Institute of Zoology
Faculty of Life Sciences
University of the Punjab, Lahore
Course Outline

Programme	BS Zoology	**Course Code**	**ZOOL-107**	**Credit Hours**	2
Course Title	**Biochemistry-I**				

Course Introduction

- To provide knowledge about macro molecules of eukaryotic cells and organelles, including membrane structure and dynamics;
- To provide in-depth knowledge about the polymerized organic compounds of life.
- To provide knowledge of the principles of bioenergetics and enzyme catalysis
- To provide knowledge of the chemical nature of biological macromolecules, their three-dimensional structure, and the principles of molecular recognition

Learning Outcomes

By the end of the course, students should be able to:

1. Demonstrate knowledge and understanding of the molecules of living cells;
2. Demonstrate knowledge and understanding of the principles that govern the structures of macromolecules and their participation in molecular recognition;
3. Analyse, interpret, and participate in reporting to their peers on the results of their laboratory experiments;
4. Participate in and report orally on team work investigations of problem- based assignments;

Course Content		**Lecture/Reading**
Week 1	**Introduction to Macromolecules** • Structure, types and role of various building blocks their respective macromolecules.	Lecture/Reading
	• Carbohydrates: Introduction; Classification Stereoisomerism	Lecture/Reading
Week 2	• Structure, types and role of monosaccharides, oligosaccharides and	Lecture/Reading
	• Polysaccharides	Lecture/Reading
Week 3	• Glycosaminoglycans and glycoconjugates;	Lecture/Reading
	• Carbohydrates as an information carrier molecule.	Lecture/Reading
Week 4	**Amino acids, peptides & proteins:** • Types of amino acids & their classification;	Lecture/Reading
	• Uncommon amino acids; Acid/base behavior of amino acids.	Lecture/Reading
Week 5	• Titration curves in amino acids and their importance:	Lecture/Reading
	• Peptides & proteins; • Biologically active peptides & polypeptides;	Lecture/Reading
Week 6	• Amino acid sequence in proteins & their importance; Conjugated proteins;	Lecture/Reading
	Purification Techniques for Proteins • An outline of purification techniques for proteins	Lecture/Reading
Week 7	• Column chromatography, gel electrophoresis	Lecture/Reading

	• Isoelectric focusing	Lecture/Reading
Week 8	**Organization of proteins** • Structural levels of proteins • Hemoglobin, Cytochrome-c	Lecture/Reading
	• Chymotrypsin, alpha Keratin and Collagen	Lecture/Reading
Week 9	• Proproteins, their examples and role	Lecture/Reading
	Enzymes Enzymes, their importance, classification	Lecture/Reading
Week 10	Nomenclature, Function & inhibition.	Lecture/Reading
	Lipids Introduction & classification of lipids;	Lecture/Reading
Week 11	Fatty acids, their types; Storage lipids	Lecture/Reading
	Classification and important characteristics Triacyclglycerols; waxes	Lecture/Reading
Week 12	Structural/membrane lipids	Lecture/Reading
	Glycerophospholipids	Lecture/Reading
Week 13	Ether and Ester linkages Galactolipids & Sulfolipds	Lecture/Reading
	Sphingolipids their types & importance: Sterols, their structure, types & functions	Lecture/Reading
Week 14	Examples of Functional diversity of Lipids as Signaling molecules	Lecture/Reading
	Cofactors, Electron carrier, antioxidants, pigments	Lecture/Reading
Week 15	**Nucleic acids** • Nucleic acids and their types; Structure and role of various Bases in nucleic acids	Lecture/Reading
	• Nucleoside & Nucleotides;	Lecture/Reading
Week 16	• Structure of DNA and RNA molecules;	Lecture/Reading
	• Organization and Chemistry of Double helical structure of DNA with their details.	Lecture/Reading

Textbooks and Reading Material

1. Lehninger principle of biochemistry by David L.Nelson and Michael M.Cox, 7th latest edition,ISBN-10:1-4641-2611-9,ISBN-13:978-14641-2611-6
2. Biochemistry by Jeremy M. Berg , John L. Tymoczko; Lubert Stryer ,ISBN- 10:1429229365,ISBN-13:97814229229364
3. Berg, J. M.,Tymoczko,J. L., Lubert Stryer. 2010. Biochemistry. 7th Ed.
4. Lodish, H., Berk, A., Zipursky, S. L., Paul. M., Baltimore D, Darnell, J. 2012. Molecular Cell Biology.
5. David L. Nelson, and Michael M. Cox, 2000. Lehninger Principles of Biochemistry, 3rd Ed., Macmillan Worth Publishers, New York.
6. Murray, R.K., Granner, D.K., Mayer, P.A. and Rodwells, V.W., 2000. Voet. D., Voet, J.G., and Pratt, C.W., 1999. Fundamentals of Biochemistry, John Wiley and Sons, Inc., New York.
7. Zubay, G., 1995. Biochemistry, 4th Ed., Wm. C. Brown Publishers, Inc., Oxford, England.
8. Stryer, L., 1995. Biochemistry, 6th Ed., W.H. Freeman and Company, New York.

Teaching Learning Strategies
1. Lectures 2. Readings 3. Prsentation 4. Home Assignment 5. Quiz
Assignments: Types and Number with Calendar
1st Assignment in Mid-term 2nd Assignment in Final-term

Assessment

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.