



**Biochemistry and
Molecular Biology
MB ٣٠٣**

Basic Information

Program Title	Bachelor of Medicine and Surgery; MB, BCh
Department Offering the Course	Medical Biochemistry Department
Academic Year / Level	First Year
Date of Specification Approval	/ / 2011
Total Teaching Hours	150 hour Theoretical: 90 Practical: 60
Allocated Marks	150 marks
Allocated Duration	September through May (as per student)
Course Director	Prof Hanaa Altayeb Nasser Head of Department
Teaching Staff	(10) Professors (1) Assistant Professors (6) Lecturers (8) Assistant lecturers (12) Demonstrators



Professional Information

1- Overall Aims of Course

Biochemistry Course Provides Students with:

- Aim 1** Fundamental understanding of chemistry of bio-molecules and metabolic processes with correlation to medical diseases.
- Aim 2** Integrated basic knowledge of molecular biology and biochemistry.
- Aim 3** Advanced information and technology concerning the human genome and bio-molecules as regard their role in diagnostic and therapeutic medicine.

2- Intended Learning Outcomes of Course (ILOs)

A. Recall of Knowledge and Understanding:

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

	Course ILO	Program ILO
a1	Describe the structure, classifications, and properties of carbohydrates, lipids, amino acids and protein.	A1
a2	Relate molecular structures and chemical properties of macromolecules to their functions including; enzymes, hemoglobin, myoglobin, collagen, elastin, plasma protein, and immunoglobulins.	A1 A6
a3	Describe biochemical membrane architecture.	A1
a4	Describe structure and function of extracellular matrix.	A1
a5	Describe steps of synthesis and degradation of heme.	A1
a6	Explain biochemical basis of jaundice and porphyrias.	A6
a7	Describe the molecular mechanism of blood coagulation, anticoagulation and fibrinolysis. and role of vitamin K in them.	A1
a8	Describe nucleotides, DNA and RNA structure.	A2



a9	Describe the molecular process of replication, transcription, reverse transcription, posttranscriptional modifications, translation and posttranslational modifications.	A2
a10	Define genetic code and its features.	A2
a11	Identify mutation and classify its types.	A2
a12	Describe DNA repair mechanisms	A2
a13	Describe the pathway of nucleic acid metabolism.	A2
a14	Explain the molecular mechanisms of cancer.	A2
a15	Describe the in-vitro (PCR) and in-vivo (cloning) amplification of DNA	A2
a16	Explain end replication problem and molecular mechanism of aging.	A5

B. Intellectual Skills

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

Course ILO		Program ILO
b1	Correlate biochemical molecular facts to clinical data.	B1
b2	Explain causes, detection and consequences of genetic defect(s).	B2
b3	Correlate biochemical alterations with clinical data to reach etiology, diagnosis and treatment.	B2
b4	Utilize problem solving skills in a variety of situations.	B4

C. Professional and Practical Skills

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

Course ILO		Program ILO
c1	Apply different methods for expression of concentration and calculation of the dilution of solution.	C1
c2	Extract DNA, measure its concentration and interpret the results.	C1
c3	Interpret electrophoresis results for serum proteins and hemoglobin.	C1
c4	Determine the concentration of substances in biological fluids by spectrophotometer.	C1
c5	Interpret results of DNA electrophoresis and DNA fingerprinting.	C1



c6	Practice basics of safety in the laboratory.	C6
c7	Identify lab instruments, apparatuses and glass wares and their uses in practice.	C1
c8	Identify different separation processes, different tonic and pH solutions.	C1
c9	Identify bio-molecules and enzymes.	C1

D. General and Transferable Skills

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

Course ILO		Program ILO
d1	Respect superiors and colleagues.	D3
d2	Gather, organize and appraise information including the use of information technology where applicable.	D4
d3	Present the medical information in written, oral and electronic forms.	D6
d4	Communicate ideas and arguments effectively.	D7
d5	Be prepared for the lifelong learning needs of the medical profession.	D8
d6	Work constructively and cooperatively within a team.	D9
d7	Manage time effectively.	D11

3- Course Contents

Topics	Teaching and Learning Methods				
	Total %	L		P/T (small group discussion) or C	O
Physical chemistry	2 (1.3%)			2	
Chemistry of Amino Acids and Protein Structure	15.5 (10.3%)	10		5.5	



Enzymes	13.5 (9%)	8		5.5	
Chemistry of Carbohydrate	4 (2.7%)	3		1	
Chemistry of Lipids	4 (2.7%)	3		1	
Biological Membranes	4 (2.7%)	3		1	
Extracellular Matrix	4 (4%)	4		2	
Heme and Iron Metabolism	6 4%	4		2	
Hemoglobin And Myoglobin	8.5 (5.7%)	4		4.5	
Plasma Proteins and Immunoglobulins (Igs)	6.5 (4.3%)	3		3.5	
The Molecular Mechanism of Blood Coagulation, Anticoagulation and Fibrinolysis, Role of Vitamin K	5 (3.3%)	3		2	
Nucleotides and Nucleic Acid Chemistry	3 (2%)	2		1	
DNA Structure And Replication	16 (10.6%)	8		8	
DNA Repair	4 (2.7%)	2		2	
RNA Structure and Synthesis	10 (6.7%)	8		2	
Genetic Code and Protein Synthesis	10 (6.7%)	8		2	
Metabolism of Nucleic Acids	10 (6.7%)	8		2	
The Molecular Biology of Cancer	7 (4.7%)	5		2	
DNA Amplification Techniques	13 (8.6%)	4		9	
Bioinformatics	2 (1.3%)				2
Total	150 100%	90		58	2

L: lecture, T: Tutorial, P: Practical, C: Clinical, O: Other: e-lab



4- Teaching and Learning Methods

Teaching/ Learning Methods	Recall of Knowledge/ Understanding	Intellectual skills	Professional/ Practical	GTS
4.1-Lectures	a1-a16	b1-b4		
4.2- Tutorials/ small group discussion	a1-a16	b1-b4		d1 - d7
4.3- Practical Classes			c1-c9	d1-d7
*4.4- E-learning Classes	a1-a16	b1,b2,b3		d1,d2,d6
**4.5- Directed Self Learning				d1 - d7

GTS: general transferable skills

* Bioinformatics laboratory, online lectures and discussion through forum.

**Projects and homework assignments

Facilities Required for Teaching and Learning

- Halls for tutorials
- Computer laboratory for e-learning classes and e-exams
- Audiovisuals

5- Teaching and learning methods for students with learning difficulties

The following process is carried out by the medical biochemistry student support team in the department as follow:

- 1- Identification of students with learning difficulties by formative quizzes and continuous assessments quizzes
- 2- Organization of meetings with these students to discuss their problems
- 3- Organize extra lectures outside the schedule to support them



- 4- Organize extra quizzes to evaluate their needs.
- 5- Close follow up of these students

6- Student Assessment Methods

6.1 Methods:

Type	Time	Assessment Method	ILOs Measured	
Formative Assessment		Weekly Assessments in Tutorials and lectures	a1-a16 b1-b4	
		Online Quizzes (MCQs)		
		Home Assignments	a1-a16 b1-b4	
Summative Assessment	Continuous Assessment	Quiz1 Written [MCQ]	a1-a16 b1-b4	
	Midyear	Quiz2 Written [MCQ]	a1-a16 b1-b4	
	Final		WRITTEN EXAM	a1-a16 b1-b4
			PRACTICAL EXAM	c1-c9 d
			ORAL EXAM	a1-a16 b1-b4

6.2 Time Schedule

Week	Method
Weeks 2-12 Weeks 17-27 Available to students all through the year	Formative Assessment: <ul style="list-style-type: none"> • Assessments in Tutorials and lectures • Online Quizzes (MCQs)
All through the year	Home Assignments
All through the year	Small group discussion and presentation



Week 10 Week 22	Continuous Assessment
END of YEAR	Practical exam
	Written Exam: <ul style="list-style-type: none"> • Multiple Choice Questions • Short • Long Essay • Complete • True And False with Explanation • Cross Matching • Case Studies
	Oral exam

6.3 Weighing of Assessments

		Method	Weight %
Continuous Assessment	20%	Quizzes	0 % (Mark)
		Written [MCQ] Mid-term 1	10% (15 Mark)
		Mid-Year Exam Written Exam [MCQ] Mid-term 2	10% (15 Mark)
Final	80%	Written Exam	50 % (75 Mark)
		Oral Exam	6.6% (10 Mark)
		Practical Exam	20% (30 Mark)
		Discussion of assignment	3.4 % (5 Mark)
Total	100%		150 Mark



7- List of References

7.1	Course Notes
	Medical biochemistry and molecular biology (2nd edition) Staff members of medical biochemistry and molecular biology department
7.2	Essential Books (Text Books) (Available at department and faculty library)
	Harper's Biochemistry (28th edition) Robert K. Murray , Daryl K. Granner , Peter A. Mayes , Victor W. Rodwell
	Textbook of Biochemistry with Clinical Correlations (8th edition) Thomas M. Devlin
	Lehninger Principles of Biochemistry (6th edition) David L. Nelson, Michael M. Cox
	Biochemistry (3rd Edition) Christopher K. Mathews , Kensal E. van Holde, Kevin G. Ahern
7.3	Recommended Books
	Lippincott's Illustrated Reviews: Biochemistry (5th edition) Richard A. Harvey, Denise R. Ferrier
7.4	Periodicals, Web Sites, etc
	www.dentistry.leeds.ac.uk/biochem/thcme
	http:// mic2.shams.eg (Faculty web site)
7.5	Others

Course Coordinator	Date: