



## Course Specifications

<b>Course Title:</b>	Molecular Medicine II
<b>Course Code:</b>	MOL125
<b>Program:</b>	Bachelor of Medicine, Bachelor of Surgery (MBBS)
<b>Department:</b>	NA
<b>College:</b>	College of Medicine
<b>Institution:</b>	Alfaisal University

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## A. Course Identification

<b>1. Credit hours:</b> 2 (2+2+0)
<b>2. Course type</b>
a. University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> Sem 2, Year 1
<b>4. Pre-requisites for this course (if any):</b> None
<b>5. Co-requisites for this course (if any):</b> None

### 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	28	67%
2	TBL, Labs, QRS	14	33%

### 7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	28
2	Laboratory/Studio	
3	Tutorial	14
4	Others (TBL)	
	<b>Total</b>	42

## B. Course Objectives and Learning Outcomes

### 1. Course Description

MOL 125 constitutes the second of a two-part course offered to first-year medical students. Molecular Medicine is designed to teach the principles of biochemical pathways, with an emphasis on normal regulation and changes during the pathogenesis of disease. MOL 125 is divided into 7 modules as follows:

Module 1: Molecular Techniques	Lectures 1-2
Module 2: Enzymology	Lectures 3-5
Module 3: Lipid Metabolism	Lectures 6-10
Module 4: Protein Metabolism	Lectures 11-16
Module 5: Nucleotide Metabolism	Lectures 17-18
Module 6: Integrative Metabolic Pathways	Lectures 19-21
Module 7: Cell & Molecular Biology	Lectures 22-28

### 2. Course Main Objective

To link basic principles in biochemistry and metabolism to physiology, pathology, pharmacology, clinical diagnosis and nutrition. Clinical correlations for each of the metabolic pathways are discussed.

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
1	<b>Knowledge and Understanding</b>	
1.1	Explain the structure and function of lipids in normal metabolism, and relate abnormal lipid metabolism to health and disease	PLO2
1.2	Explain normal amino acid metabolism and describe anomalies resulting from inborn errors of metabolism	PLO2
1.3	Describe the normal biochemical pathways of nucleotide metabolism, and relate their regulation to pathogenesis of diseases	PLO2
1.4	Compare and contrast the function of insulin, glucagon and epinephrine, and describe their regulation of metabolism	PLO2
1.5	Explain the process of DNA replication and repair with an emphasis on clinical correlations	PLO2
1.6	Discuss the role of signal transduction in controlling cellular function, and outline abnormalities that lead to disease	PLO2
1.7	Discuss the pathogenesis of diabetes and relate to aberrations of biochemical metabolism	PLO2
1.8	Discuss mechanism of enzyme action and explain Michaelis-Menton kinetics. Identify the role of common enzymes in clinical diagnosis	PLO2
2	<b>Skills :</b>	
2.1	Describe techniques used in molecular biology, and apply these to the molecular diagnosis of diseases	PLO2
3	<b>Values:</b>	
3.1	Adhere to the attendance policy.	
3.2	Maintain professional conduct with colleagues, faculty and staff.	

### C. Course Content

No	List of Topics	Contact Hours
1	Molecular techniques	2
2	Enzymology	3
3	Fatty acid & Triacylglycerol Synthesis	1
4	Fatty acid oxidation & ketone bodies	1
5	Complex lipids	1
6	Cholesterol and steroid metabolism	1
7	Plasma lipoproteins	1
8	Amino Acids: Disposal of nitrogen	1
9	Urea cycle	1
10	Amino acids degradation	1
11	Amino acid synthesis	1
12	Metabolic defects in amino acid metabolism	1
13	Conversion of amino acids to specialized products	1
14	Nucleotide metabolism	2
15	Metabolic effects of insulin and glucagon	1
16	Feed/fast cycle	1
17	Biochemical basis of diabetes	2
18	DNA replication, and repair	2
19	Cell Cycle	1

20	Cell Signaling	3
21	Cell death	1
22	TBLs, Labs, QRS	14
<b>Total</b>		<b>42</b>

## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and Understanding</b>		
1.1	Explain normal amino acid metabolism and describe anomalies resulting from in-inborn errors of metabolism	Lectures, Labs, TBLs	Formative and summative assessments
1.2	Describe the normal biochemical pathways of nucleotide metabolism, and relate their regulation to pathogenesis of diseases	Lectures, Labs, TBLs	Formative and summative assessments
1.3	Compare and contrast the function of insulin, glucagon and epinephrine, and describe their regulation of metabolism	Lectures, Labs, TBLs	Formative and summative assessments
1.4	Explain the process of DNA replication and repair with an emphasis on clinical correlations	Lectures, Labs, TBLs	Formative and summative assessments
1.5	Discuss the role of signal transduction in controlling cellular function, and outline abnormalities that lead to disease	Lectures, Labs, TBLs	Formative and summative assessments
1.6	Discuss the pathogenesis of diabetes and relate to aberrations of biochemical metabolism	Lectures, Labs, TBLs	Formative and summative assessments
1.7	Discuss mechanism of enzyme action and explain Michaelis-Menton kinetics. Identify the role of common enzymes in clinical diagnosis.	Lectures, Labs, TBLs	Formative and summative assessments
1.8	Explain normal amino acid metabolism and describe anomalies resulting from in-inborn errors of metabolism	Lectures, Labs, TBLs	Formative and summative assessments
<b>2.0</b>	<b>Skills</b>		
2.1	Describe techniques used in molecular biology, and apply these to the molecular diagnosis of diseases	Lectures, Labs	Summative assessment
<b>3.0</b>	<b>Values</b>		
3.1	Adhere to the attendance policy.		Continuous assessment
3.2	Maintain professional conduct with colleagues, faculty and staff.		Continuous assessment

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	TBL	9,12,14	5
2	Midterm	10	20
3	Final Exam	18	75

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

### Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

The CoM program established its own mentorship program that employs all full-time faculty as mentors. Through this program, every medical student in the program is assigned a mentor at the beginning of their first semester of studies. The program has a broad scope covering academic advising and counseling. The mentors handle all aspects related to academic advising, including academic planning, academic performance review, and advice on course drop or withdrawal, study skills, and time management.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	Lippincott's Illustrated Reviews: Biochemistry, 7th Edition, 2017 ISBN-13: 978-1496344496 ISBN-10: 1496344499
<b>Essential References Materials</b>	<ul style="list-style-type: none"> <li>Harper's Illustrated Biochemistry: 28th edition by Murray RK, Granner DK, Mayes PA, Rodwell VW, McGraw-Hill companies New York, 2009.</li> <li>Principles of Biochemistry, Donald J. Voet, Judith G. Voet, Charlotte W. Pratt; Willey, 3rd edition; 2008</li> </ul>
<b>Electronic Materials</b>	PowerPoint presentations including suggested animations links uploaded on Alfaisal eLearning portal
<b>Other Learning Materials</b>	

### 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms, Examination Facilities
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	AV (Audio-Visual), Smartboard, Moodle (E-learning Management)
<b>Other Resources</b>	Nanodrop for DNA Quantification Centrifuges Thermomixer (Heating block)

Item	Resources
(Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Vortex Micropipettes PCR machine Microplate reader Aspirators Safety cabinet Tissue culture incubator Inverted microscope Cell counter

### G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Course and Faculty Evaluation Survey	Students	Survey

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

### H. Specification Approval Data

Council / Committee	
Reference No.	
Date	