's Biochemistry: R.K. Murray, D.K Granner, P.A. Mayes and U.W.Rodwell – Lange Medical publications, 31 st edition
3.	Textbook of Medical Biochemistry – Rana Shindae and Chatterjee, 8 th Edition, 2012.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	onlinecourses.swayam2.ac.in/cec20_bt12
2	onlinecourses.swayam2.ac.in/cec20_bt19
Course Designed By:Mrs S.Seethalakshmi(Chairperson)	

Course code	1AC/3AC	Allied Biochemistry II	L	T	P	C
Core/Elective/Supportive	Allied		2	1	-	3
Pre-requisite	Basic knowledge in metabolism of biomolecules		Syllabus Version		20-21	
Course Objectives:						
The main objectives of this course are to:						
1. Provides much information related to carbohydrate, fat and protein metabolism that takes place in our body.						
2. Interrelationship between carbohydrate, fat and protein metabolism.						
3. Various disorders related to each metabolism						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understood the Concepts of thermodynamics and the mechanism of oxidation reduction reactions					K2
2	Gained knowledge about carbohydrates, protein and lipid metabolism					K2
3	Understood the Interrelation among the carbohydrates, fat and protein metabolism					K2
4	Gained knowledge about the role of hormones and vitamins					K2
5	Gained knowledge about various disorders related to each metabolism					K2
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
Bioenergetics			12 hours			
Basic principles of thermodynamics – entropy, enthalpy and free energy; Laws of thermodynamics, Structure of mitochondria, high-energy phosphates, oxidation- reduction reactions.						
Unit:2						
Carbohydrate Metabolism			12 hours			
Glycolysis, TCA cycle, HMP shunt, Glycogenesis and glycogenolysis. Disorders of carbohydrate metabolism: Diabetes mellitus, glucosuria						
Unit:3						
Protein metabolism			12 hours			
General pathway of amino acid metabolism – deamination, transamination and decarboxylation. Urea cycle. Glycine and phenylalanine metabolism (structures not required).						
Unit:4						
Lipid Metabolism			11 hours			
Beta oxidation and biosynthesis of fatty acids- palmitic acid, ketone bodies. Inter-relationship of carbohydrate, fat and protein metabolism (Flow chart only).						
Unit:5						
Hormones and Vitamins			11 hours			
Hyper and hypo secretions of pituitary, adrenal and thyroid glands. Fat and water soluble vitamins- Sources, metabolic functions and deficiency diseases						
Contemporary Issues						
			2 hours			
Expert lectures, online seminars – webinars(self study)						
			Total Lecture hours			
			60 hours			
Text Book(s)						
1	Deb, A.C., Fundamentals of Biochemistry, New Central Agency, Calcutta, 2016.					
2	Ambika Shanmugam, Fundamentals of Biochemistry for Medical Students, Seventh Edition, Lippincott Williams and Wilkins Publications.					

3.	Jain J.L, Fundamentals of biochemistry, S.Chand Publication 7th Edition, 2005
Reference Books	
1	Lehninger, A.L., Nelson, D.L., Cox, M.M., Principles of Biochemistry, CBS Publishers, 7th Edition
2	Harper's Biochemistry: R.K. Murray, D.K Granner, P.A. Mayes and U.W.Rodwell – Lange Medical publications, 31 st edition
3	Textbook of Medical Biochemistry – Rana Shindae and Chatterjee, 8 th Edition, 2012.
4	David T. Plummer, An introduction to practical biochemistry. 3 rd Edition. Mc GRAW-Hill Publishing company Ltd.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	onlinecourses.swayam2.ac.in/cec20_ag10
2	https://nptel.ac.in/courses/102/105/102105034/
Course Designed By: Mrs S.Seethalakshmi (Chairperson)	

Course code	43Q	Allied Biochemistry Practical	L	T	P	C
Core/Elective/Supportive	Allied		-	-	2	2
Pre-requisite	Basic knowledge in sugars and amino acids		Syllabus Version		20-21	
Course Objectives:						
The main objectives of this course are to:						
1. able to analyse the given carbohydrate systematically						
2. able to analyse amino acids systematically						
3. able to characterize lipids						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Facilitate students to identify the sugars				K2,K4	
2	Facilitate students to identify the aminoacids				K2,K4	
3	Characterize lipids				K2,K4	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
Analysis of carbohydrates					26 hours	
a.Monosaccharides-Pentose- Xylose. Hexoses- Glucose, Fructose,						
b.Disaccharides- Sucrose, Lactose						
c.Polysaccharide- Starch.						
Unit:2						
Analysis of Amino acids					26 hours	
a. Histidine b. Tyrosine. c. Tryptophan d. Arginine e. Cysteine f. Methionine						
Unit:3						
Characterisation of Lipids [Group experiment]					8 hours	
1. Determination of acid number.						
2. Determination of iodine number						
Total practical hours					60 hours	
Text Book(s)						
1	Laboratory manual in biochemistry by J.Jayaraman, Wiley Eastern Publishers.					
2	Biochemical Methods- Sadasivam and Manickam, 3 rd Edition, New Age International Publishers					
Reference Books						
1	David T. Plummer, An introduction to practical biochemistry.3 rd Edition. Mc GRAW-Hill Publishing company Ltd.					
2	Pattabiraman, Laboratory manual in biochemistry.					
Course Designed By:Mrs S.Seethalakshmi(Chairperson)						