UNIVERSITY OF JAMMU

(NAAC ACCREDITED 'A+ GRADE' UNIVERSITY
Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

NOTIFICATION
(21/Sept./Adp/21)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Academic Council, is pleased to authorize the adoption of the Syllabi and Courses of Study in the subject of **Bio-Chemistry** for semesters Ist under the **Choice Based Credit System** at the **Undergraduate Level (as given in the Annexure)** for the examinations to be held in the years indicated against each semester as under:-

Subject	**Semester**	**For the examinations to be held in the year**
Bio-Chemistry	Semester-I	December 2021, 2022 and 2023

The Syllabi of the courses is also available on the University website: www.jammuuniversity.ac.in.

DEAN ACADEMIC AFFAIRS

17/9 17/9/2021 17/09/21

No. F. Acd/II/21/6856-6866
Dated: 17-9-2021

Copy for information and necessary action to:

1. Dean Faculty of Life-Science
2. HOD/Convener, Board of Studies Bio-Technology
3. All members of the Board of Studies
4. C.A. to the Controller of Examinations
5. Director, Computer Centre, University of Jammu
6. Deputy Registrar/Asst. Registrar (Conf. /Exams. U.G/Evaluation.prof)
7. Incharge University Website for necessary action please
8. Principal, G.D.C., Rajouri.

B.Sc. BIOCHEMISTRY
SEMESTER- I
Under (CBCS) at Undergraduate level
Syllabus for the examinations to be held in the years Dec. 2021, Dec. 2022& Dec. 2023)
CORE COURSE

COURSE TITLE: BIOMOLECULES & ENZYMOLOGY
Course Code: UBCTC-101 **Credits: 4**
Duration of Examination: 2 ½ hrs. **Max. Marks: 100**
Internal Examination: 20 marks
External Examination: 80 marks

Unit-I: Water and its properties

Water and its properties; physico-chemical properties of water; Weak interactions in aqueous systems, hydrophobicity and hydrophilicity; Dissociation constants, pH and buffer, Henderson-Hasselbalch equation and its significance, Physiological buffers.

Unit-II: Carbohydrates & Proteins

Definition, classification and structure of monosaccharides, Open and Ring structure, Anomeric forms, mutarotation, Reaction of monosaccharides with special reference to glucose, Structure and functions of important oligosaccharides, Structure and functions of important polysaccharides, Bacterial cell wall polysaccharides. Amino acids: Structure & their classifications. Proteins: Classification and functions, Properties of proteins, Structure of peptide bond, Levels of structure in protein architecture, forces stabilizing the tertiary structure and quaternary structure of proteins, Determination of the amino acid sequence of the polypeptide chain.

Unit-III: Lipids and Nucleic Acids

Introduction, classification, nomenclature, structure and properties of Fatty acids, Saturated and unsaturated fatty acids, Essential fatty acids, Chemical properties and characterization of fats – hydrolysis, Sponification value, Reichert – Meissel number, Iodine number, Acid number, rancidity of fats, Triacylglycerol, simple and mixed Triacylglycerol, Structure and functions of phospholipids and sphingolipids.
General composition of nucleic acids, types and structure of purine and pyrimidine bases, structure of nucleosides, nucleotides and deoxynucleotides, cyclic nucleotides and polynucleotides, features of Watson and Crick model for DNA, Structure and roles of different types of RNA.

Unit-IV: Basic concept of enzymes & Enzyme Catalysis

Classification and nomenclature of enzymes, chemical nature and properties of enzymes, isoenzymes, enzyme specificity, active site, measurement and expression of enzyme activity Role of cofactors in enzyme catalysis, Acid-base catalysis, Mechanism of enzyme action; Lock and key Model, Induced fit theory.

Unit-V: Enzyme Kinetics & Enzyme Inhibition

Factors affecting enzyme activity; enzyme concentration, substrate concentration, pH and temperature, Derivation of Michaelis-Menton equation for uni-substrate reactions, km and its significance, Line Weaver Burk plot and its limitations, Enzyme inhibition definition, reversible and irreversible inhibition, competitive, non-competitive and uncompetitive inhibitions, determination of Km & Vmax in presence and absence of inhibitor, allosteric enzymes.

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COURSE TITLE: BIOMOLECULES & ENZYMOLOGY

Course Code: UBCTC-101 **Credits: 4**
Duration of Examination: 2 ½ hrs. **Max. Marks: 100**
Internal Examination: 20 marks

Books Recommended:

1. Nelson, D. L. and Cox, M. M. *Lehninger's Principles of Biochemistry*, W. H. Freeman and company, New York.
2. Voet, D., Voet J. G. and Pratt, C. W. *Fundamentals of Biochemistry*, John Wiley & Sons, Inc.
3. Richard A. H. and Denise R. F. *Lippincott'sIllustrated Reviews: Biochemistry,* Lippincott Williams & Wilkins, a Wolters Kluwer business.
4. Jeremy, M. B., John L. T. and Styrer, L. *Biochemistry,* W. H. Freeman and company, New York.
5. Karp, G. *Cell and Molecular Biology Concepts and Experiments,* John Wiley & Sons, Inc.
6. Jain, J. L., Jain, S. and Jain, N. *Fundamentals of Biochemistry*, S. Chand.
7. Satyanarayana, U. and Chakrapani, U. *Biochemistry*, Arunabha Sen Books and Allied (P) Ltd
8. Palmer, T. and Bonner, P. *Enzymes: Biochemistry, Biotechnology and Clinical Chemistry,* Horwood Publishing Limited.
9. Price, N. C. and Stevens, L. *Fundamentals of Enzymology,* Oxford University Press Inc. (New York).
10. Plummer, D. T. *An Introduction to Practical Biochemistry,* Mc Graw Hill Education (India) Pvt. Ltd.
11. Thimmaiah, S. R. *Standard Methods of Biochemical Analysis*, Kalyani Publisher.
12. Chawla, R. *Practical Clinical Biochemistry; Methods and Interpretations,* Jaypee Brothers Medical Publisher (P) Ltd.
13. Rizvi, E. H. *Laboratory Manual of Biochemistry & Biotechnology,* Mr. Books Fairdeal Shopping Complex Residency Road Srinagar.

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Note for paper setters

External End Semester Examination (Total marks: 80) Time duration: 2 hours 30 minutes

The question paper will have 3 sections

Section I: Five (5) short answer questions representing all units i.e. at least one from each unit (without detailed explanation having 70-80 words) of 3 marks each = 15 marks (All question compulsory)

Section II: Five (5) medium answer questions (with explanation having 250-300 words) of 7 marks each = 35 marks (All questions compulsory)

Section III: Five (5) long answer questions (with detailed explanation of 500-600 words) covering all the units. The candidate will be required to answer only two questions of 15 marks each = 30 marks.

Internal Assessment (Total Marks: 20) Time duration: 1 hour

The internal assessment under CBCS shall comprise of two parts

Part A: Total weightage to this part shall be 10 marks. It will have eight short answer questions, selecting at least three from each of the two / three units / 50 % of the syllabus covered. A candidate has to attempt any five questions of two marks each.

Part B: Total weightage to this part shall be 10 marks. It will have two long answer questions selecting at least one from first two / three / 50% of the syllabus covered. A candidate has to attempt any one question of 10 marks.

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SEMESTER-I
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Course title: Biomolecules and Enzymology (Laboratory course)
Couse code: UBCPC-102 **Credits: 2**
Duration of Examination: 3 hrs. **Max. Marks: 50**
Internal Examination: 25 marks
External Examination: 25 marks

1. Preparation of standard solutions; molar solution, molal solution, normal solution, percent solution, parts per million (ppm) solution.
2. Preparation of standard buffers.
3. Methods to determine the pH of a solution.
4. Qualitative tests for carbohydrates.
5. Qualitative tests for amino acids and proteins.
6. Qualitative tests for lipids.
7. Verification of Beer-Lambert law.
8. General handling of enzymes.
9. Preparation of standard curve for maltose.
10. Extraction of amylase from germinating wheat seeds.
11. Estimation of amylase activity.
12. Effect of substarte concentration on enzyme activity.
13. Effect of temperature on enzyme activity and determination of optimum temperature.
14. Effect of pH on enzyme activity and determination of optimum pH.

Note for distribution of 50 marks in Practical Examination: (50% internal and 50% external)

I. Internal Assessment **(25 marks)**
1. Attendance — 5 marks
2. Practical test — 5 marks
3. Daily performance based on practical work done — 10 marks
4. Viva-voce — 5 marks

II. External Assessment **(25 marks)**
1. External practical examination — 20 marks
2. Viva-voce — 5 marks