GOVT. COLLEGE FOR WOMEN, PARADE GROUND, JAMMU-180001, J&K.
(Erstwhile Maharani Mahila College
Autonomous College affiliated to the University of Jammu
College with Potential for Excellence, 2016
(Estd. 1944)

Syllabus for the examinations to be held in 2024-2025, 2025-26& 2026-27

Core Course No.	**Course No. PSZOTC-411**
Course Title:	**Fundamentals of Biochemistry**
Credits:	**4**
Maximum Marks:	**100**
Minor Test I:	**20**
Minor Test II:	**20**
Major Test :	**60**
Duration Of External Exam.	**2.5 hrs**
Date Of BOS	**12-06-24**

Objectives: The course has been designed to expose the students of Zoology to modern functionalapproach with prime object to understand the biochemical basis explaining the basic functioningof various body mechanisms. The attempt is to arrive at an approach that would necessarily involve biochemistry and help to solve mysteries of cellular activities.

Learning Outcomes: The learning outcomes that a student should be able to demonstrate on completion of the semester shall involve a level of understanding of the Biochemistry subject and itssub-areas.

- The programme learning outcomes shall include academic competence, disciplinary knowledge and understanding of biochemistry, structure and function of biological moleculesand explain biological mechanisms, such as the processes and control of bioenergetics andmetabolism.
- The student is also expected to attain basic professional skills pertaining to biochemical analysis and carrying out clinical diagnostic tests.

UNIT I - Proteins: Structure, Function & Metabolism (13h)

1.1General features and classification
1.2 Biological Functions of Proteins
1.3 Levels of organization: Primary, Secondary, Tertiary, Quaternary
1.4 Globular & Fibrous proteins
1.5 Protein metabolism
1.5.1Catabolism of Amino Acid Nitrogen
1.5.2 Transamination & Deamination.
1.5.3 Formation of Ammonia, its transport and effects of its retention.
1.5.4 Biosynthesis of Urea, Uric Acid.
1.5.5 Denaturation

UNIT II- Enzymes: Structure & Function (12h)

2.1 General properties and classification.
2.2 Coenzymes: Structure,function and types.
2.3Kinetic properties of enzymes: Michaelis–Menten kinetics
2.4 Mechanism of enzyme activity.
2.5 Inhibition of enzyme activity.
2.5.1 Irreversible inhibition.
2.5.2 Reversible inhibition.
2.5.3Competitive and Non-competitiveUncompetitive
2.5.4 Feedback inhibition, Allosteric inhibition

UNIT III-Carbohydrates: Structure and Function (12h)

3.1General features and classification.
3.2Isomerism in Glucose and Optical Isomerism
3.3 Ring Structure:Anomers and Epimers
3.4 Classification of Polysacchaides Homopolysaccharides (Cellulose, Starch, Chitin and Glycogen), Heteropolysaccharides (bacterial peptidoglycans, glycosaminoglycans, hyaluronic acid, and heparin) :Structural characteristics and functions.

UNIT IV- Lipids: Structure & Function (12h)

4.1Concept and classification.
4.2Nomenclature and forms of fatty acids
4.3Simple lipids : Triacylglycerols, waxes
4.4Complex Lipids : Phospholipids, Glycolipids
4.5Derived Lipids: Steroids, Lipoprotein, Prostaglandins, disorders of Lipid Metabolism (Dyslipidemia)

UNIT V- Metabolism of Carbohydrates & Lipids (13h)

5.1 Introduction to bioenergetics
5.2 Steps of cellular respiration
5.21 Glycolysis
5.2.2 Pyruvate Oxidation
5.2.3 Citric Acid Cycle
5.2.4 Mechanisms of oxidative phosphorylation-ATP synthesis -inhibitors and uncouplers
5.3 Glycogenesis, Glycogenolysis & Gluconeogenesis
5.4 β oxidation of Fatty Acids
5.5 Hormonal Control of Adipose Tissue Metabolism

Note for Paper Setting

Examination Theory	Syllabus to be covered in examination	Time allotted forExam	% weightage (marks)
Minor Test I	upto 20%	1 Hr.	20
Minor Test II	21% to 40%	1 Hr.	20
Major Test	41% to 100%	2Hrs.& 30 mins.	60

i. Major test will have two sections (A & B)
ii. Section A is compulsory comprising of 10 questions of 1.5 marks each and be spread
Over entire syllabus
iii. Section B comprises of 6 questions (2 from each unit) from the remaining 3 unitsand candidate has to attempt one question from each unit (15 marks each).

Books Recommended:

1. Geoggrey L.Zubay, William w. Parson, Dennis E. Vance.(1995). Principles of Biochemistry.
2. R.I. Gumport, Frank, H. Deis, Nancy Counts Gerber & Rager. W.H. Freeman Co. N.Y.(2002). Biochemistry 5th Ed.
3. Horton Moran, Scrimgeour Perry Rawn(.2006). Principles of Biochemistry : PearsonInternational Edition. Fourth Edition.
4. Donald Voet, Judith, G. Voet, Wiley Plus Charlotte, W. Pratt. (2008). Principles ofBiochemistry
5. Murray, Bender, Botham, Kennelly Rodwell,(2009). Harper's Illustrated Biochemistry, Mc.Graw Hill Publ. House.
6. Lehninger, Michael M. cox and David L. Nelson. W.H. Freeman & Co. N.Y. (2010).Principles of Biochemistry
7. Hannah Sulochana, (2010). Principles of Biochemistry. 8.Thomas M. Devlin. (2011).
8. Text book of Biochemistry,7th Edition. John, L. Tymoczko, Jeremy M, Berg & Lubert Stryer(2013).
9. Biochemistry, 2nd Ed. 10.Jeremy M.Berg, John L. Tymocz Ko and Lubert storyer. (2013).Biochemistry 7th Edition.
10. B.D. Hames. Instant Notes in Biochemistry. Bios Pub. UK.
11. Metzler D.E. and Metzler C.M. , Biochemistry, Wiley – Liss.
12. Devlin T.M. , Text book of Biochemistry , Willey-Liss.

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LAB COURSE 1

Course No- PSZOPS-415
Credits -02

Syllabus for Practicals of Fundamentals of Biochemistry

1. To measure metabolites present in biological samples such as blood or urine using abiochemistry analyzer.
2. Demonstration of tests for qualitative analysis of carbohydrates:
   - Molisch's Test
   - Fehling's Test
   - Barfoed's Test
   - Seliwanoff's Test
   - Bial's Test
   - Benedict's test
   - Tollen's test
3. To determine the Iodine Number of Lipids.
4. To determine the Saponification Number of Fats.
5. Demonstration of tests for detection of proteins:
   - Biuret test
   - Xanthoproteic test
   - Ninhydrin test

Committee Members(External)

1	Prof. (Dr.) Seema Langer Head, Department of Zoology & Dean, Life Sciences, University of Jammu	
2	Dr. N. K. Tripathi, Professor (Retd.) Department of Zoology, University of Jammu	
3	Dr. Surya Partap Singh,Assistant Prof. & Head, Department of Zoology, GDC Basholi	
4	Dr. Shvetambri Jasrotia, Assistant Prof., Department of Zoology, Central University of Jammu	
5	Mr. Munish Sharma Assistant Director Fisheries, Jammu.	
6	Col. (Retd.) Sunil Sambyal ,Biofloc Expert & Entrepreneur	