



**ROYAL COLLEGE OF PHARMACY
WAZIRPUR**

DEPARTMENT OF PHARMACY

Course: Diploma in Pharmacy

LESSON PLAN

Faculty Name:

Subject Name: BIOCHEMISTRY & CLINICAL PATHOLOGY(T)

Class: D. Pharmacy – IInd year

Subject Code: - ER20-23T

Scope: This course is designed to impart basic knowledge on the study of structure and functions of biomolecules and the chemical processes associated with living cells in normal and abnormal states. The course also emphasizes on the clinical pathology of blood and urine.

Course Objectives: This course will discuss the following at the fundamental level

1. Structure and functions of biomolecules
2. Catalytic activity, diagnostic and therapeutic importance of enzymes
3. Metabolic pathways of biomolecules in health and illness (metabolic disorders)
4. Biochemical principles of organ function tests and their clinical significance
5. Qualitative and quantitative determination of biomolecules / metabolites in the biological sample
6. Clinical pathology of blood and urine

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Describe the functions of biomolecules
2. Discuss the various functions of enzymes in the human system
3. Explain the metabolic pathways of biomolecules in both physiological and pathological conditions
4. Describe the principles of organ function tests and their clinical significances
5. Determine the biomolecules / metabolites in the given biological samples, both qualitatively and quantitatively
6. Describe the clinical pathology of blood and urine.

Lecture no.	Particular	Remarks/Date
Module 1: - Introduction		
1.	Scope of biochemistry in pharmacy	
2.	Cell and its biochemical organization	
Module 2: - Carbohydrates		
3.	Definition, classification with examples, chemical properties	
4.	Monosaccharides - Structure of glucose, fructose, and galactose	
5.	Disaccharides - structure of maltose, lactose, and sucrose	
6.	Polysaccharides - chemical nature of starch and glycogen	
7.	Qualitative tests and biological role of carbohydrates	
Module 3: - Proteins		
8.	Definition, classification of proteins based on composition and solubility with examples	

9.	Definition, classification of amino acids based on chemical nature and nutritional requirements with examples	
10.	Structure of proteins (four levels of organization of protein structure)	
11.	Qualitative tests and biological role of proteins and amino acids	
12.	Diseases related to malnutrition of proteins.	
Module 4: - Lipids		
13.	Definition, classification with examples	
14.	Structure and properties of triglycerides (oils and fats)	
15.	Fatty acid classification - Based on chemical and nutritional requirements with examples	
16.	Structure and functions of cholesterol in the body Lipoproteins - types, composition and functions in the body	
17.	Qualitative tests and functions of lipids	
Module 5: - Nucleic acids		
18.	Definition, purine and pyrimidine bases	
19.	Components of nucleosides and nucleotides with examples	
20.	Structure of DNA (Watson and Crick model) and their functions	
21.	Structure of RNA and their functions	
Module 6: - Enzymes		
22.	Definition, properties and IUB and MB classification	
23.	Factors affecting enzyme activity	
24.	Mechanism of action of enzymes	
25.	Enzyme inhibitors	
26.	Therapeutic and pharmaceutical importance of enzymes	
Module 7: - Vitamins		
27.	Definition and classification with examples	
28.	Sources, chemical nature and functions of Vitamins	
29.	coenzyme form of vitamins	
30.	recommended dietary requirements	
31.	deficiency diseases of fat-and water-soluble vitamins	
32.	Revision and Doubt Clearing session	
Module 8: - Metabolism		
33.	Study of Metabolism cycle	
34.	Study of Metabolism pathways without chemical structures	
35.	Metabolism of Carbohydrates: Glycolysis	
36.	TCA cycle	
37.	Glycogen metabolism	
38.	Regulation of blood glucose level	
39.	Diseases related to abnormal metabolism of Carbohydrates	
40.	Metabolism of lipids: Lipolysis	
41.	β -oxidation of Fatty acid (Palmitic acid)	
42.	ketogenesis and ketolysis	
43.	Diseases related to abnormal metabolism of lipids	
44.	Ketoacidosis, Fatty liver, Hypercholesterolemia	
45.	Metabolism of Amino acids (Proteins)	
46.	General reactions of amino acids and its significance- Transamination and deamination	
47.	Urea cycle and decarboxylation	
48.	Diseases related to abnormal metabolism of amino acids	
49.	Disorders of ammonia metabolism, phenylketonuria	
50.	Alkaptonuria and Jaundice.	
51.	Biological oxidation: Electron transport chain	
52.	Oxidative phosphorylation	
Module 9: - Minerals		
53.	Introduction to minerals	
54.	Types and function of minerals	
55.	Deficiency diseases	

56.	Recommended dietary requirements	
57.	Revision and doubt class	
Module 10: - Water and Electrolytes		
58.	Distribution, functions of water in the body	
59.	Water turnover and balance	
60.	Electrolyte composition of the body fluids	
61.	Dietary intake of electrolyte and Electrolyte balance	
62.	Dehydration, causes of dehydration and oral rehydration therapy	
Module 11: - Introduction to Biotechnology		
63.	Introduction to Biotechnology	
Module 12: - Organ function tests		
64.	Functions of kidney	
65.	Routinely performed tests to assess the functions of kidney and their clinical significances	
66.	Functions of liver	
67.	routinely performed tests to assess the functions of liver and their clinical significances	
68.	Revision	
69.	Lipid profile tests and its clinical significances	
Module 13: - Introduction to Pathology of Blood and Urine		
70.	Lymphocytes and Platelets	
71.	Role of Lymphocytes and Platelets in health and disease	
72.	Erythrocytes - Abnormal cells	
73.	Significance of Erythrocytes	
74.	Normal and abnormal constituents of urine and their significance	
75.	Test	

Practicals

Expt. No.	Name of Experiments	Remarks/Date
1.	Qualitative analysis of carbohydrates (Glucose).	
2.	Qualitative analysis of carbohydrates (Fructose).	
3.	Qualitative analysis of carbohydrates (Lactose).	
4.	Qualitative analysis of carbohydrates (Sucrose).	
5.	Qualitative analysis of Proteins (Albumin).	
6.	Qualitative analysis of Proteins (Casein).	
7.	Qualitative analysis of amino acids (Tryptophan).	
8.	Qualitative analysis of amino acids (Tyrosine).	
9.	Qualitative analysis of lipids (Triglycerides).	
10.	Qualitative analysis of lipids (Cholesterol).	
11.	Determination of constituents of urine (glucose).	
12.	Determination of constituents of urine (Creatinine).	
13.	To analyze the given sample of urine for its normal inorganic constituents.	
14.	To analyze the given sample of urine for its normal organic constituents.	
15.	To analyze the given sample of urine for its abnormal constituents.	
16.	To analyze the given sample of urine for its abnormal constituents.	
17.	Determination of constituents of blood/serum glucose in blood	
18.	Determination of constituents of blood/serum Cholesterol in blood.	
19.	Determination of constituents of blood/serum glutamateoxaloacetate transaminase (S.G.O.T) in blood serum.	
20.	Determination of constituents of blood/Serum glutamatepyruvate transaminase (S.G.P.T) in blood serum.	