School of Chemistry
Faculty of Science
University of the Punjab, Lahore
Course Outline

BS Chemistry Semester-III					
Programme	**BS Chemistry**	**Course Code**	**Chem-276**	**Credit Hours**	**2**
Course Title	**Introductory Biochemistry**		**Course Type**	**Major Elective**	

Course Introduction

This course will provide the Fundamental concepts in biochemistry and understand the basic knowledge of Cell, organelles and their function. This course will also give the knowledge about the importance of water, buffer, electrolytes in cell structure and function. This can be helpful to understand the importance of nutrients to sustain the heathy life

Scope and molecular basis of Biochemistry in life. Introduction of living cells; Prokaryotes and Eukaryotes. A brief description on the isolation, structure and functions of cellular organelles. Importance of water in living cells to sustain the life; Physical, Chemical properties of water and the importance of water to sustain the animal and plant, water homeostasis, hypertonic and hypotonic pressure, biomolecules. Water importance with respect to electrolytes, buffer and its importance in life; respiration, importance of pH in different. Introduction and importance the science of food, nutrition and nutrients in life Classification of nutrients and its importance. Energy value of biomolecules, Basal metabolic rate (BMR), respiratory quotient and their measurements. Energy expenditure and its importance for healthy life. Factors affecting metabolism and energy expenditure. Different methods to measure the energy expenditure; like Direct, Indirect calorimetry methods etc. Thermogenic effect of food in energy expenditure. Status of nutrition in different countries around Pakistan

Learning Outcomes

After studying this course, students will be able to understand the cells, organelles and life.

1. Students will also learn the importance of water, buffer and buffering system in both animal and plants
2. Student will chance to learn about nutrition and nutrient to sustain healthy life and its status in Pakistan and developed countries in the world

	Course Content	Assignments/Readings
Week 1	Scope and molecular basis of Biochemistry in life.	Class base learning/test
	Introduction of living cells; Prokaryotes and Eukaryotes.	Class base learning/test
Week 2	A brief description on the isolation, structure and functions of cellular organelles.	Class base learning/test
	A brief description structure and functions of cellular organelles.	Class base learning/test
Week 3	Importance of water in living cells to sustain the life; A brief description about Physical and the effect of solute on the physical properties of water	Class base learning/test
	Importance of water to sustain the animal and plant, water homeostasis, hypertonic and hypotonic pressure, biomolecules.	Class base learning/test

Week 4	Weak acids, strong acids and Proton hoping in water, water as weak conductor of electricity,	Class base learning/test
	Class Discussion	-
Week 5	What is pH and buffer, and their importance in laboratory	Class base learning/test
	Importance of importance in life; respiration, importance of pH in different	Class base learning/test
Week 6	Role of water in photosynthesis	Class base learning/test
	Detail summary lecture on cells, and water and its importance along with buffer, pH and solute	-
Week 7	Discussion with class	-
	Quiz on previous (Give marks, if necessary, from assignment)	-
Week 8	Mid term	
Week 9	Assign topics on biochemistry importance in life and other sciences as assignments and discussion	Class base learning/test
Week 10	What is food and nutrients Introduction and importance the science of food, nutrition and nutrients in life	Class base learning/test
	Classification of nutrients and its importance	Class base learning/test
Week 11	Brief introduction and role of macronutrients for heathy life	Class base learning/test
	Brief introduction and role of vitamins as microminerals for heathy life	Class base learning/test
Week 12	Brief introduction and role of minerals as microminerals for heathy life	Class base learning/test
	Class Discussion	-
Week 13	Energy value of biomolecules, Basal metabolic rate (BMR), respiratory quotient and their measurements.	Class base learning/test
	Factors affection in Energy value of biomolecules, Basal metabolic rate (BMR), respiratory quotient and their measurements.	Class base learning/test
Week 14	Energy expenditure and its importance for healthy life. Factors affecting metabolism and energy expenditure.	Class base learning/test
	Different methods to measure the energy expenditure; like Direct, Indirect calorimetry methods etc.	Class base learning/test
Week 15	Thermogenic effect of food in energy expenditure	Class base learning/test
	Status of nutrition in different countries around Pakistan	Class base learning/test

Week 16	Discussion with Class	-
	Quiz on previous (Give marks, if necessary, from assignment)	-

Reading Material

1. Lehninger, A. L., Nelson, D. L., & Cox, M. M. (2017). *Principles of biochemistry* (7th ed.). W. H. Freeman and Company.
2. Stryer, L. (2019). *Biochemistry* (8th ed.). W. H. Freeman and Company.
3. Murray, R. K., Bender, D. A., Botham, K. M., Kennelly, P. J., & Rodwell, V. W. (2017). *Harper's biochemistry* (30th ed.). McGraw-Hill Education.
4. Eastwood, M. A. (2005). *Principles of human nutrition* (2nd ed.). Blackwell Publishing. ISBN: 9780632058112.
5. Mahmood, S. (2002). *Essentials of human nutrition*. Urdu Bazar Lahore Majeed Book Depot.
6. Mahan, L. K., & Escott-Stump, S. (2020). *Krause's food & the nutrition care process* (15th ed.). Elsevier.
7. Smolin, L. A., & Grosvenor, M. B. (2020). *Nutrition: Science and applications* (4th ed.). Wiley.
8. Mato, J. M., & Mato, J. M. (2020). *Nutrients: Mechanisms and pathways*. Wiley.

Teaching Learning Strategies

- Lecturing using white/black board/Multimedia
- Written Assignments/presentations/ Task related to assigned topics
- Class activities and discussion
- Quiz about last lecture

Assignments: Types and Number with Calendar

Assignment, Quiz, Task, Presentation etc.

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.