



## **Course Specification for M.D. Degree in Medical Biochemistry and Molecular Biology**

(Digestion,absorption and principles of nutrition)

**Program on which the course is given : M.D. Degree in Medical  
Biochemistry and Molecular Biology .**

**Department offering the program: The Medical Biochemistry Department.**

**Major or minor element of program : .....**

**Department offering the course: Medical Biochemistry department.**

**Academic year :2016-2017**

**Credit points:2**

**Course coordinators: Prof. Dr. Head of Medical Biochemistry**

### **I. Aim of the course:**

The aim of the course is to allow the candidate to describe the digestion and absorption of various food stuffs,to diagnose different types of malnutrition,to diagnose diseases caused by different vitamins and minerals deficiency and to measure energy requirements.

### **II. Intended learning outcomes:**

**1. Knowledge and understanding: By the end of the course the candidate should;**

A1.Describe the digestion and absorption of carbohydrates , lipids, proteins vitamins and minerals.

A2. Describe the consequences of undernutrition: marasmus, cachexia and kwashiorkor.

A3.Define a vitamin and Describe the metabolism, principal functions, deficiency diseases associated with inadequate intake, and the toxicity of excessive intake of the vitamins.

A4.Describe how reference intake for vitamins and minerals are determined.

**2. Intellectual skills: By the end of the course the candidate should be able to;**

B1.Measure energy requirements.

B2.illustrate how measuring the respiratory quotient permits estimation of the mix of metabolic fuels being oxidized.

B3.illustrate why mineral salts are required in the diet.

**3. Professional and practical skills: By the end of the course the candidates should be able to;**

C1.Diagnose different types of malnutrition.

C2.Diagnose diseases caused by different vitamins deficiency.

C3.Diagnose diseases caused by different minerals deficiency.

**4. General and transferable skills: By the end of the course the candidates should be able to;**

D1.Demonstrate how protein requirements are determined.

D2.Demonstrate why some proteins are required to maintain nitrogen balance than other proteins

### **III. Course contents:**

Topics (specify which ILO each topic fulfill if applicable)

1. Digestion and absorption of various food stuffs.
  - a.carbohydrates.
  - b. Lipids.
  - c. proteins.
2. Digestion and absorption Vitamins.
  - a. Definition and classification
  - b. Structure of Fat soluble vitamins(A,D,E and K)and their active forms.
  - c. Structure of Water soluble vitamins(C and B complex) and their active forms.
3. Digestion and absorption Minerals.
4. Forms of undernutrition.
5. Energy balance.

## IV. Teaching methods:

1-lectures:

2-Tutorials

- Slides /data show
- Discussion

3-Presentations

### Lecture Timetable:

Topic	Hours/topic	NO of lectures	Total hours
1.Digestion and absorption of carbohydrates	4	4	30
2.Digestion and absorption of lipids	4	4	
3.Digestion and absorption of proteins	5	5	
4.Digestion and absorption vitamins	4	4	
5.Digestion and absorption Minerals	5	5	
6.Forms of undernutrition	6	6	

7. Energy balance	<b>2</b>	<b>2</b>	
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## V. Teaching and learning facilities:

Lecture halls.

Rooms for small groups

Audio-visual aids (data-show, slide projection).

### List of references

- Course notes
- Essential books (text books)
  1. Marks' Basic Medical Biochemistry "A Clinical Approach" (fourth edition); Lieberman and Marks
  2. Harpers Illustrated Biochemistry (29th edition); RK Murray et al.
- Recommended books
  1. Lippincott's Illustrated Reviews: Biochemistry (sixth Edition).
  2. Lehninger Principles of Biochemistry (fifth edition); Nelson and Cox.
- Periodicals, Web sites, ... etc
  1. <https://www.ncbi.nlm.nih.gov/pubmed>
  2. <http://biochemweb.net/>

## VI. Assessment:

### Attendance criteria:

The prerequisite for entry the final examination is 75% attendance of the lectures as shown in the attendance book.

### Assessment tools:

Final examination: Written oral .... etc

### Assessment schedule:

### Examination description:



## **Course Specification for MD Degree in Medical Biochemistry**

### **Biochemistry of Muscle**

**Program on which the course is given :** MD Degree in Medical Biochemistry.

**Department offering the program:** The Medical Biochemistry Department

**Course code:** BIO 903 BM

**Major or minor element of program :**

**Department offering the course:** The Medical Biochemistry Department

**Academic year 2016–2017**

**Credit points:.** 2

**Course coordinators:**

#### **I. Aim of the course:**

By the end of the course the post graduate students should be able to have the professional knowledge of the biochemical role of the proteins and  $Ca^{+2}$  in muscular contraction, diseases related to it and able to diagnose.

#### **II. Intended learning outcomes:**

**A. Knowledge and understanding: By the end of the course the candidate should;**

- a1. Describe the general biochemical features of skeletal, cardiac, and smooth muscle contraction.
- a2. Describe the general structure of the cytoskeleton.
- a3. Illustrate the importance and application of clinical Biochemistry in diagnosis metabolic disorders in muscle disease.
- a4. Illustrate the different functions of the major components of the cytoskeleton.
- a5. Know the biologic effects of nitric oxide (NO).
- a6. Mention the different metabolic fuels required for a sprint and for the marathon.

**B. Intellectual skills: By the end of the course the candidate should be able to;**

- b1. Interpret basic biochemical and physiological facts with clinical data.
- b2. Plan a general scheme to reach the correct diagnosis of metabolic disturbances.
- b3. Select from the different diagnostic tools the one can help reaching a final solving of the problem in field of Medical Biochemistry.
- b4. Identify biochemical problems and find solutions.
- b5. Have the ability to innovate nontraditional Solutions to biochemical problems.
- b6. Categorise the major components of the cytoskeleton, namely microfilaments, microtubules, and intermediate filaments and compare between them.
- b7. Compare between skeletal, cardiac, and smooth muscles.

**C. Professional and practical skills: By the end of the course the candidates should be able to;**

- c1. Mastery of the basic and modern professional skills in the area of Medical Biochemistry.
- c2 .Writing and evaluation of medical reports. Conduct researches.
- c3. Evaluation and development of methods and tools existing in the area of Medical Biochemistry.
- c4. Detect association and causation.
- c5. Describe neuronal signals to muscle.
- c6. Demonstrate how certain drugs affect cardiac contraction.

**D. General and transferable skills: By the end of the course the candidates should be able to;**

- d1. Use information technology to serve the development of professional practice.
- d2. Assess himself/herself and identify of personal learning needs.
- d3. To use of different sources for information and knowledge.

d4. Working in a team and team's leadership.

d5. Scientific meetings administration according to the available time.

d6. Recognize the applicability of muscle biochemistry.

### III. Course contents (Syllabus):

#### Topics

1. Types of muscles and its metabolism
  - a. Muscle proteins
  - b. Mechanism of muscle contraction
  - c. Regulation of muscle contraction
2. The major components of the cytoskeleton
  - a. The different functions of the major components of the cytoskeleton
  - b. Diseases related to the muscles

### IV. Teaching methods:

#### *example*

lectures:

Tutorials

- Slides /data show
- Discussion

Presentations

- Including clinical case presentations

Independent assignments

- Writing / presenting a literature review article

#### **Lecture Timetable:**

Topic	No of hours	Lectures
Types of muscles	3	3

(skeletal, smooth, cardiac ) and its metabolism		
Muscle proteins	2	2
Filaments (actin, myosin, tropomyosin and tropinin)	2	2
Changes in the conformation of the head of myosin drive muscle contraction	2	2
Ca <sup>+2</sup> and its role in regulation of muscle contraction	2	2
Mutations in the gene encoding the Ca <sup>+2</sup> release channel	2	2
Diseases related to the muscles.	2	2
The biologic effects of nitric oxide (NO)	2	2
Several mechanisms replenish stores of ATP in muscle	3	3
Skeletal muscle contains slow and fast twitch fibres	2	2
Non muscle cells contain actin that forms microfilaments	2	2
Microtubules	2	2
Intermediate filaments	2	2



differ from microfilaments and microtubules		
Biomedical importance and disease implication	2	2
<b>Total</b>	30	30
<b>Credit</b>	2	2

## V. Teaching and learning facilities:

Lecture halls.

Rooms for small groups

Audio-visual aids (data-show, slide projection).

### List of references

- Course notes
- Essential books (text books)
  - .....Harper's Illustrated Biochemistry
  - .....
- Recommended books
  - ...Department book.....
- Periodicals, Web sites, ... etc
  - <http://www.ncbi.nlm.gov/>
  - <http://www.vlib.org/>
  - [www.genome.ad.jp/kegg/regulation.](http://www.genome.ad.jp/kegg/regulation)
  - Findarticle.com
  - Freemedicaljournals.com

## VI. Assessment:

**Attendance criteria:**

The prerequisite for entry the final examination is 75% attendance of the lectures as shown in the attendance book.

**Assessment tools:**

Final examination: Written oral .... etc

**Assessment schedule:**

**Examination description:**

**Written exam.** Duration: minutes. Type of questions.

**Oral:** number of examiners ..... etc

**Weighing of assessment:**

Final-term written examination 50 %

Oral examination 30 %

Other types of assessment ( article review and presentations) 20%

Total 100%

**Grading system:**

**Course directors**



## **Course Specification for MD Degree in Medical Biochemistry**

### **Protein : structure and function**

**Program on which the course is given :** MD Degree in Medical Biochemistry.

**Department offering the program:** The Medical Biochemistry Department.

**Major or minor element of program :**

**Department offering the course:** The Medical Biochemistry department.

**Academic year:** 2016-2017

**Credit points:** 1

**Course coordinators:**

### **I. Aim of the course:**

Educate students about different protein structure with relation to its function & also to provide the students with updated data and researches concerned with metabolic and genetic diseases of different protein, as well as laboratory diagnosis of those diseases..

### **II. Intended learning outcomes:**

- 1. Knowledge and understanding: By the end of the course the candidate should;**
  - a) Explain and illustrate the primary, secondary, tertiary and quaternary structure of proteins. Identify protein structure and function, recent data concerned with this issue, and diseases resulting from any defect in protein structure or folding
  - b) Indicate the advantages and drawbacks of several approaches to classifying proteins.
  - c) Identify the major recognized types of second structure and explain supersecondary motifs.
  - d) Describe the kind and relative strengths of the forces that stabilize each order of protein structure.
  - e) Demonstrate different protein metabolic pathways and the related metabolic errors.
  - f) Describe mechanisms of protein biochemical processes.
  - g) Explain mechanisms of enzyme action, enzyme kinetics and regulation

**2. Intellectual skills: By the end of the course the candidate should be able to;**

- a) Interpret results of colorimetric and molecular tests.
- b) Interpret laboratory reports
- c) Formulate a systematic approach for laboratory diagnosis of metabolic and genetic diseases
- d) Use Computer to analyze the electrophoresis bands by image analysis
- e) Make oral presentation and open discussions about scientific issues in a professional way.
- f) Estimate the risks of handling and use of chemical agents on community and environment as a part of their ethical heritage and consequently implement the standard guidelines of chemist and environmental safety

**1. Professional and practical skills: By the end of the course the candidates should be able to;**

- a) Measure different protein substances with various techniques as (spectrophotometry, electrophoresis, colorimetric assays, competitive binding assays (RIA-Elisa)
- b) Use Computer to analyze the electrophoresis bands by image analysis
- c) Analyze Statistic data.
- d) Implement standards of quality control and assurance in lab.

**2. General and transferable skills: By the end of the course the candidates should be able to;**

- a) Demonstrate competence in data presentation. Statistical analysis and interpretation.
- b) Demonstrate key skills in the retrieval, preparation, analysis and interpretation of information from different sources.
- c) Make effective use of information technology e.g. web and internet. Database work
- d) Demonstrate self-direction and some originality in tackling and solving problems
- e) Work effectively both individually and in team and making appropriate use of the capacities of group members
- f) Communicate effectively, using the appropriate method with audiences of different levels of knowledge or experience..

### **III. Course contents:**

Topics (specify which ILO each topic fulfill if applicable)

Properties of amino acids and peptides.

Structure of protein & protein folding

The mechanisms of protein mis-folding and disease states.

Globular protein

Fibrous protein

## IV. Teaching methods:

*example*

lectures:

Tutorials

- Slides /data show
- Discussion
- Clinical meetings departmental / interdepartmental

Presentations

- Including clinical case presentations

Independent assignments

- Writing / presenting a literature review article

### Lecture Timetable:

Topic	No of hours	Lectures
Properties of amino acids and peptides.	3	3
Structure of protein &	3	3

protein folding		
The mechanisms of protein mis-folding and disease states.	3	3
Globular protein	3	3
Fibrous protein	3	3
<b>Total</b>	15	15
<b>Credit</b>	1	1

## V. Teaching and learning facilities:

Lecture halls.

Rooms for small groups

Audio-visual aids (data-show, slide projection).

### List of references

- Course notes
- Essential books (text books)
  - Marks' textbook (fourth edition) .
  - Harper's Illustrated Biochemistry: 29th edition by Murray RK, Granner DK, Mayes PA, Rodwell VW, McGraw-Hill companies New York, 2010.
  - Lippincott's Reviews of Biochemistry, 4th edition by Champe PC, Harvey RA, Ferrier DR, Lippincott William & Wilkins London, 2008
- Recommended books
  - Department book
- Periodicals, Web sites, ... etc

Findarticle.com

Freemedicaljournals.com

<http://www.medlib.iupui.edu/ref/biochem.htm>

The Biology Project (from the University of Arizona):

<http://www.biology.arizona.edu/default.html>

Harvard Department of Molecular & Cellular Biology Links:

<http://mcb.harvard.edu/BioLinks.html>

## **VI. Assessment:**

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### **Assessment tools:**

Final examination: Written oral .... etc

### **Assessment schedule:**

### **Examination description:**

**Written exam.** Duration: minutes. Type of questions.

**Oral:** number of examiners ..... etc

### **Weighing of assessment:**

Final-term written examination 50 %

Oral examination 30 %

Other types of assessment ( article review and presentations) 20%

Total 100%

### **Grading system:**

## **Course directors**





**Written exam.**

1-Compulsory courses: 2 written exam (each paper 3 hours)(300+300 marks)

2- Elective courses:written exam (2 papers)(2 hours)(75+75)

**Oral:**

1-Compulsory courses: 200 mark.

2- Elective courses:each course 25 marks.

**Practicle exam :**

For Compulsory courses only: 200 marks.

**Total marks :**

**1-Compulsory courses: 1000 marks.**

**2- Elective courses: 200 marks.**

**Weighing of assessment:**

Final-term written examination -- %

Oral examination --- %

Practical/clinical exam ---%

Other types of assessment ( article review and presentations) --- %

Total 100%

**Grading system:**

**Course directors**