

MINOR COURSES IN BIOCHEMISTRY (For Aquaculture and Microbiology Students)

Programme	B. Sc. Biochemistry				
Course Code					
Course Title	Biochemistry				
Type of Course	Minor				
Semester	I				
Academic Level	100				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75hrs
Pre-requisites	+2 level Science with Biology and chemistry background				
Course Summary	The course focus on the basics of cell, cellular organelles, biological molecules and membrane transport and physical principles.				

Course Outcomes (CO):

After the successful completion of the course, a student will be able to:

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	To understand the structure and functioning of eukaryotic cell.	U	C	Instructor-created exams / Quiz
CO 2	To understand the classification, structure, function and applications of biomolecules	U	C	Practical Assignment / Observation of Practical Skills
CO 3	To understand the biochemistry of life and living organisms	U	C	Seminar Presentation / Group Tutorial Work

CO 4	To understand the physical biochemistry of phenomena observed in living world	U	C	Instructor-created exams / Home Assignments
CO 5	To understand the type of membrane transportation.	U	C	One Minute Reflection Writing assignments
CO 6	Understand the functions and different types of biological solutions.	U	C	Viva Voce
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Detailed Syllabus:

Module	Unit	Content	Hrs
I	Unit I (15 marks)		
	1	Cell theory, Cell types, Cell- structure and function of different cell organelle	1
	2	Cell wall, mitochondria, extracellular matrix, nucleus, cytoplasm, ribosome, golgi apparatus etc.	2
	3	Digestion and absorption of macromolecules	2
	4	Biochemical aspects of diet and nutrition (energy level)	1
II	Unit II (15 marks)		
	5	Biological Macromolecules, Functions	3
	6	Definition and classification of biomolecules of life, types, source.	3
	7	Importance of biomolecules in living organisms	2
	8	Chemical elements essential for life, trace elements	2
III	Unit III (20 marks)		
	9	Chemical bonds and interactions- Van der Waals forces	2
	10	Dipole-dipole interactions, Ion-dipole interactions, covalent bonds, ionic bonds	1
	11	Chemical equilibrium	1
	12	Hydrogen bonding- importance in Biology	1
	13	Water the universal biological solvent, Dissociation of water, Ionic product of water	4
	14	Concepts of Acids, bases	1
	15	Dissociation of weak acids, Titration curve	1
	16	Concept of pH, POH buffers - physiological buffers, calculations	2
	17	Henderson Hassel Balch equation, calculations	2
IV	Unit IV (20 marks)		
	18	Biomembrane and transport, osmosis, diffusion, dialysis	2

	19	Colloids: True solution, colloidal solution and suspension. Preparation of colloidal system, Classification of colloids: Lyophilic, lyophobic, macromolecular, multimolecular and associated colloids with examples. Properties of colloids	3
	20	Brownian movement – Tyndall effect – Electrophoresis. Emulsions. Applications of colloids: Delta formation, medicines, emulsification, cleaning action of detergents and soaps	3
	21	Basic reactions of organic functional groups, OH, CO, CHO, COOH, NH ₂ , Amide, SH	3
	22	Redox reactions, decarboxylation, elimination, addition, substitution, condensation, isomerisation	3
V	Practicals		30 hrs
	1	Scientific weighing using weighing bottle and electronic balance	
	2	Preparation of standard solutions	
	3	Percentage solutions W/V, V/V, W/W etc preparation	
	4	Molar and mole fraction - solutions- preparation	
	5	Normal solutions	
	6	Quantitative transfer of materials, accuracy in transfer (to find out percentage error.)	
	7	To learn the functions of light microscope	

REFERENCES

1. B. R. Puri, L. R. Sharma, M. S. Pathania, Principles of Physical Chemistry, 46 th Edn., Vishal Publishing Company, New Delhi, 2013.
2. Lehninger Principles of Biochemistry" by David L. Nelson and Michael M. Cox.
3. "Biochemistry" by Jeremy M. Berg, John L. Tymoczko, and Lubert Stryer.
4. F. Daniels, R. A. Alberty, Physical Chemistry, 5 th Edn., John Wiley and Sons, Canada, 1980.
5. The Cell: A Molecular Approach by Geoffrey M. Cooper and Robert E. Hausman.
6. Cell and Molecular Biology: Concepts and Experiments by Gerald Karp.
7. "Chemistry: The Central Science" by Theodore L. Brown, H. Eugene LeMay, Bruce E. Bursten, and Catherine Murphy

Mapping of COs with PSOs and POs:

	PSO 1	PSO 2	PSO 3	PSO4	PSO 5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6
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