



**A- COURSE TITLE, CODE, ACADEMIC YEAR:**

Medical Biochemistry 1 (MLT 212) 1437-1438 H

**B- COURSE INFORMATION:**

Course Code	Course Title	Credit Units			Study Level	Pre-requisites
		Total	Theory	Practical		
MLT-212	Medical Biochemistry 1	3	2	1	4 <sup>th</sup>	MLT-211
Course Coordinator		Extension		Email Address		
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**C- COURSE DESCRIPTION:**

The course improve the knowledge of students about the metabolism of biomolecules. The course started by demonstration the role of enzymes in catalyzing metabolic reactions and explaining the production of ATP during the respiratory chain. After that, the students learned how the carbohydrates, lipids, and protein in the diet are digested, absorbed and catabolized for production of energy or for production of important building blocks for the human body. Also, they studied the metabolic integration between different pathways during the starve-feed cycle. Furthermore, they will be able to use the equipment in the laboratory to get accurate results and to measure the biochemical parameters, such as glucose, lipids, and enzyme activities in the laboratory.

**D- COURSE OBJECTIVES:**

1. Demonstrate enzymes structure, functions, its mechanisms of action, and regulation of its activities.
2. Explain how the cell oxidizes reducing equivalents through electron transport chain for production of energy in the form of ATP.
3. Outline different pathways for catabolism of carbohydrates, lipids and proteins.
4. Show how the cell synthesizes its requirement from glucose, fatty acids, and amino acids if they not supplied in the diet.
5. Summarize the major metabolic disorder associated with metabolism of carbohydrates, lipids and proteins.
6. Illustrate how the human cells and organs integration between metabolism of carbohydrates, lipids, and proteins.
7. Demonstrate how the equipments in the biochemical lab work, how to process the serum and urine samples, and how to analyze the biochemical parameters, such as serum, in these samples.

**E- THEORY TOPICS:**

Week	Theory Topic	Contact Hours
1	Enzymes specificity, enzyme composition, and nomenclature.	2



	Enzymes classification and theories of interaction between enzyme active site and its substrate.	
2	Electron transport chain, its regulation and inhibitors.	2
3	- Carbohydrate digestion, absorption, and their fate. - Glycolysis and its types.	2
4	- Regulation of glycolysis. - Citric acid cycle and its regulation	2
5	- Pentose phosphate pathway and Glycogenesis. - Glycogenolysis and Gluconeogenesis.	2
6	- Lipids digestion and absorption. - Fate of absorbed lipids and mobilization of stored TG and Carnitine shuttle	2
7	- $\beta$ -oxidation of fatty acids. - Biosynthesis of fatty acids.	2
8	- Ketone bodies. - Cholesterol metabolism.	3
9	- Protein digestion, absorption and fate of absorbed amino acids. - Deamination of amino acids.	2
10	- Fate of the removed amino group and their transport to liver. - Urea cycle, its regulation and disorders.	3
11, 12	- Catabolism of carbon skeleton of amino acids and their disorders. - Conversion of amino acids to specialized products.	3
12, 13, 14	Metabolic integration between carbohydrate, lipids and protein metabolism.	5
15	Revision	2

#### F- PRACTICAL SESSIONS:

Week	Practical Session	Contact Hours
1	Orientation, lab equipment's and Laboratory safety	2
2	The SI units and its calculation and preparation of standard solution	2
3	Preparation of buffer solutions.	2
4	Spectrophotometry and types of colorimetric reactions.	2
5	Anticoagulant and preparation of serum, plasma, and urine samples.	2
6	Assay of enzyme activity for amylase enzyme.	2
7	Determination of blood glucose by GOD method	2
8	Determination of serum total protein	2
9	Determination of serum albumin	2
10	Determination of serum albumin and A/G ratio	2
11	Determination of serum total cholesterol	2



12	Determination of serum triglycerides	2
13	Determination of LDL and HDL cholesterol	2
14	Revision	2
15	Final practical exam	2

<b>G- ASSESSMENT TASKS:</b>			
#	Type of assessment task	Week	Total Grades
1	Continuous assessment	Weeks 1-13	10%
2	Midterm examination (written)	Week 8	15%
3	Assignment submission	Week 10	5%
4	Final practical exam	Week 16	30%
5	Final written examination	Week 17-18	40%

<b>H- LEARNING RESOURCES:</b>
<p><u>1- Required textbook:</u></p> <ul style="list-style-type: none"> <li>Burtis et al., 2000. Teitz text book of clinical chemistry, Saunders Press.</li> <li>Lippincotts Illustrated Reviews Biochemistry 4thEdition</li> </ul> <p><u>2- Essential references:</u></p> <ul style="list-style-type: none"> <li>Journal of biochemistry</li> </ul>

**Notes:**

- Assignments topics and requirements shall be announced by the end of Week-1, the deadline for submission is 12pm Thursday of Week-10 (each semester).
- Assignments and written assessment tasks must be verified against plagiarism, the maximum acceptable percentage is determined by the department (according to each level).
- Continuous assessments may include quizzes, internet searches, home-works, exercises, class activity, scratch cards, presentations, group work, etc.
- Practical exams may contain hands-on experiments, laboratory work, simulations, or demonstrations.
- Written exams will include multiple-choice questions (MCQ), short essay questions, and long essay questions.