



Week	Subject (Theory)	Objectives	Hours	Practical	objectives
1	Fluid and Electrolyte Balance	1. Define body fluid and electrolytes. 2. Know the volumes and main composition of body fluids. 3. List the factors that determine body water content and describe the effect of each factor. 4. Describe the role of the body systems in regulating the body's fluid composition and volume. 5. Describe mechanisms that regulate water intake and hormonal controls of water output in urine.	6	Laboratory safety	a. Understand the proper laboratory safety. b. Increase the awareness of the possible risks or hazards involved with laboratory work. c. Realize the laboratory is generally a safe place to work if safety guidelines are properly followed
2	Acid-Base Balance	1. Defines acids, bases. 2. Know the natural acids and bases ratio of the body. 3. Recognize the types of acid and base. 4. List the source of acids and bases of the body. 5. Study the systems responsible for maintenance of the acid-base balance. 6. Explain the role of buffer systems in regulating the pH of the intracellular fluid and the extracellular fluid. 7. Discuss acid base disorders. 8. Analysis of Acid-Base Imbalances Report	6	Laboratory instruments and apparatuses	a. Identify and categorize the different instruments and apparatuses with their parts and uses in practice. b. Identify the photometer with its main parts and uses

3	Chemistry of Carbohydrates 1- Monosaccharides & Disaccharides	1. Define carbohydrate and the groups of saccharides . 2. Know the chemical structure of the common sugars. 3. Understand the concepts of and isomerism in simple sugars anomers. 4. Glycosides, sugar alcohols, sugar acids, phosphate esters, deoxy sugars and amino sugars. 5. Understand the role saccharides play in biology. 6. Know the biochemical functions and differences between the various heteropolysaccharides. 7. Be able to recognize the N and O linked polysaccharides. 8. Know how dietary polysaccharides are digested by humans.	9	Units and references values	a. Recognize the principles of photometry and the related laws. b. Measure weight and volume
4	Chemistry of Carbohydrates - Polysaccharides Part-2	1. Study the chemical structure of polysaccharides. 2. Classify polysaccharides. 3. Know the biochemical functions and differences between the various heteropolysaccharides. 4. Be able to recognize the N and O linked polysaccharides. 5. Know how dietary polysaccharides are digested by humans	9	Applications of spectrophotometers	a. Learn the purpose and proper use of a spectrophotometer. b. Determine the relationship between light absorbance and the number of particles in a sample in a given volume. c. Apply different methods for expressing concentration . d. Prepare stock solutions and perform different dilutions.

5	Fatty acids & Derivatives	1. Have general idea about lipid structure and properties. 2. Classify lipids. 3. List the major physiological functions of fatty acids. 4. Derive the structure of saturated or unsaturated fatty acids. 5. Study the relation between the structure and function of fatty acids. 6. Be able to specify the omega or delta ends. Recognize the alpha, beta and gamma carbons of fatty acids. 7. List and be able to identify the general features of the eicosanoids. 8. Know the biochemical functions of the eicosanoids	6	Blood components	- a- Describe the blood components in details. - b- Explain the blood samples in details .
6	Glyceride , Non-glyceride & Complex lipids	1. Classify lipids. 2. Know the main class of lipids. 3. Have an idea about the structure of each class. 4. Understand the physical and chemical of the classes. 5. List the biological function of all classes. 6. Relate the structure and properties with the diseases come as a result of this lipids.	6	Preparation of plasma and serum for analysis	- a- Describe the blood samples in details. - b- Outline the importance of blood samples .

7	Final first semester exam		3	Sample collection, processing and handling	a. Outline the type of biological samples . b. Describe the Blood collection techniques
8	Amino Acids & Proteins Part 1	1. Describe the general structure of an amino acid. 2. Recognize amino acids and classify them based on the characteristics of their side chains. 3. List the twenty common amino acids found in living organisms. 4. Describe how a peptide bond forms. 5. Understand the biologic activities of peptides.	6	pH and Buffer, Acid-Base Balance	a. Explain the acid base balance. b. Describe the role of buffers in maintaining the pH of a solution in body fluids
9	Amino Acids & Proteins Part 2	1. Understand that amino acids are linked via peptide bonds to make polypeptides and proteins 2. Understand that each protein molecule can be hundreds of amino acids long and the amino acids must be joined in a precise order. 3. Know that the side-chains (R groups) of the amino acids can interact with one another to fold the protein into a particular shape which is essential for the protein to function correctly. 4. Describe, using examples, the relationship between protein structure and function. 5. Define denaturation and list factors led to protein denaturation 6. List some medical application of denaturation .	6	Buffers in blood	a- Identify the most powerful buffer systems in the body. b- Outline the importance of buffer systems .

10	Amino Acids & Proteins Part 3	1. Classify proteins according to different parameters including chemical composition, shape, biological function, solubility in water. 2. Describe, using examples, the relationship between protein structure and function 3. Explain of biological activity of some important proteins	6	Urinalysis (UA)	a. Outline the importance of urine samples. b. Describe the collection of urine samples. c. Describe urine examinations.
11	Nucleic Acids Part 1	1. Describe the structure of a nucleotide as being a phosphate group, pentose sugar (either ribose or deoxyribose), and a nitrogen containing base, 2. Recall that the nitrogenous bases are adenine, cytosine, guanine, and thymine in DNA, or uracil in RNA, and the base pairings that occur, 3. State that a nucleic acid is formed from many nucleotides, joined by condensation reactions, 4. Compare and contrast the structures of DNA and RNA, 5. Explain the importance of DNA in storing genetic material and safely transferring genetic information between organisms.	6	Analysis of normal constituents of urine	a- Describe the content of normal urine samples . b- explain the results of urine examinations .

12	Nucleic Acids Part 2 Protein Biosynthesis	1. Comprehend the universal nature of the gene. 2. Be able to define replication of DNA. 3. Know the roles of mRNA, ribosomes, tRNA and amino acids in the process of translation. 4. Understand what start codons and stop codons are. 5. Understand how a polypeptide is built, one amino acid at a time, in the different docking sites of the ribosome. 6. Understand how tRNAs are 'charged' with amino acids. 7. Know that ribosomes consist of a large and a small subunit. 8. Be able to define polysome.	3	Analysis of abnormal constituents of urine	a- Describe the content of abnormal urine samples . b- explain the results of urine examinations for different cases .
13	Nucleic Acids Part 3	1. Define how errors by DNA polymerase create mutations. 2. Identify the types of gene mutations. 3. Describe what occurs during each type of mutation. 4. Explain the structure and shape of viruses. 5. Know the viral replication, viral transaction and viral protein biosynthesis. 6. Discuss how to prevent viral transaction and viral protein biosynthesis	3	General stool examination	a. Outline the importance of stool samples. b. Describe the collection of stool samples. c. Describe stool examinations

14	Enzymes Part 1	1. Define enzyme and explain basic functions of enzymes. 2. Explain basic properties of enzymes. 3. Discover and defines the enzyme components. 4. Express localization of enzymes in the cell. 5. Defines the active site and catalytic activity of enzyme. 6. Discuss working principle of enzymes. 7. Express the relationship between enzyme and substrate.	6	Hematological test	a. Outline the importance of hematological test. b. Explain the hematological test
15	Enzymes Part 2	1. Explain what an enzyme inhibitor is. 2. Distinguish between reversible and irreversible inhibitors. 3. Differentiate between competitive and noncompetitive inhibitors. 4. Discuss the biological role of isoenzymes and their use in clinical diagnosis. 5. Understand the bases of enzyme catalysis and the mechanisms of enzyme regulation. 6. Know the role of regulatory enzymes in controlling metabolic pathways and cellular responses.	6	First- semester practical examination	

16	Final second semester exam		3	Blood Glucose Test	a. Identify the principles of the blood glucose test. b. Calculation of glucose concentration in the unknown sample
17				Oral Glucose Tolerance Test	a. Explain the types of the blood glucose tests. b. Define the Oral Glucose Tolerance Test
18				Diabetes mellitus	a- Describe diabetes mellitus. b- Explain its diagnosis and classification
19				Case scenario of diabetes mellitus (Type I)	a- Describe Type I diabetes mellitus . b- Illustration of case studies on Type I Diabetes Mellitus
20				Case scenario of diabetes mellitus (Type II)	a- Describe Type II diabetes mellitus . b- Illustration of case studies on Type II Diabetes Mellitus
21				Lipid Profile	a. Identify the principles of the lipid profile test. b. Calculation of total cholesterol concentration in the unknown sample
22				Lipoproteins	a. Identify the lipoproteins.

					b. Estimate the concentration of HDL and LDL in the unknown sample.
23				Plasma lipids and lipoproteins	a. Describe disorders of lipid metabolism. b. Illustration of case study.
24				Case scenario of hypercholesterolemia	a- Describe hypercholesterolemia. b- Illustration of case studies on hypercholesterolemia.
25				Case scenario of hypercholesterolemia in patients with diabetes mellitus	a- Describe hypercholesterolemia in patients with diabetes mellitus . b- Illustration of case studies on hypercholesterolemia in patients with diabetes mellitus.
26				Triglycerides	a. Identify the principles of the triglycerides test. b. Calculation of TG concentration in the unknown sample.
27				Case scenario of hyperlipidaemia	a- Describe hyperlipidaemia . b- Illustration of case studies on hyperlipidaemia .
28				Case scenario of hyperlipidaemia in patients with diabetes mellitus	a- Describe hyperlipidaemia in patients with diabetes mellitus . b- Illustration of case studies on hyperlipidaemia in patients with diabetes mellitus.
29				Case scenario of hypercholesterolemia and hyperlipidaemia in patients with diabetes mellitus	a- Describe hypercholesterolemia and hyperlipidaemia in patients with diabetes mellitus .

					b- Illustration of case studies on hypercholesterolemia and hyperlipidaemia in patients with diabetes mellitus .
30				Second-semester examination	