

**Course Specification 2015/2016**  
For the Medical Biochemistry (Second year)

**Faculty :** Medicine  
**Department :** Medical Biochemistry

**Course Specification:**

Programme (s) on which the course is given : M.B.B.Ch program  
Department offering the course : Medical Biochemistry  
Academic year / level : 2<sup>nd</sup> year  
Date of specification approval : 3/5/2015 (Department assembly approval)

**1- Basic information:**

Title: **Medical Biochemistry and Molecular Biology for 2<sup>nd</sup> year undergraduate medical students** Code: BIC2

Lecture:	3	Tutorial	--	Practical	2.5 hours/week	Total:	5.5	(hour/week)
	hours/week			60 hours	(for 24 weeks)		135	
	(for 25						hours	
	weeks							
	75 lectures)							

**2- Professional Information:****1 - Overall Aims of Course**

To enable students to

- **Acquire essential knowledge related to:**

- Biochemical importance and metabolic pathways of macro- and micronutrients
- The structure and functions of enzymes
- Hereditary and acquired metabolic disturbances and their biochemical laboratory and clinical outcomes
- Bioenergetics of the concerned metabolic pathways under different physiological circumstances and their integrator regulations with other working metabolic pathways
- Major body fluids composition and their clinical impact.

- Acquire the skill of interpretation of medical laboratory reports.

**2 – Intended Learning Outcomes of Course (ILOs):****A - Knowledge and Understanding:**

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

- A 1. Define the metabolic pathways of carbohydrates, lipids, proteins, nucleotides and their micro-molecules and their interrelation.
- A 2. Illustrate the steps and regulatory mechanisms of these pathways.
- A 3. Explain the related metabolic disorders and their clinical prints on biochemical and molecular basis.
- A 4. Describe micronutrients, their biochemical, clinical and laboratory importance and deficiency manifestations of each.
- A 5. Explain different mechanisms of hormonal action.
- A 6. Describe biochemical thermodynamics and biological oxidation process and its application
- A 7. Describe how foreign materials be handled at the cellular level.
- A 8. Discuss different globular protein especially heme and its metabolism.

**B- Intellectual Skills:**

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

- B 1. Correlate the biochemical basis and the laboratory findings of some metabolic disorders.
- B 2. Interpret urine report outcome.

- B 3. Interpret the liver and kidney function tests.  
 B 4. Interpret the results of diagnostic measures of diabetes mellitus.  
 B 5. Conclude the etiology of metabolic disturbance in a given case study report (as Diabetes mellitus, Favism and Gout).

### P-Professional and Practical Skills:

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

- C1. Elicit the physical and chemical characters of normal urine under different physiological conditions.  
 C2. Detect of abnormal urinary constituents by urinary strips.  
 C3. Estimate serum levels of glucose, total proteins, albumin, creatinine, SGPT, SGOT, Billirubin, LDH and uric acid by colorimetric methods.  
 C4. Separate plasma protein by electrophoresis in normal and abnormal cases.

### T- General and Transferable Skills:

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

- D1. Work effectively in team.  
 D2. Communicate ideas and argument effectively.  
 D3. Acquire presentation skills.  
 D4. Manage time effectively and use informational technologies during learning.

### 3- Contents:

Topic	No. of hours	Lectures	Practical/ small groups
Biological oxidation	9	5	4
Carbohydrate Metabolism	20	12	8
Lipid Metabolism	20	12	8
General protein Metabolism	15	5	10
Amino acid Metabolism	13	9	4
Heme Metabolism	10	4	6
Purine & pyrimidine Metabolism	7	5	2
Metabolic Interrelation	6	4	2
Minerals	8	6	2
Body Fluids	19	5	14
Mechanism of hormonal action	5	5	0
Xenobiotic metabolism	3	3	0
<b>Total</b>	<b>135</b>	<b>75</b>	<b>60</b>

### 3a- Topics:

- 1- **Biological oxidation, and Bioenergetics:** oxido-reductases, cytochrome P450, electron-transport chain, oxidative phosphorylation (theories & inhibitors), ATP, energy bonds & sources of body fuels.  
 2- **Metabolism of xenobiotics**  
 3- **Tricarboxylic acid cycle:** steps, regulation, and importance.  
 4- **Metabolism of carbohydrates:** digestion and absorption, pathways of glucose oxidation, glycogen metabolism, gluconeogenesis, special metabolism of fructose, galactose and aminosugars, genetic disorders of carbohydrates metabolism and biochemical aspects of diabetes mellitus.  
 5- **Metabolism of lipid:** digestion and absorption, metabolism of triacylglycerol, fatty acid metabolism, metabolism of: eicosanoids, conjugated lipids, cholesterol, ketone bodies, plasma lipoproteins, adipose tissue metabolism and fatty liver.  
 6- **Metabolism of proteins:** digestion and absorption, general aspect of protein metabolism, metabolism of ammonia, metabolism of individual amino acids with related errors of metabolism.  
 7- **Metabolism of Heme:** Synthesis of porphyrins and heme, catabolism, hyperbilirubinemia and porphyrias.

8- **Metabolism of purines and pyrimidines:** degradation of nucleic acids, biosynthesis and catabolism of purines and pyrimidines with the related errors of metabolism (including gout) and synthetic base analogues and their clinical use.

9- **Metabolic integration:** Metabolic changes, adaptation and regulation during starve-feed cycle.

10- **Minerals:** Major elements (Ca-P-Mg-Na-K-Cl-S) and trace elements (Fe-Cu-Zn-Mn-Co-Cr-I)

11- **Mechanism of hormonal action**

**3b- Practical classes:**

1. *Urine report.*

2. *Colorimetric measurement of* : glucose, total proteins, albumin, creatinine, SGPT, SGOT, Billirubin, LDH and uric acid and interpretation of their results.

3. *Variations in glucose tolerance curve* under different clinical conditions.

4. *Case report studies* applying the out-comes of previous parameters.

5. *Haemoglobin derivatives.*

6. *Separation of plasma proteins by electrophoresis in normal and abnormal cases .*

**3c- Self learning (S. L.) activity:** Students will be responsible for preparation and presentation of one of preset topic on recent issues related to applied biochemistry and finally evaluated by staff members of the department.

### Content ILO's Matrix

Subject	Knowledge & understanding								Intellectual skills					Professional & practical skills				General & transferable skills			
	a1	a2	a3	a4	a5	a6	a7	a8	b1	b2	b3	b4	b5	c1	c2	c3	c4	D1	D2	D3	D4
Biological oxidation						•												•	•	•	•
Carbohydrate metabolism	•	•	•						•	•	•	•	•		•	•	•	•	•	•	•
Lipid metabolism	•	•	•						•	•			•		•	•		•	•	•	•
General protein metabolism	•	•	•						•	•	•		•		•	•		•	•	•	•
Amino acid metabolism	•	•	•						•	•	•		•		•	•		•	•	•	•
Heme metabolism									•	•			•					•	•	•	•
Purine and pyrimidine metabolism	•	•	•						•	•			•					•	•	•	•
Metabolic interrelation	•																	•	•	•	•
Minerals				•														•	•	•	•
Mechanism of hormonal action					•													•	•	•	•
Xenobiotic metabolism																		•	•	•	•
Body fluids									•	•				•	•			•	•	•	•

#### 4- Teaching and Learning Methods

- 4.1- *Lectures: small group teaching through interactive lectures with audio-visual aids supplemented by data show.*
- 4.2- *Practical classes:* small group teaching with clinical demonstration, practice of laboratory skills and discussion in addition for virtual lab presentation.
- 4.3- *Self learning,* (student presentations): 2<sup>nd</sup> year medical students will be divided into 12 sections. Every section will be divided into 10 subgroups. Each one will be responsible for preparation and

presentation of one of preset topic on recent issues related to applied Biochemistry and finally evaluated by staff members of the department.

### 5- Student Assessment Methods:

#### Assessment ILOs Matrix

Assessment method	Knowledge & understanding								Intellectual skills					Professional & practical skills				General & transferable skills			
	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4
Written exam	•	•	•	•	•	•	•	•													
Structured Oral exam	•	•	•	•	•	•	•	•											•		
Practical urine report test														•	•	•	•		•		
Practical colorimetric test														•	•	•	•				
Practical sheet test									•	•	•	•	•								
Log book and Student Presentation									•	•	•	•	•					•	•	•	•

#### Assessment Schedule:

	Method of assessment	Description
Assessment 1	Midyear exam	Held at January, students should submit their Log books to sit for the examination
Assessment 2	Final term exam	At the end of the academic year for all students.
Assessment 3	Structured Practical exam	At the end of the academic year for all students.
Assessment 4	Structured Oral exam	Held by the end of the academic year.
Assessment 5	Log book and student presentation	Submitted by the end of the academic year

	Examination	Description	Marks
Assessment 1	Midyear exam	<ul style="list-style-type: none"> <li>Selection type items: (MCQ &amp; cross matching and interpretive exercise).</li> <li>Supply type item: short answers</li> </ul>	25 (16.63%)
Assessment 2	Final term exam	<ul style="list-style-type: none"> <li>A 3-hour written paper composed supply type item ( short answer &amp; restricted response essay)</li> <li>MCQ</li> </ul>	50  25
Assessment 3	Structured Practical exam	<ul style="list-style-type: none"> <li>Identify and write a complete report of provided urine sample</li> <li>Colorimetric estimation of some plasma parameters</li> <li>Sheet examination</li> </ul>	10 (6.66%) 10 (6.66%) 10 (6.66%)

Assessment 4	Structured Oral exam	Oral cards in two oral examination stations for each student	15 (10%)
Assessment 5	Log book and student presentation	Presentation of students for self learning & log book	5(3.33%)
	<b>Total</b>		150 (100%)

### 6- List of References

- Course Notes
  - Department book (last edition): available for students to purchase from bookshops at the faculty.
  - Computer presentation used during teaching.
  - Notes on the laboratory activity notebook for practical work (last edition).
- Text Books
  - Textbook of biochemistry for medical students
  - Lippincott's Illustrated Biochemistry (last edition).
- Recommended Books
  - Harper's illustrated Biochemistry (last edition).

### 7- Facilities Required for Teaching and Learning:

- 1- **Lecture halls:** provided by the faculty. Each hall is equipped with white board, computer, laser pointers, and wireless phones. It is air conditioned
- 2- **Small group classes:** in the biochemistry department. it is equipped with Smart board, white board, overhead projector, computer, data show, laser pointers. It is air conditioned.
- 3- **Laboratory:** laboratory facilities to perform the required experiments are available in the department.
- 4- **Supply of chemicals for practical work**

**Course Coordinators:**

**Noha Salah**

**Head of Department**

**Prof. Dr. Fagr Bazeed**

**This document is edited and updated by:**

Coordinator of quality assurance unit in the department

