

Course Description

This course description provides a brief summary of the most important characteristics of the course and list the learning outcomes expected from the student to achieve when he\she has made maximum use of the available learning opportunities.

1-Educational Institution/ college	CMUM	
2-Department offering the course	Biochemistry	
3-Name of Academic Program	MSc	
4-Academic Year/level	preparation year	
5-Title of the course	Biochemistry	
7-Total Course Hours	Theoretical hours=45 Practical hours=30	Total=75 hour theory 60 hour practice
	Theoretical hours=30 Practical hours=30	
8-Date of specification approval	20/10/2023	

9-General Aims of Course

The scientific-knowledge building, employing the ability and refining the skill, in order to assimilate the scientific foundations in the subject of biochemistry, in order to understand and assimilate the natural chemical reactions that take place inside the human body.

10-Intended learning outcomes of the course:

By the end of the course, students should be able to:

A-Knowledge and understanding:

- A1. Recall the basic concepts of major body metabolism and its important biochemical pathways and reactions.
- A2. Repeat the mechanisms of different diseases that develop due to metabolic derangements and/or genetic mutations.
- A3. Recognize the possible treatment of different diseases by analyzing the metabolic (or molecular) etiology.
- A4. Arrange how to make final diagnosis of common chronic diseases that develop due to disturbances of body metabolism by using biochemical and/or molecular laboratory tests.
- A5. Arrange signs and symptoms and expect the clinical findings of a disease that results from disturbances in body metabolism.
- A6. Describe what they learned about metabolic diseases to patients in their families and friends with confidence based on the knowledge they acquired.
- A7. Select the appropriate body specimen to conduct the appropriate lab analysis that aids in confirmation of diagnosis of different diseases and acquire the necessary knowledge to conduct the lab experiments with the ability to interpret results.
- A8-acquire sufficient skills and knowledge in selecting appropriate collection tubes and anticoagulants and preparation of both serum and plasma samples.
- A9-Learn how to examine normal urine both physically (including the color, appearance, PH, specific gravity) and chemically (testing for urobilinogen, uric acid, ammonium salt and creatinine).

B-Intellectual Skills

- B1 -Identify the link between the materials produced from raw materials, understand their path, and try to transform them from their natural path to other paths for more benefit.
- B2- Arrange to transform the paths of harmful produced substances into harmless substances, especially inside the body
- B3- Predict the means of analysis and selection of the

	<p>resulting materials and increase their specialization</p>
<p>C-Professional Skills</p>	<p>C1-Judge the modifications that occur as a result of a few interactions within the body and the unnatural substances resulting from them that lead to various types of diseases</p> <p>C2-Interpret the means of analysis and measurement of models taken from the human body, especially blood and other physiological or pathological models, which help in diagnosing diseases or assessing the health or treatment</p> <p>Measuring total protein concentrations by a spectrophotometer.</p> <p>C3-Measure the protein concentration in CSF and identify its physical properties as well.</p> <p>C4-measure protein quantity in a 24- hour urine sample.</p> <p>C5-Learn about the principle and necessary tools of conducting a Polymerase Chain Reaction (PCR)</p> <p>C6-Use of enzymatic method to measure plasma glucose and learn how to interpret results based on WHO and ADA criteria</p> <p>C7-Measuring serum cholesterol as well as other blood lipids</p> <p>C8-Measuring bilirubin alkaline phosphatase activity, liver enzymes using enzymatic method</p> <p>C9-Assessment of renal function blood urea, serum creatinine and calculations of</p>

	<p>creatinine clearance</p> <p>C10-Interpret the means of analysis and measurement of models taken from the human body, especially blood and other physiological or pathological models, which help in diagnosing diseases or assessing the health or treatment status</p> <p>C11- Use the spectrophotometer and learn to calculate the concentrations of any substances using Beer's Lambert law. He/ She will learn how to prepare samples used for this procedure (namely: blank, standard and test solutions.</p> <p>C12-Practice blood aspiration</p> <p>C13- Learn how to use minividas ,ELISA and other modern devices.</p>
<p>D-General and Transferable Skills</p>	<p>D1- Summarize skills in the use of materials and equipment and the necessities that support them in verification, measurement and evaluation</p> <p>D2- Test and follow up students practically, directing them and alerting them to the possible specialized dangers as a result of their work, especially for the unscheduled and inferred judgments from their activities in personal development and assigning distinctive abilities to be on the right track.</p>

E-Attitude outcomes	The student will be able to recognize any ethical problems in relation to the topics and act accordingly, the student will acknowledge the importance of wearing gloves and mask in chemical lab

11- Course structure:

topic	No. Of lectures	Lecturer
Vitamins	5	Dr. Sura Khairuddin (Lecturer)
Enzymes	5	Ehsan Hassan (Lecturer)
Nucleic acids	10	Dr. Amjad Hazim (Lecturer)
Amino acids and protein	10	Dr..Hazim Allawi (Ass.prof.)
Carbohydrates	10	Ehsan Hassan(Lecturer
Hormones	10	Dr..Hazim Allawi (Ass.prof.)
Lipid metabolism	5	Dr. Sura Khairuddin (Lecturer)
Bioenergetics and Biological Oxidation	5	Saba Khairy (Lecturer)

Nutrition	5	(Lecturer) Saba Khairy
porphyrins	3	Ehsan Hassan (Lecturer)
Trace elements	2	Dr. Sura Khairuddin (Lecturer)
Tumor markers	2	Dr. Amjad Hazim (Lecturer)
Liver function test	1	Dr. Amjad Hazim (Lecturer)
Renal function test	1	Dr..Hazim Allawi (Ass.prof.)
Selected topics	1	Dr. Amjad Hazim (Lecturer)

Lecturer	Title of lab.	hours	week
Saba Khairy (Lecturer)	Laboratory principles and safety in medical laboratory	2 hours	1
Dr. Sura Khairuddin Lecturer Saba Khairy (Lecturer)	Types of specimens	2 hours	2
Saba Khairy (Lecturer) Nashwan Sadiq (ass.lecturer)	Normal urine examination	2 hours	3
Saba Khairy (Lecturer) Nashwan Sadiq (ass.lecturer)	General urine examinations	2 hours	4
Ehsan Hassan (lecturer)	Colorimetry & spectrophotometry	2 hours	5
Ehsan Hassan (lecturer)	Calibration curve	2 hours	6
Nashwan Sadiq (ass.lecturer)	Haemoglobin measurement	2 hours	7
Saba Khairy (Lecturer) Dr. Sura Khairuddin Lecturer	Total serum protein	2 hours	8
Saba Khairy (Lecturer) Dr. Sura Khairuddin Lecturer	Serum albumin	2 hours	9
Saba Khairy Lecturer Dr.SuraKhairuddin Lecturer	Urinary protein quantitative tests	2 hours	10
	Students' seminars	2 hours	11
All lecturers	A review and an Open Discussion with Students	2 hours	12

	with Data Interpretation		
Saba Khairy (Lecturer)	Cerebrospinal fluid	2 hours	13
Saba Khairy (Lecturer) Nashwan Sadiq	Total cholesterol	2 hours	14
EhsanHassan(lecturer) Nashwan Sadiq)	Serum bilirubin	2 hours	15
Hazim Allawi	Blood or Plasma Glucose	2 hours	16
Hazim Allawi	Serum protein electrophoresis	2 hours	17
AmjadHazim(lecturer	Uric acid	2 hours	18
Saba Khairy (Lecturer) Nashwan Sadiq)	Alkaline phosphatase	2 hours	19
Dr. Sura Khairuddin Lecturer Nashwan Sadiq)	Total calcium	2 hours	20
Dr. Sura Khairuddin)Lecturer Nashwan Sadiq)	Inorganic phosphate	2 hours	21
Dr. Sura Khairuddin Lecturer Nashwan Sadiq)	Blood urea	2 hours	22
Nashwan Sadiq)	Creatinine and creatinine clearance	2 hours	23
Nashwan Sadiq)	Alanine transaminase (alt)	2 hours	24
Nashwan Sadiq)	Aspartate transaminase (ast)	2 hours	25
All lecturers	Students' seminars	2 hours	26
AmjadHazim(lecturer(Polymerase chain reaction	2 hours	27
AmjadHazim(lecturer(Polymerase chain reaction	2 hours	28

Dr. Sura Khairuddin)Lecturer	S I unit ,mass unit and conversion factors	2 hours	29
Teaching staff	A review and an Open Discussion with Students with Data Interpretation	2 hours	30

12-Teaching and learning methods	
1. Theoretical lectures	3 lectures \week
2. Practical labs or clinical sessions	The students will have setions interpreting data of laboratory results
3. Seminars and presentations	Students are presenting about different topics in biochemistry through seminars conducted by each student and encouraged to make scientific posters. They are subjected to thorough discussion by teaching staff and colleagues.

13-Assessment methods	
1. Formative assessments	<p>1. Fast quizzes at the end of lecture</p> <p>2. Asking students to answer two or three questions (may be an MCQ), explain a mechanism or a finding and react with slides and discussion within the lecture minutes.</p> <p>3. Electronic assignments to the class (using google forms)</p>

	<p>4. Case interpretations in the lab (students will discuss some lab results to settle differential diagnosis)</p> <p>5. Seminar discussion (the teacher and/or student select a topic and present it with thorough discussion).</p>
2. Summative assessments	<p>1. Mid term (1st.) exam in practical biochemistry using manual work (experiments) or oral examination. Students are rewarded 30% of total marks for each term.</p> <p>2. End of first term (usually oral examination, spot examination and students are subjected to written assessment). Students are rewarded 70% of total marks.</p> <p>3. Mid-term (2nd.) written examinations in theoretical knowledge (student has to answer MCQ questions and short essay questions). Students are rewarded 30%</p> <p>4- End of 2nd. term (usually oral examination, spot examination and students are subjected to written assessment). Students are rewarded 70% of total marks.</p>
3. Pass mark	60%

14-Resources and requirements

Essential text books	1. Lippincott's illustrated reviews of Biochemistry 2. Review of physiological chemistry by H A Harper 3- Clinical Biochemistry and Metabolic Medicine by Martin A Crook
Recommended text books	Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, by Nader Rifai, 6th Edition.
Other resources	Theoretical and practical lectures in all the mentioned specializations

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