AMITY UNIVERSITY
UTTAR PRADESH

Course Title: **Fundamental Biochemistry**
Course Code: GCMB202
Credit Units: 4

L	T	P/ S	Lab	TOTAL CREDIT UNITS
3	--	--	2	4

Course Objectives:
The course is aimed to provide insight into fundamentals of structures and functions of biomolecules.

Pre-requisites: Knowledge of biology and chemistry.

Student Learning Outcomes:

- The student will learn composition/structure and functions of biomolecules.
- The student will able to understand basic structure of enzymes and mechanism of action.
- The student will be able understand the building blocks of the biomolecules.

Course Contents/Syllabus- Theory:

	Weightage (%)
Module I Introduction to Biomolecules:	**10**
Descriptors/Topics: Bio-molecular interactions: covalent and non- covalent interactions. Hydrophobic and hydrophilic interaction and influence on structures of bio-molecules.	
Module II Carbohydrates:	**25**
Descriptors/Topics: Importance of carbohydrates. Monosaccharides (aldoses and ketoses: glucose, fructose, riobose and others), conformation and configuration of sugars: dextro- and levo- rotatory sugars, stereoisomerism. Disaccharides (maltose, sucrose and lactose), oligosaccharides (raffinose) and polysaccharides (starch, glycogen and cellulose). Sugar derivatives.	
Module III Lipids:	**25**
Descriptors/Topics: Fatty acids (saturated and unsaturated (mono- and poly-), physical and chemical properties of fatty acids (saponification and acid values, iodine number, and rancidity). Structure functions of triacylglycerols, phospholoipids, phosphoglycerides; lacithins, cephalins, plasmogens, phosphatidyl inositol, sphingomylin, glycolipds (cerebrosides and gangliosides) and cholesterol.	
Module IV Proteins and nucleic acids	**20**
Descriptors/Topics: Classification, structure and properties of amino acids, Essential and non-essential amino acids. Peptide bond and its properties. Oligo- and polypetides. Structure of proteins: primary, secondary, tertiary and quaternary structures. Structure of nucleotides and nucleosides, nitrogenous bases. Chemical structures of DNA (Watson-Crick Model) and RNA. Significance of DNA and RNA.	
Unit VI Enzymes	**20**

Descriptors/Topics: General characteristics of **e**nzymes**,** apoenzymes, prosthetic groups [cofactors (metal ions) and co-enzymes (FAD, NAD and TPP)]; holoenzyme; active sites, mechanism of enzyme action: Lock and Key model and Induced Fit hypothesis. Single substrate enzyme catalyzed reaction. Henri-Michaelis-Menten equation.	

Pedagogy for Course Delivery:
Lectures: 42
Tutorial: 0
Assignment: 1
Class Test: 2
Total: 45

Lab/ Practical details, if applicable:
Practical: 13
Tutorial: 0
Class test: 2
Total: 15

List of Experiments:

- Preparation of reagents, buffers and solutions
- Qualitative analysis of sugars by Molish, Fehling, Barfod, Bials and Saliwinof Tests
- Qualitative analysis of amino acid by Ninhhydrin, Xanthprotic and Biuret tests.
- Estimation of reducing sugars by DNS method.
- Determination of Iodine number of fatty acid.
- Estimation of cholesterol by cholesterol oxidase/peroxidase method.
- Estimation of protein by Bradford/Lowry's method.
- Estimation of DNA by Di-phenyl amine (DPA) method.
- Estimation of RNA by Orcinol method

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	End Term Examination
75	**25**	**100**

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment					End Term Examination
Components (Drop down)	**Class Test 1**	**Class Test 2**	**Home Assignment**	**Attendance**	
Weightage (%)	10	10	5	5	70

Lab/ Practical/ Studio Assessment:

	Continuous Assessment/Internal Assessment				End Term Examination			Total
Components (Drop down	**Performance**	**Lab record**	**viva**	**Attendance**	**Lab record**	**Performance**	**Viva**	
Weightage (%)	10	10	5	5	10	50	10	100

Text:

- Biochemistry by Todd, W. B., Mason, M., Bruggen, R. V. & Macmillan. ISBN9780781798754
- Biochemistry by U Satyanarayana. ISBN 81-87134-80-1
- Introductory Practical Biochemistry by S.K. Sawhney and R. Singh, 2nd Edition, Alpha Science International, 2005. ISBN-10: 1842652451
- An Introduction to Practical Biochemistry by David Plummer, 3rd Edition, Tata Mcgraw Hill Education (2006). SBN 13: 9780070941625

References:

- Principals of Biochemistry 6^{th} Edition by David L. Nelson, Michael M. Cox. W.H. Freemen and Co ISBN 13-9780716771081