Mansoura University
Faculty of Medicine

Log Book

Biochemistry Department

2016 - 2017

ختم القسم

إيصال تسليم Log Book

اسم الطالب : .....

الفرقة : .....

رقم الجلوس : .....

تاريخ التسليم : .....

توقيع المستلم : .....

رسالــة الكلــية

"تقديم مستوى عال التميز فى التعليم والتدريب الطبى
وتقديم خدمات صحية متميزة للمجتمع
عن طريق المراكز الطبية المتخصصة
وكذلك الإرتقاء بالبحث العلمى"

رؤيــة الكلــية

"أن نصنف إقليميا ونحقق التميز فى التعليم الطبى
والبحوث وخدمة المجتمع"

Course Specification 2015/2016

For the Medical Biochemistry (first 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 :	1st year
Date of specification approval :	3/5/2015 (Department assembly approval)

1- Basic information:

Title: **Medical Biochemistry and Molecular Biology for 1nd year undergraduate medical students** Code: BIC1

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

2- Professional Information:

1 - Overall Aims of Course

To enable students to acquire knowledge and skills and attitude related to some essential topics of biochemistry including

- Micro- and macromolecules of carbohydrates, lipids, protein, nucleotides and nucleic acids.
- The role of free nucleotides in signal transduction control; macromolecules involved in transmission of information from gene expression to the formation of functioning proteins.
- Basic principles of molecular biology and protein synthesis.
- The molecular basis of some genetic diseases.
- Biotechnology techniques (especially recombinant DNA technology) and their clinical implication and their importance in diagnosis of diseases.
- Physico-chemical basis of biological body fluids; the kinds and amounts of macro- and micro-nutrients needed for maintaining health.
- The basics of nutritional care in different diseases.

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 different concepts of physical chemistry e.g. Diffusion, osmosis, surface tension, viscosity……etc..
A 2. Describe structure& properties of carbohydrates, lipid and proteins of biological importance
A 3. Describe vitamins and explain their role in body metabolism
A 4. Discuss enzyme chemistry, action and regulation
A 5. Discuss the chemistry of nucleotides and nucleic acids.
A 6. Explain the processes of replication, transcription and translation and their regulation.
A 7. Explain recombinant DNA bio-techniques.
A 8. List different DNA amplification techniques and identify their applications.
A 9. Explain principles of carcinogenesis, causes and mechanisms of apoptosis and enumerate different tumor markers.

B- Intellectual Skills:

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

B 1. Correlate biochemical findings with vitamin deficiency diseases, protein misfolding diseases, lactose intolerance.

B 2. Relate enzymes kinetics with clinical diseases.

B 3. Apply the role of molecular biology techniques in diagnosis of diseases

P-Professional and Practical Skills:

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

C1. Perform some basic chemical tests to identify different sugars and proteins

C2. Use the electrophoresis technique to separate nucleic acids & proteins

C3. Perform DNA extraction amplification of DNA by PCR & visualization of PCR product

C4. Elicit molecular biology techniques via virtual lab.

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 and acquire presentation skills .

D3. Manage time effectively

3- Contents:

Topic	No. of Hours	Lectures	Practical / small groups hrs
Physical Chemistry	**5**	**--**	**5**
Milk & Nutrition	**5**	**--**	**5**
Carbohydrate Chemistry	**20**	**9**	**11**
Lipid Chemistry	**12**	**9**	**3**
Protein Chemistry	**14**	**8**	**6**
Vitamins	**14**	**10**	**4**
Enzymes	**13**	**9**	**4**
Nucleotides and Nucleic acids chemistry	**11**	**7**	**4**
DNA Replication and repair	**8**	**4**	**4**
Gene expression and transcription	**6**	**4**	**2**
Protein synthesis and modifications	**8**	**4**	**4**
Biochemistry of cancer	**5**	**4**	**1**
Recombinant DNA technology	**14**	**7**	**7**
Total	**135**	**75**	**60**

3a- Topics:

1. **Carbohydrate Chemistry**: classification (monosaccharide – disaccharides and polysaccharides), properties and biological importance.
2. **Lipid Chemistry**: fatty acids, eicosanoids simple lipids, conjugated lipids (including phospholipids and cerebrosides), lipoproteins and derived lipids (including steroids); their properties and biological importance.
3. **Protein Chemistry**: classification and properties of amino acids. The protein conformation, properties of proteins, isolation and purification, classification into simple and conjugated proteins.
4. **Vitamins** : introduction and classification (fat soluble vitamins & water soluble vitamins) , chemistry, function, deficiency manifestations,.
5. **Enzymes**: nature, mechanism of action, specificity, classification, co enzymes, enzyme units, enzyme kinetics, factors affecting rate of enzyme action, enzyme inhibition, regulation of enzyme activity, plasma enzymes.

6. **Chemistry of nucleotides**: Structure of nitrogenous bases, nucleosidesand nucleotides ,free nucleotides of biological importance.
7. **Chemistry of nucleic acids**: Structure of DNA, chromatin and chromosomes, mitochondrial DNA, and types of RNA.
8. **DNA replication**: DNA replication.
9. **Gene mutation and repair**: causes, types and effects of mutation and repair.
10. **Gene expression and transcription**: Transcription (RNA synthesis), processing of RNA, regulation of gene expression.
11. **Protein synthesis and modifications** : synthesis of polypeptide chain post-translation processing.
12. **Biochemistry of cancer**: a. Carcinogenesis: oncogenes, tumor suppressor genes and DNA repair genes.
b. Apoptosis: definition, causes and mechanism.
c. Tumor markers.
13. **Recombinant DNA technology**: Restriction enzymes, cloning, PCR, hybridization, DNA sequencing, gene therapy, human genome project.

3b- <u>Practical classes</u>:

1- Identification by chemical tests:

- Carbohydrates:
  a. Monosaccharides: glucose, fructose.
  b. Disaccharides: sucrose, maltose & lactose .
  c. Polysaccharides: starch, dextrin.
- Protein
  peptone, gelatin, caseinogen & egg white (albumin and globulins)
- Uric acid and Urea.
- Extraction of deoxyribonucleic acid (DNA) &amplification by PCR
- Agarose gel electrophoresis for the extracted DNA & PCR product
- Study of factors affecting rate of enzyme action& role of rennin enzyme in milk clotting as an example.
- Physical chemistry: calculation of PH & molarity of solution.
- Virtual lab for agarose gel electrophoresis and DNA amplification techniques.
- Calculation of daily calorie requirement for normal individual & in different physiological and pathological condition

3c- <u>Self learning (S. L.) activity:</u>

1st 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.

Content ILO's Matrix

Subject	Knowledge & understanding									Intellectual skills			Professional & practical skills				General& transferable skills		
	A 1	A 2	A 3	A 4	A 5	A 6	A 7	A 8	A 9	B 1	B 2	B 3	C 1	C 2	C 3	C 4	D 1	D 2	D 3
Physical chemistry	•																•	•	•
Carbohydrate chemistry		•								•			•				•	•	•
Lipid chemistry		•															•	•	•
Protein chemistry		•								•			•	•			•	•	•
Vitamins			•							•	•						•	•	•
Enzymes				•													•	•	•
Nucleotides & nucleic acids					•									•	•	•	•	•	•
DNA replication & repair						•										•	•	•	•
Gene expression and transcription						•										•	•	•	•
Protein synthesis & modification						•										•	•	•	•
Biochemistry of cancer									•								•	•	•
DNA amplification								•								•	•	•	•
Recombinant DNA& gene therapy							•					•				•	•	•	•

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 for agarose gel electrophoresis and DNA amplification techniques

4.3- **Self learning.** (student presentations): 1st 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

Types of assessment: Assessment ILOs Matrix

Assessment method	Knowledge & understanding									Intellectual skills			Professional & practical skills				General& transferable skills		
	A1	A2	A3	A4	A5	A6	A7	A8	A9	B1	B2	B3	C1	C2	C3	C4	D1	D2	D3
Written exam	•	•	•	•	•	•	•	•	•	•	•	•						•	
Oral exam	•	•	•	•	•	•	•	•	•	•	•	•						•	
Practical exam: Practical test Practical sheet OSPE													•	• •	• •	• •		•	
Student Presentation assessment																	•	•	•

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**	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

Weighting of Assessments

	Examination	Description	Marks
Assessment 1	**Midyear exam**	-Selection type items (MCQ & cross matching, complete and interpretive exercise) - Supply type item; short answer: • January	25 marks (16.63%)
Assessment 2	**Final**	A 3-hour written paper composed of : • Supply type item (short answer & restricted response essay) • MCQ	**75** (50%) {70% short essay questions &30% MCQ
Assessment 3	**Structured Practical exam**	Identification of provided solution Sheet examination OSPE in 5 stations	**10** (6.66%) **10** (6.66%) **10**

			(6.66%)
Assessment 4	**Student activities**	Presentation of students for self learning & log book	**5** (3.33%)
Assessment 5	**Structured Oral exam**	Oral cards in two oral examination stations	**15** (10%)
	Total		150 marks (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.

Mansoura University
Faculty Of Medicine

جامعة المنصورة
كلية الطب
قسم الكيمياء الحيوية الطبية

Blue printالفرقة الأولى ٢٠١٥ /٢٠١٦

Written =100 Mark

MCQ = 25 Mark

Mid year Exam=25

Written(last Exam) =50 Mark

	المجموع	Mid year Exam	MCQ	Written(last Exam)
Carbohydrate chemistry	١٣.٥	٧	١	٥.٥
Lipid chemistry	١٢.٥	٦	١	٥.٥
Protein chemistry	١٢.٥	٦	١	٥.٥
Enzymes	١٢.٥		٧	٥.٥
Vitamins	١٤	٦	٣	٥
Nucleic acid chemistry	٤		١	٣
Molecular Biology	٣١		١١	٢٠
	١٠٠	٢٥	٢٥	٥٠

رئيس قسم الكيمياء الحيويه

أ.د / فجر بازيد

Name: .....

Serial Number: .....

Section Number: .....

Section Day & Time:.....

Teaching Group: .....

Telephone Number: *Home*: .....
Mobile: .....

e-mail Address: .....

Home Address: .....

section Supervisors: .....

2012 /2013

Head of the Department ***Vice Dean for Education &Student Affairs***

Preface

Dear student

Welcome to department of medical biochemistry at the beginning of your 1st year of medical education, Workers in health science - particularly physician- have two major concern: understanding and maintenance of life and understanding and effective treatment of disease. Biochemistry impacts enormously on both of these fundamental concerns of medicine. Our mission is to enhance your understanding of all the chemical process associated with living cells in both health and disease.

This Log Book was specially provided for you to record all the activities performed during practical classes , it is the formal way for faculty to know and evaluate the student's attitude, achievement and progress and as a document for your attendance. Therefore, overall usage of the book is important to be completed by each student.

Lastly I wish you a fruitful & enjoyable study of medical biochemistry during this year.

Curriculum Contents &Assessment

Intended learning outcomes:

- **Knowledge :**

By the end of the course ,student should be able to

1- Understand different concepts of physical chemistry.
2- Describe structure& properties of carbohydrates,lipid and proteins of biological Importance.
3- Gain knowledge about vitamins and their roles in body metabolism.
4- Understand enzyme chemistry, action and regulation.
5- Demonstrate the structure and importance of immunoglobulins.
6- Describe the chemistry of nucleotides and nucleic acids.
7- Point out the processes of replication ,transcription and translation and their regulation
8- Identifies recombinant DNA bio-techniques.
9- Explain different DNA amplification techniques and their applications.
10- Illustrate cell cycle, apoptosis and carcinogenesis processes and their regulatory factors.

- **Intellectual Skills**

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

1- Interpret the observations of chemical tests to identify unknown sugar or protein solution.
2- Interpret symptoms, signs and biochemical laboratory findings of some vitamins deficiency disease.
3- Point out the clinical significances of some enzymes reactions and kinetics.
4- Point out the applications of molecular biology in basic and clinical sciences

- **Professional and Practical Skills:**

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

1- Perform some basic chemical tests to identify different sugars and proteins
2- Use the electrophoresis technique to separate nucleic acids & proteins
3- Perform and demonstrate DNA extraction and be aware of further techniques using the extracted DNA

- **General and Transferable Skills:**

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

1- Work effectively in a group in lab or during preparation of seminars.
2- Manage time effectively and use informational technologies during learning.

Topics:

1. **Physical chemistry:** water, acids and bases, buffer, acid-base balance disturbance solutions (types and properties).
2. **Carbohydrates** : classification (monosaccharide – disaccharides and polysaccharides), properties and biological importance.
3. **Lipids:** fatty acids, eicosanoids simple lipids, conjugated lipid (phospholipids and cerebrosides), lipoproteins and derived lipids (including steroids); their properties and biological importance.
4. **Proteins:** classification and properties of amino acids. The protein conformation, properties of proteins, isolation and purification, classification into simple and conjugated proteins.
5. **Immunoglobulins**: immune system, primary and secondary immune response, structure and types of immunoglobulins.
6. **Enzymes:** nature, mechanism of action, specificity, classification, co enzymes, enzyme units, enzyme kinetics, factors affecting rate of enzyme action, enzyme inhibition, regulation of enzyme activity, plasma enzymes.
7. **vitamins** : introduction and classification (fat soluble vitamins & water soluble vitamins) , chemistry, function, deficiency manifestations,.
9. **Chemistry of nucleotides**: Structure of nitrogenous bases, nucleosides and nucleotides ,free nucleotides of biological importance.
10. **Chemistry of nucleic acids** : Structure of DNA, chromatin and chromosomes, mitochondrial DNA, and types of RNA.
11. **DNA replication and repair**.
12. **Transcription** (RNA synthesis), processing of RNA, regulation of gene expression.
13. **Translation** (protein synthesis) : synthesis of polypeptide chain post-translation processing
14. **Gene mutation**: causes, types and effects.
15. **Apoptosis:** definition, causes and mechanism.
16. **Carcinogenesis**: proto-oncogenes, oncogenes and tumor suppressor genes.
17. **Recombinant DNA technology** :Restriction enzymes, cloning, PCR, hybridization, DNA sequencing, gene therapy, human genome project.
18. **Milk & Nutrition**

Practical classes:

1- Identification of unknown solution:

- Carbohydrates:
    a. Monosaccharides: glucose, fructose.
    b. Disaccharides: sucrose, maltose & lactose .
    c. Polysaccharides: starch, dextrin.
- Protein
  peptone, gelatin, caseinogen, alkaline metaprotein & egg white(albumin and globulins).
- Uric acid and Urea.

2- Extraction of deoxyribonucleic acid (DNA)

3- Agarose gel electrophoresis.

4- Physical chemistry

Self learning activity:

1st year medical students will be divided into 4 sections. Every section will be divided into 5 subgroups. Each one will be responsible for preparation and presentation of an essay in one of preset topic on recent issues related to applied Biochemistry and finally evaluated by staff members of the department.

Teaching & time plan:

Item	Time schedule	Teaching hours	Total hours
Lectures	3 times/ week; one hour each between 8.00 a.m and 2.00 p.m	3 x 25 weeks	75
Practical	2 hour every week according to the current time table	2 x 24 weeks	48
S. L. activity	1 hour every 2 weeks according to the current time table	1 x 12 weeks	12
Total			135

Student Assessment:

Term Examinations

Marks

- ***November*** **5**
- ***January*** **20**

Final Examination

- ***written*** **75**
- ***Oral Examination*** **15**
- ***Practical Examination*** **25**

Other types of assessment

- ***Student logbook*** **5**
- ***Student presentation*** **5**

Total : 150 marks

- ***The minimum passing score is 90 marks provided at least 30 marks are obtained in the final written examination.***

- ***Passing grades are :***
  EXCELLENT≥ 85%,
  VERY GOOD 75-<85%,
  GOOD 65-<75%
  FAIR 60 -< 65%

- ***The minimum acceptable practical (and tutorial) attendance is 75%; in order to attend for the final practical examination.***

- ***The practical marks(20 marks) are divided as the following:-***
  a- Ten marks for practical lab exam
  b- Ten marks: practical sheet exam .

Logbook Activities

A. Practical lessons

B. Clinical cases

C. Virtual Lab

D. Activities of self learning

- ***Student presentation preparation***
- ***Essay writing***

E. Other Activities in the field of Medical Biochemistry:

- ***Seminar attendance***
- ***Workshops and training courses attendance***
- ***Conferences attendance***
- ***Others***

F. Quizzes

A. Practical Lessons

Attendance of Practical lessons:

week	Date	Activity		Signature
		Title	Result	

1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

week	Date	Activity		Signature
		Title	Result	

13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

B. Clinical Cases

Case No.	Date	Answer	Signature

1			
2			
3			
4			
5			

Case No.	Date	Answer	Signature
6			
7			
8			
9			
10			

C. Virtual Lab

Date	Subject	Supervisor

D. Self learning activities

1- Student Presentation Preparation

Title: ……

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Items:

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Summary:

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Presentation date: ……

Supervisors:

Name				
Signature:				

Evaluation:

2- Essay writing

Title: ……

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Students sharing:

1-..... 2- .....

3-..... 4- .....

5-..... 6- .....

Abstract of the essay:

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Presentation date: .....

Supervisors:

Name				
Signatu				

Evaluation:

E. Other Activities in the field of Medical Biochemistry:

1- Seminars attendance:

Date	***Subject***	***Supervisor***

2-Workshops and training courses attendance:

Date	Subject	Supervisor

3-Conferences attendance:

Date	Conference	Supervisor

4-Others:

Date	Activity	Supervisor

F.Quizzes

Quizzes Answers

Quiz No	*Date*	*Answer Mark*	*Supervisor*

Attendance Report

A. Attendance Report

(Filled by the department)

- *Number of sections attended:*
- *Number of sections missed:*
- *Total number of sections:*
- *Percentage of attendance (**Number of sections attended/ total number):***

Signature of attendance employee ***Signature of principle supervisor***

B. Final Attendance Report

(Filled by Supervisors)

1- Attendance			
□ **Above 85%**	□ **Above 75%**	□ **Below 75%**	
2- Commitment Level			
□ **Excellent**	□ **Satisfactory**	□ **Poor**	
3- Mid- term Evaluation:			
4- Presentation Evaluation			
□ **Excellent**	□ **Satisfactory**	□ **Poor**	
5- Essay Evaluation			
□ **Excellent**	□ **Satisfactory**	□ **Poor**	
6- General Evaluation			
□ **Excellent**	□ **Good**	□ **Average**	□ **Poor**

Written Conclusive Opinion (Optional)

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