RKUNIVERSITY

SYLLABUS

Biochemistry

Course Title	Biochemistry
Course Code	PT207
Course Credit	Lecture: 4
	Practical: 0
	Clinical Training: 0
	Total: 4

Course Objectives

1. To share the knowledge related to biological oxidation, minerals, acid-base balance, water electrolyte balance and imbalance, hormones and connective tissue.
2. To describe the importance of balanced diet.

#	Detailed Syllabus	Hours
	SECTION I	
1	**Cell biology** Introduction, Cell structure, Cell membrane structure and function, various types of absorption.	**2**
	Intracellular organelles and their functions, briefly on cytoskeleton.	
2	**Carbohydrates** Chemistry-definition, classification with examples.	**1**
	Functions of carbohydrates with muccopolysaccharides [in details].	**1**
	Glycogenesis, Glycolysis, Glycogenolysis& their regulation, Cori's Cycle.	**2**
	Gluconeogenesis-significance of H.M.P. shunt.	**1**
3	**Proteins** Chemistry-definition, function, classification of Amino acids, protein structure,	**2**
	Effect of temperature on proteins, denaturation, coagulation, isoelectric pH & its importance.	**2**
	Metabolism- De-amination, Transmethylation, Transamination &its importance, Detoxification of ammonia in the body & urea cycle.	**2**
4	**Nucleic Acids** D.N.A. /R.N.A.-definition, structure & function.	**2**
	Catabolism of purine – Gout.	**1**
5	**Lipids** Chemistry, definition, classification of lipids & fatty acids with examples &functions	**2**
	Metabolism- Beta oxidation of fatty acids & its energetic, Ketone bodies formation & utilization, cholesterol & its importance [no biosynthesis needed]	**2**
	Classification, sources & function of lipoproteins.	**2**
	Fate of acetyl-Co A (in brief)	**1**
	Fate of Glycerol (in brief)	**1**
	Enzymes	**2**

6	Definition, classification, factors affecting enzyme action.	
	Co-enzyme & Isoenzyme with their significance.	**1**
	Inhibition & types of inhibitors.	**1**
	Clinical & therapeutic use of enzymes.	**1**
7	**Vitamins** Water & Fat soluble with definition & classification.	**1**
	Individual vitamins-sources, Co-enzyme forms & functions.	**2**
	Daily requirement, absorption & transport,	**2**
	Deficiency & toxicity.	**2**
Section II		
1.	**Biological Oxidation** Oxidative phosphorylation and ETC in brief	**1**
2.	**Minerals** 1. Phosphorous, Calcium- sources, RDA, absorption, transport, excretion, function and disorder	**2**
	2. Fluoride, Iron, Zinc, Copper, Selenium, Iodine-sources, RDA, absorption, transport, excretion, function and disorder.	**2**
	3. Acid-Base balance	**1**
	4. Acids, bases and buffers, pH. Buffer systems of the body, bicarbonate buffer system.	**2**
	5. Role of lungs and kidneys in acid base balance,	**1**
	6. Acid base imbalance	**1**
	7. Water - Electrolyte balance and imbalance	**1**
	8. Water distribution in the body, Body water, water turnover,	**1**
	9. Regulation of water balance: role of ADH and thirst centre	**1**
3.	**Muscle Contraction** 1. Contractile elements.	**1**
	2. Biochemical events during contraction	**1**
	3. Energy metabolism in skeletal and cardiac muscle	**1**
	4. Protein misfolding and disease	**1**
4.	**Hormones** 1. Definition, classification, Mechanism of hormone action. Receptors, signal transduction, second messengers and cell function.	**1**
5.	**Nutrition – dietitian** 1. Introduction, importance of nutrition, calorific values	**1**
	2. Respiratory quotient – Definition, and its significance.	**1**
	3. Energy requirement of a person – 4. Basal metabolic rate: Definition, Normal values, factor affecting BMR.	**2**
	5. Special dynamic action of food	**2**
	6. Physical activities - Energy expenditure for various activities, calculation of energy requirement of a person	**2**
	7. Balanced diet, recommended dietary allowances	**2**
	8. Role of carbohydrates in diet: Digestible carbohydrates and dietary fibers.	**2**

	9. Role of lipids in diet	
	10. **Role of proteins in diet:** Quality of proteins - Biological value, net protein utilization, Nutritional aspects of proteins-essential and non-essential amino acids, Nitrogen balance.	**2**
	11. Nutritional disorders	**2**
6.	**Clinical Biochemistry** Normal levels of 1. blood and urine constituent, relevance of blood and urine levels of Glucose, Urea, Uric acid, Creatinine, Calcium, Phosphates, pH and Bicarbonate.	**1**
	2. Liver function tests, Renal function tests	1

Instruction Method

1. Teaching and training sessions will be carried out through active learning. Active participation and contribution in group discussion and seminars are mandatory for students
2. Lectures to be conducted with the help of black board and/or audio-visual aids that includes multi-media projector, OHP, etc.
3. Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval

Text Books

1. Biochemistry: 4th edition. Dr. Satyanarayan. Elsevier India
2. Biochemistry. Dr. Debajyoti Das. Academic Publishers, 1980
3. Text book of Biochemistry for Medical students: 6th edition. Dr Vasudevan DM, Shrikumari S. Jaypee Publication.

Reference Books

1. Harpers Illustrated Biochemistry: 24th edition. Murray RK et al. McGraw Hill Education