ALLIED COURSE OFFERED BY BIOCHEMISTRY

FIRST YEAR :FIRST SEMESTER

ALLIED BIOCHEMISTRY I

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BBCA1	**Allied Biochemistry I**	Allied I	2	1	-	-	3	3	25	75	100

Learning objectives

The objectives of this course are to

- Introduce the structure and classification of carbohydrates
- Comprehend the metabolism of carbohydrates
- Study the classification and properties of amino acids
- Elucidate the various levels of organization of Proteins
- Study functions and deficiency diseases of vitamins

Unit I	Definition and classification of carbohydrates, linear and cyclic forms (Haworth projection) for glucose, fructose and mannose and disaccharides (maltose, lactose, sucrose).General properties of monosaccharides and disaccharides. Occurrence andsignificance of polysaccharides.
Unit II	Metabolism- Catabolism and Anabolism.Carbohydrate metabolism- Glycolysis, TCA cycle, HMP shunt and glycogen metabolism and energetics
Unit III	Amino acids -Classifications, physical properties -amphoteric nature, isoelectric point and chemicalreactions of carboxyl ,amino and both groups. Amino acid metabolism- transamination, deamination and decarboxylation.
Unit IV	Proteins- classification - biological functions ,physical properties- ampholytes, electric point, salting in and salting out, denaturation, nature of peptide bond. Second structure, α-helix and β-pleated sheet, tertiary structure, various forces involv quaternary structure.
Unit V	Vitamins- Fat(A,D,E and K) and water soluble vitamins(B complex and C)- sources, RDA, biological functions and deficiency diseases

Text Books

1 Satyanarayan,U (2014) Biochemistry (4th ed), Arunabha Sen Books & Allied (P) Ltd, Kolkata.

2.Jain J.L.(2007) Fundamentals of Biochemistry,S.Chand publishers 311

Reference books

1. David L.Nelson and Michael M.Cox (2012) Lehninger Principles of Biochemistry (6th ed) W.H. Freeman.

2. Voet.D&Voet. J.G (2010) Biochemistry , (4th ed), John Wiley & Sons, Inc.

3. Lubert Stryer (2010) Biochemistry,(7th ed), W.H.Freeman

4. Satyanarayan,U (2014) Biochemistry (4th ed), Arunabha Sen Books & Allied (P) Ltd, Kolkata.

5.Jain J.L.(2007) Fundamentals of Biochemistry,S.Chand publishers 31

Web sources

1.onlinecourses.swayam2.ac.in/cec20_bt12

2 onlinecourses.swayam2.ac.in/cec20_bt19

Course Outcome

CO	On completion of this course, students will be able to	Programme Outcome
CO1	Classify the structure of carbohydrates and its properties	PO1
CO2	Explain the metabolism of carbohydrates and its significance	PO1
CO3	Classify amino acids and its properties	PO1
CO4	Explain the classification and elucidate the different levels of structural organization of proteins	PO1
CO5	Identify the disease caused by the deficiency of vitamins	PO1

Mapping with Program Outcome

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PSO1	PSO2	PSO3	PSO4
CO 1	3						3			3
CO 2	3						3			3
CO 3	3						3			3
CO 4	3						3			3
CO5	3						3	3		3

S - Strong (3) M - Medium (2) L -Low(1)

FIRST YEAR : SEMESTER I

ALLIED BIOCHEMISTRY PRACTICAL-I

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BBCA P1	**Allied Biochemistry Practical I**	Allied Practical I	-	-	3	-	2	2	25	75	100

Learning objectives

- Identify carbohydrates by qualitative test
- Estimate biomolecules volumetrically
- Estimate protein quantitatively

I Qualitative analysis of carbohydrates- 25Hrs

a) Monosaccharides-Glucose, Fructose

b) Disaccharides- Lactose, Maltose, Sucrose

c) Polysaccharides-Starch

II Volumetric analysis 15 Hrs

a) Estimation of ascorbic acid using 2,6dichlorophenolindophenol as link solution

b) Estimation of Glucose by Benedicts method

c)Estimation of Glycine by Sorenson Formal titration

III Quantitative analysis(Demonstration Expt)5 hrs

a)Colorimetric estimation of protein by Biuret method

Text books

1.Laboratory manual in Biochemistry, J. Jayaraman, 2nd edition, New Age International Publishers, 2011,

2. An Introduction to Practical Biochemistry, David T. Plummer, 3 rd edition, Tata McGraw-Hill Publishing Company Limited, 2001.

3. Biochemical Methods, Sadasivam S and Manickam A, 4h edition, New Age International Publishers, 2016

Course Outcome

CO	On completion of this course, students will be able to	Program Outcomes
CO1	Qualitatively analyze and report the type of carbohydrate based	PO1,PO2.PO3

	on specific tests	
CO2	Quantitatively estimate the carbohydrates, amino acids and ascorbic acid	PO1,PO2,PO3
CO3	Estimate protein by colorimetric method	PO1,PO2,PO3

Mapping with Program Outcomes

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO 1	2	3	3				3	3	3	3
CO 2	2	3	3				3	3	3	3
CO 3	2	3	3				3	3	3	3

S - Strong (3) M - Medi) L -Low(1)

FIRST YEAR : SEMESTER II

ALLIED BIOCHEMISTRY II

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BBCA2	**Allied Biochemistry II**	Allied II	2	1	-	-	3	3	25	75	100

Learning objectives

The objectives of this course are to

- Impart knowledge on the classification, properties and characterization of lipids.
- Comprehend the metabolism of Lipids
- Acquaint with the structure, properties and functions of nucleic acids
- Learn about the enzyme kinetics and inhibition
- Study the importance of Hormones

Unit I	Lipids–Bloor's classification of lipids- simple lipids, fatty acids (saturated and unsaturated), compound lipids, derived lipids.Properties of lipids- reduction, oxidation, halogenation,saponification and rancidity .Classification andfunctions of phospholipids, Cholesterol – structure and biological importance.
Unit II	Lipid metabolism- Oxidation of fatty acids(Palmitic acid) – Beta oxidation-Role of carnitine,energetics , alpha oxidation and omega oxidation.Biosynthesis of saturated fatty acids.
Unit III	Purine and pyrimidine bases, nucleosides, nucleotides, polynucleotides, DNA structure, various types, properties- absorbance, effect of temperature. Different types of RNA, structure and function, Genetic code.
Unit IV	Enzymes - Nomenclature, IUB system of enzyme classification,active site, specificity, isoenzymes, units of enzyme activity factors affecting enzyme activity- substrate concentration, pH, temperature.Enzyme Kinetics- Michaelis and Menten equation.Lineweaver- Burk plot. Enzyme inhibition, competitive, uncompetitive and andnon competitive inhibition
Unit V	Hormones -classification,Biological functions of Insulin, Thyroid and Reproductive hormones

Text books

1.Satyanarayan,U (2014) Biochemistry (4th ed), Arunabha Sen Books & Allied (P) Ltd, Kolkata.

2.Jain J.L.(2007) Fundamentals of Biochemistry,S.Chand publishers

Reference books

1. David L.Nelson and Michael M.Cox (2012) Lehninger Principles of Biochemistry (6th ed) W.H. Freeman.

2. Voet.D& Voet. J.G (2010) Biochemistry , (4th ed), John Wiley & Sons, Inc.

3. Lubert Stryer (2010) Biochemistry,(7th ed), W.H.Freeman

Web sources

1.onlinecourses.swayam2.ac.in/cec20_bt12

2 onlinecourses.swayam2.ac.in/cec20_bt19

Course Outcome

CO	On completion of this course, students will be able to	Program Outcomes
CO1	Elaborate on classification, structure, properties, functions and characterization of lipids	PO1
CO2	Discuss the metabolism of lipids and its importance	PO1
CO3	Explain about structure, properties and functions of nucleic acids	PO1
CO4	Derive Michaelis Menten equation and concepts of enzyme inhibition	PO1,PO3
CO5	Classify the Hormones and its biological functions	PO1,PO4

Mapping with Program Outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PSO1	PSO2	PSO3	PSO4
CO 1	3						3			3
CO 2	3						3			3
CO 3	3		3				3			3
CO 4	3			3			3			3
CO5	3						3	3		3

S - Strong (3) M - Medium (2) L -Low(1)

FIRST YEAR: SEMESTER II
ALLIED BIOCHEMISTRY : PRACTICAL II

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BBCA P2	**Allied Biochemistry Practical II**	Allied Practical II	2	1	-	-	2	2	25	75	100

Learning objectives

The objectives of this course are to

- Identify amino acids by qualitative test
- Prepare biomolecules from its sources
- Estimate phosphorus quantitatively

I.**Qualitative analysis of amino acids**

a) Arginine b)Cysteine c) Tryptophan d)Tyrosine e) Histidine

II. **Biochemical preparations**

a) Preparation of casein from milk.

b)Preparation of starch from potato.

c)Preparation of albumin from egg.

IIIGroupExperiment

Determination of Iodine/ Saponification number of an edible oil(Demonstration) .

Text books

1.Laboratory manual in Biochemistry, J. Jayaraman, 2nd edition, NewAge International Publishers, 2011,

2. An Introduction to Practical Biochemistry, David T. Plummer, 3 rd edition, Tata McGraw-Hill Publishing Company Limited, 2001.

Reference books

1. Biochemical Methods, Sadasivam S and Manickam A, 4h edition, NewAge International Publishers, 2016

2. Essentials of Food and Nutrition, Vol. I & II, M.S. Swaminathan.

Course Outcome

CO	On completion of this course, students will be able to	Programme Outcome
CO1	Qualitatively analyze the amino acids and report the type of amino acids based on specific tests	PO1,PO2,PO3
CO2	Prepare the macronutrients from the rich sources.	PO1,PO2,PO3
CO3	Check the quality of edible oil	PO1,PO2,PO3

Mapping with Program Outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PSO1	PSO2	PSO3	PSO4
CO 1	2	3	3				3	3	3	3
CO 2	2	3	3				3	3	3	3
CO 3	2	3	3				3	3	3	3

S - Strong (3) M - Medium (2) L -Low

LIST OF ALLIED COURSES TO BE OFFERED TO B.Sc., BIOCHEMISTRYAPPROVED BY OTHER BOARD (SEMESTER I ,II,III and IV)

Chemistry

Microbiology

Biostatistics

Zoology

Botany