



توصيف برنامج ماجستير الكيمياء الحيوية الطبية
(عام 2013-2014)

A- Basic information : *معلومات أساسية:

1- اسم البرنامج : **Master degree of Medical Biochemistry**

2- طبيعة البرنامج : **single (احادي)**

3- القسم المانح للدرجة و المسئول عن البرنامج : **Department Medical Biochemistry**

4- تاريخ إقرار البرنامج فى مجلس القسم : 3 / 9 / 2013

5- تاريخ إقرار البرنامج فى مجلس الكلية 356 : 15 / 9 / 2013

6- مسؤل البرنامج : **Prof. Dr. Mahasen Abd Elsattar, Dr. Inas Abdulmonem Elsayed,**

Dr. Shuzan Ali

7- المراجع الداخلى للبرنامج : **Prof. Dr Amal Abou ELfadl**

8- المراجع الخارجى للبرنامج : **Prof. Dr. Hanaa Eltayeb; Professor & Head of Medical Biochemistry, Ain Shams University**

B- Professional information : *معلومات متخصصة:

1- الأهداف العامة للبرنامج :

1- Program aims:

The overall aims of the program are:

- 1.1. To provide the candidates with the basic and advanced knowledge in Medical Biochemistry and molecular Biology and apply such knowledge in related medical fields
- 1.2. To encourage the graduates to apply analytical methods of scientific research in the field of Medical Biochemistry
- 1.3. To develop the ability to apply the above mentioned knowledge and methods to find innovative solutions for obstacles and difficulties encountered during work in Medical Biochemistry and related fields



- 1.4. To equip candidates with professional skills that serve the field of Medical Biochemistry and Molecular Biology including techniques that serve related disciplines
- 1.5. To enable candidates to update their knowledge by continuous research and self-learning
- 1.6. To enable the candidates to plan, design and execute a research plan employing resources of Benha Faculty of Medicine to facilitate their scientific research
- 1.7. To ensure awareness of the candidates with principles of ethical, honorable and safe practice related to Medical Biochemistry
- 1.8. To allow the candidates acquire the ability to work as a teamwork member and/or to lead a team in different professional contexts
- 1.9. To develop awareness of the candidates with their role in community development in light of global and regional variables
- 1.10. To promote innovative and creative thinking in various contexts
- 1.11. To encourage candidates to use means of communication and information technology to serve the professional practice in the field of Medical Biochemistry and Molecular Biology
- 1.12. To qualify the candidates for pursued careers and advanced studies of the MD Degree
- 1.13. To enable the candidates make the right decisions according to available data in different professional contexts

٢ - المخرجات التعليمية المستهدفة من البرنامج :

2-Intended Learning Outcomes (ILOS):

2.a. Knowledge and Understanding أ.٢ - المعرفة والفهم :

On successful completion of the program, the graduate will be able to:

2. a.1. Describe the broad-based core concepts in Medical Biochemistry and Molecular Biology together with their clinical correlations
2. a.2 Know different research techniques, including information retrieval, experimental design and statistics, modeling, sampling, Medical Biochemistry and Molecular Biology techniques
2. a.3 Know and understand the degree of impact of Medical Biochemistry and Molecular Biology science on surrounding environment and vice versa
2. a.4 Recognize the legal and moral principles in professional practice in Medical Biochemistry field



2. a.5 Identify and follow scientific updates in Medical Biochemistry and Molecular Biology field
2. a.6 Highlight the importance of quality assurance in medical and professional practice related to Medical biochemistry and Molecular Biology
2. a.7 Describe the essential facts, concepts, principles and theories relevant to the student's project

2.b. Intellectual Skills:

٢. ب - القدرات الذهنية :-

On successful completion of the program, the graduate will be able to:

2. b.1 Analyze and solve problems related to Medical Biochemistry and Molecular Biology using an integrated multidisciplinary approach.
2. b.2 Make decisions in various medical and professional contexts
2. b.3 Write-up and conduct a plan of original scientific research.
- 2.b.4 Develop plans to improve performance and encourage evidence based learning and practice.
2. b.5 Integrate information and professional skills to interpret laboratory reports related to Medical Biochemistry and Molecular Biology
2. b.6 Evaluate risks in professional practice.
2. b.7 create and innovative methods and tools in medical and professional practice related to Medical Biochemistry

2.c. Practical and professional Skills:

٢. ج . مهارات مهنية وعملية :

On successful completion of the program, the graduate will be able to:

2. c.1 Analyze experimental results and determine their strength and validity.
2. c.2 Evaluate established methods and develop tool and/or methods used in Medical Biochemistry investigations.
2. c.3 Use computational tools and packages to serve his professional career .
2. c.4 Plan and execute experiments and investigations according to quality and safety principles.
2. c.5 write up and evaluate technical reports related to Medical Biochemistry and Molecular Biology



٢. د. مهارات عامة و منتقلة:

2.d. General and transferable skills:-

By the end of the program the graduate should be able to:

2. d.1 Communicate properly with staff members, colleagues and subordinates
2. d.2. Use information technology in a proper way that keeps him current with advances in knowledge and practice.
2. d.3 Use different teaching and evaluation methods to teach others and give feedback on their performance.
2. d.4 Manage time effectively in various contexts
2. d.5 develop and evaluate skills needed for continuing professional improvement.
2. d.6 Express respect the rules of laboratory work.
2. d.7 Work independently or as part of a team in different professional contexts related Medical Biochemistry

3- Academic Standards

٣ - المعايير الأكاديمية للبرنامج:

a.Academic Standards of Master Program of Medical Biochemistry, Faculty of Medicine, Benha University: approved in department council 6 / 2013, and in faculty council no. (354) date 16 / 6 / 2013. (مرفق ١)

٤ _ العلامات المرجعية:

4-Reference standards (Bench mark):

1. **Academic reference standards (ARS), Master Program (March 2009)**, which were issued by the National Authority for Quality Assurance & Accreditation of education NAQAAE. (مرفق ٢)



المعايير القياسية لبرامج الدراسات العليا (درجة الماجستير) الصادرة عن الهيئة القومية لجودة التعليم والإعتماد (مارس ٢٠٠٩)

2. Academic standards of Program of Master's Degree in Bio molecular Sciences, University of Oxford

<https://weblearn.ox.ac.uk/access/content/group/252a2dc0-6c8b-4c30-a837-> ,

(مرفق ٣)

مرفق ٤ : مصفوفة المعايير الأكاديمية للبرنامج مع المعايير القياسية للدراسات العليا الصادرة عن الهيئة.

4- Program structure and contents

5 - هيكل ومكونات البرنامج :

أ - مدة البرنامج : 72 weeks

Program duration

- 1st part: - One Semester (6 months).
- 2nd part: - Two Semesters (one year).
- Thesis: 6 months

Program structure

ب - هيكل البرنامج:

- Total hours of program: 47 credit hours
- Theoretical: 25 credit hours
- Practical: 10 credit hours
- Thesis: 6 hours
- University and Faculty requirements: 6 hours

ج - مستويات ومقررات البرنامج:
إلزامي compulsory

الساعات المعتمدة	الكود	المقررات	البند
٦ ساعات	UNIV	للجامعة والكلية	متطلبات
١٥ ساعة			الجزء الأول
١١ ساعة		تشمل:	أ- مقررات نظرية
١		Carbohydrate chemistry	كيمياء الكربوهيدرات
١		Lipid & protein chemistry	كيمياء الدهون والبروتينات



توصيف برنامج الماجستير في الكيمياء الحيوية الطبية



١		Vitamins	الفيتامينات	
١		Enzymes	الأنزيمات	
١	BIO 601, BIO 603- 606, BIO 608-611	Digestion, biochem. Changes in large intestine xenobiotics & biotransformations	الهضم والتغيرات الحيوية في الأمعاء الغليظة	
١		Carbohydrate metabolism	ميتابولزم الكربوهيدرات	
١		Lipid metabolism	ميتابوليزم الدهون	
١		Protein metabolism & Haem	ميتابولزم البروتينات والهيموجلوبين	
١		Metabolism of purines. Pyrimidines & protein synthesis	ميتابولزم القواعد النيتروجينية وتصنيع البروتين	
١		Mineral metabolism, body fluids & tissue chemistry	ميتابولزم المعادن وسوائل الجسم وكيمياء الأنسجة	
١		Hormones	الهرمونات	
٤ ساعات		Determination:	تشمل تحاليل:	ب- مقررات عملية
	BIO 612	Plasma glucose, urea, creatinine and uric acid	بلازما جلوكوز و البولينا والكرياتينين وحمض البوليك	الجزء الثاني أ- مقررات نظرية
	BIO 613	Plasma cholesterol, triglycerides, total & phospholipids	الكوليسترول والدهون ثلاثية والدهون الفوسفاتية في البلازما	
	BIO 614	Plasma calcium, urine calcium, plasma iron & total iron binding capacity	الكالسيوم بالبلازما والبول وقياسات الحديد	
	BIO 615	Urine exam & stone analysis	تحليل البول والحصوات البولية	
٢٠ ساعة				
١٤ ساعة			تشمل:	
١	BIO 612, BIO 616,	Bioenergetics, biological oxidation & respiratory chain	الأكسدة البيولوجية والطاقة الحيوية	



توصيف برنامج الماجستير في الكيمياء الحيوية الطبية



١	BIO 618-620,	Carbohydrates & lipid of physiological significance	الكربوهيدرات والدهون ذات الدلالة الفسيولوجية	
١	BIO 622-624,	Intermediary metabolism	المتابولزم الوسيط	
١	BIO 626-629	Citric acid cycle, glycolysis & oxidation of pyruvate, metab. Of glycogen. Gluconeogenesis, pentose phosphate & Hexose metabolism pathways	متابولزم الكربوهيدرات (دورة كريس، أكسدة الجلوكوز، وحمض البيروفيك، و الجليكوجين. تصنيع الجلوكوز، مسارات الأيض للسكريات الأحادية (ذات الخمس والست كربونات) في الجسم	
١		Metabolism of fatty acids, and lipid metabolism	متابولزم الأحماض الدهنية والدهون	
١		Metabolism of amino acids, porphyrins & bile pigments	متابولزم الأحماض الأمينية و البورفيرينات والعصارات الصفراوية	
١		Nucleotides, metabolism of purines. Pyrimidines, nucleic acid structure & function	متابولزم الأحماض النووية تركيب ووظيفة الأحماض الأمينية	
١		DNA Organization- replication and repair	كيمياء DNA	
١		RNA synthesis, processing & modification	كيمياء RNA	
١		Protein Synthesis and the genetic code	تركيب الكود الجيني	
١		Regulation of gene expression	تنظيم ظهور الجينات	
١		Recombinant DNA technology	تقنية الهندسة الوراثية	
١		Cancer genes and growth factors	الأورام وعوامل النمو	
١		Biochemical and genetic basis of disease	الأسس الكيميائية والجينية للأمراض	
٦ ساعات			تشمل	ب- مقررات عملية



١	BIO 630	Spectrophotometry		
١	BIO 631	Flame photometry		
١	BIO 632	Chromatography		
١	BIO 633	Electrophoresis		
١	BIO 634	Colorimetric assays		
١	BIO 635	Competitive binding assays (RIA, ELISA)		
		يسجل بها حضور المقررات العملية		كراسة أنشطة
٦ ساعات				رسالة ماجستير
٤٧ ساعة				الإجمالي

First part (one semester):

a- Compulsory courses:

Course Title	Course Code	NO. of hours per week			Total teaching hours for 1 st part master degree
		Theoretical Lectures	Practical	Total	
Biochemistry	BIO 601, 603-606, 608-611	6:52	- -	6:52	165
Practical	BIO 612-615	---	7:30	7:30	180
Total		6:52	7:30	14:22	345 hours

b- Elective courses: none



Second part (2 semesters):

a- Compulsory courses:

Course Title	Course Code	NO. of hours per week			Total teaching hours for 2 nd part master degree
		Theoretical	Practical	Total	
Biochemistry	BIO 612, 616,	8:45	----	8:45	420
Practical	618-620, 622-624, 626-629 BIO 630-635	----	11:15	11:15	540
Total:		8:45	11:15	20	960
Thesis					6 credit

b- Elective courses: none

c- Selective: none

6- course content

٦- محتويات المقررات (راجع توصيف المقررات)

(مرفق ٧: توصيف مقرر الجزء الأول لماجستير الكيمياء الحيوية الطبية)

(مرفق ٨: توصيف مقرر الجزء الثاني لماجستير الكيمياء الحيوية الطبية)

- كود أو رقم المقرر
- اسم المقرر
- المحتويات

7- Program admission requirements

٧- متطلبات الالتحاق بالبرنامج :

مادة (٤): **يشترط في قيد الطالب لدرجة الماجستير: (١)

- أ- أن يكون حاصلًا على درجة البكالوريوس في الطب والجراحة من إحدى جامعات ج.م.ع أو على درجة معادلة لها من معهد علمي معترف به من الجامعة بتقدير جيد على الأقل.
- ب- يسمح للحاصل على الدبلوم وفقا لنظام هذه اللائحة وتقدير جيد على الأقل بتسجيل رسالة لاستكمال درجة الماجستير بشرط ألا يكون قد مر أكثر من ثلاث سنوات على تاريخ حصوله على درجة الدبلوم وبغض النظر على تقديره في درجة البكالوريوس.
- ت- يسمح للحاصل على الدبلوم وعلى خلاف لنظام هذه اللائحة أن يسجل لدرجة الماجستير بشرط أن يكون



توصيف برنامج الماجستير في الكيمياء الحيوية الطبية



تقديره في الدبلوم لا يقل عن جيد وبغض النظر عن تقديره في البكالوريوس.

(٢) أن يكون قد أمضى السنة التدريبية أو ما يعادلها (سنة الامتياز)

(٣) أن يتفرغ للدراسة لمدة سنة على الأقل في الجزء الثاني (فصلين دراسيين)

مادة (٥): يكون التقدم للقيود لدرجة الماجستير مرة واحدة في السنة خلال شهري يوليو وأغسطس من كل عام. تبدأ الدراسة لدرجة الماجستير في شهر أكتوبر من كل عام.

8- القواعد المنظمة لإستكمال البرنامج :

مادة (٦): تتولى لجنة الدراسات العليا بالكلية عن طريق لجنة تشكل لكل تخصص من أعضاء مجلس القسم التابع له المادة والقسم المانح للدرجة وضع البرنامج التفصيلي للمقررات في حدود الساعات المعتمدة الواردة باللائحة وعند الاختلاف يتم الاسترشاد بمقررات جامعة القاهرة ومقررات الشهادات العالمية الاوربية والامريكية يعتمدها مجالس الأقسام ثم يقرها مجلس الكلية وتشمل هذه الساعات محاضرات نظرية ودروس عملية وتدريب اكلينيكي ومحاضرات وندوات مشتركة.

مادة (٧): يشترط في الطالب لنيل درجة ماجستير التخصص في أحد الفروع الاكلينيكية والعلوم الطبية الأساسية:

- أ- حضور المقررات الدراسية والتدريبات الاكلينيكية والعملية والمعملية بصفة مرضية طبقا للساعات المعتمدة.
 - ب- أن يقوم بالعمل كطبيب مقيم أصلي أو زائر لمدة سنة على الأقل في قسم التخصص بالنسبة للعلوم الاكلينيكية.
 - ت- أن ينجح في امتحان القسمين الأول والثاني.
 - ث- اجتياز الطلب لثلاث دورات في الحاسب الآلي (دورة في مقدمة الحاسب – دورة تدريبية متوسطة – دورة في تطبيقات الحاسب الآلي) وذلك قبل مناقشة الرسالة.
 - ج- اجتياز اختبار التوفيل بمستوى لا يقل عن ٤٠٠ وحدة وذلك قبل مناقشة الرسالة.
- أن يقوم باعداد بحث في موضوع تقره الجامعة بعد موافقة مجلس القسم ومجلس الكلية ينتهي باعداد رسالة تقبلها لجنة التحكيم.

9- Students Assessment Methods

9- طرق وقواعد تقييم المنتحقين بالبرنامج

م	الطريقة	ما تقيسه من مخرجات التعلم المستهدفة
1	Written examination	To assess knowledge and understanding & intellectual skills
2	Oral examination	To assess knowledge and understanding, intellectual skills & General & transferable skills



To assess knowledge and understanding, intellectual skills & practical and clinical skills and General & transferable skills	Practical & clinical examination	3
--	----------------------------------	---

First part

إجمالي	الدرجة				الاختبار	المقرر
	إكلينيكي	عملي	شفهي	تحريري		
300	---	100	100	100	اختبار تحريري مدته ثلاث ساعات + اختبار شفهي + اختبار عملي	
٣٠٠						إجمالي الدرجة

Second part

إجمالي	الدرجة				الاختبار	المقرر
	عملي	شفهي	تحريري			
	١٧٥		١٧٥	٣٥٠	اختباران تحريريان مدة كل منهما ثلاث ساعات + اختبار شفهي + اختبار عملي	
٧٠٠						إجمالي الدرجة

Evaluation of Program:**١٠ - طرق تقويم البرنامج:**

Evaluator	Tools	Sample
Internal evaluator (s) مقيم داخلي	Focus group discussion Meetings	<u>٢-١ Report</u>
External Evaluator (s) مقيم خارجي	Reviewing according to external evaluator checklist report of NAQAA.	<u>1-2 Report</u>
Senior student (s) طلاب السنة النهائية	مقابلات , استبيان	<u>جميع الطلبة</u>
Alumni الخريجون	مقابلات , استبيان	<u>لا تقل عن ٥٠% من طلبة آخر ٣ دفعات</u>
Stakeholder (s) أصحاب العمل	مقابلات , استبيان	<u>عينة ممثلة لجميع جهات العمل</u>
Others طرق أخرى	none	

المسؤول عن البرنامج : التوقيع : التاريخ : / /

Program Coordinator:

Name Dr Signature.....Date



الملحقات :

مرفق ١ : Academic standard of the program

مرفق ٢ : المعايير القياسية العامة للدراسات العليا الصادرة عن الهيئة.

مرفق 3: Benchmarks (المعايير المرجعية الخارجية)

مرفق 4: مصفوفة المعايير الأكاديمية للبرنامج مع المعايير القياسية للدراسات العليا الصادرة عن الهيئة

مرفق 5: مصفوفة البرنامج مع المعايير الأكاديمية للبرنامج.

مرفق 6: مصفوفة المقررات مع البرنامج

مرفق 7: توصيف مقرر الماجستير الجزء الأول

مرفق 8: توصيف مقرر الماجستير الجزء الثاني

مرفق ١: Academic standard of the program

جامعة بنها
كلية الطب
قسم الطب الكيمياء الحيوية الطبية

وثيقة المعايير الأكاديمية المرجعية لبرنامج الماجستير

Academic Reference Standards (ARS) for Master Degree in Medical biochemistry

1. Graduate Attributes:

By the end of the Master program of Medical Biochemistry, the graduate should:

1. Understand the basics of Medical Biochemistry and Molecular Biology and good knowledge of the details that serve the medical field and integrate them to related medical knowledge
2. Apply the basics and methodologies of scientific research and mastering the use of various tools in the field of Medical Biochemistry
3. Apply the analytical method and use it in the field of Medical Biochemistry
4. Show awareness of current problems and the latest developments in the field of Medical Biochemistry
5. Identify any problems in the field of Medical Biochemistry during the performance of his duties and propose suitable solutions
6. Master Medical Biochemistry related skills using appropriate technological methods that serve professional practice
7. Use various means of communication and information technology to serve the professional practice in the field of Medical Biochemistry and Molecular Biology
8. Work effectively as a team member and/ or lead a team of subordinates
9. Make the right decision according to the professional context
10. Employ and maintain the available resources to achieve the highest benefit from them
11. Work in light of his role in community development and environmental conservation taking global and regional variables in consideration
12. Act with integrity, credibility and scientific research follow the ethical code of medical practice
13. Develop himself academically and professionally, through continuous learning

14. Implement research projects in the field of Medical Biochemistry and Molecular Biology
15. Implement creative ideas in a way that serve his profession and career in Medical Biochemistry

2. Standards:

2-1 Knowledge and understanding:

By the end of the Master program of Medical Biochemistry, the graduate should understand and be familiar with:

- 2.1.1 Extensive medical biochemistry including molecular biology knowledge and related disciplines
- 2.1.2 Extent of interaction and mutual influence between the biomedical and the surrounding environment Chemistry.
- 2.1.3 Scientific developments in the field of Medical Biochemistry and Molecular Biology.
- 2.1.4 Moral and legal principles of professional and medical practice with special emphasis on medical biochemistry investigation
- 2.1.5 Principles and the basics of quality assurance in professional practice in the field of Medical Biochemistry
- 2.1.6 Basics and ethics of scientific research.

2-2 Intellectual skills:

By the end of the Master program of Medical Biochemistry, the graduate should be able to:

- 2.2.1 Analyze and evaluate information in the field of Medical Biochemistry and use it to solve medical biochemical problems
- 2.2.2 Solve specialized problems in the field of Medical Biochemistry problems with the shortage of some data
- 2.2.3 Link between the various professional knowledge to solve Medical Biochemistry related problems
- 2.2.4 Conduct a research study or write a problem based systematic scientific study in the field of Medical Biochemistry and Molecular Biology
- 2.2.5 Assess risks in professional practices related to the field of Medical Biochemistry
- 2.2.6 Plan to improve performance in the field of Medical Biochemistry and Molecular Biology
- 2.2.7 Make professional decisions in a variety of contexts.
- 2.2.8 Encourage evidence -based learning and practice needed for experience acquisition

3 Professional skills:

By the end of the Master program of Medical Biochemistry, the graduate should be able to:

- 2.3.1 Master the basic and advanced professional techniques and skills in the field of Medical Biochemistry and Molecular Biology
- 2.3.2 Write and evaluate Medical Biochemistry and Molecular Biology laboratory reports
- 2.3.3 Assess established methods and tools in Medical Biochemistry
- 2.3.4 Assess risks of using chemicals on society and the environment
- 2.3.5 Apply safety principles in medical and Molecular Biology laboratories

4 General skills and transmitted:

By the end of the Master program of Medical Biochemistry, the graduate should be able to:

- 2.4.1 Communicate effectively in various directions
- 2.4.2 Assess himself and determine the educational needs
- 2.4.3 Use information technology to serve the professional practice
- 2.4.4 Use different resources to get the needed knowledge and information
- 2.4.5 Assess the performance of others using standards and indicators
- 2.4.6 Work in team in a variety of professional contexts
- 2.4.7 Manage time efficiently
- 2.4.8 Learn continuously depending on himself

اعتماد مجلس القسم رقم (.....) ، بتاريخ ٦/ ٢٠١٣

رئيس مجلس القسم

اعتماد مجلس الكلية ٣٥٤ بتاريخ ١٦/٦/٢٠١٣

مرفق 2: المعايير القياسية العامة للدراسات العليا الصادرة عن الهيئة

برامج الماجستير

١ - موصفات الخريج

- خريج برنامج الماجستير فى أى تخصص يجب أن يكون قادراً على :
- ١-١ إجادة تطبيق أساسيات ومنهجيات البحث العلمى واستخدام أدواته المختلفة
 - ٢-١ تطبيق المنهج التحليلى واستخدامه فى مجال التخصص
 - ٣-١ تطبيق المعارف المتخصصة ودمجها مع المعارف ذات العلاقة فى ممارسته المهنية
 - ٤-١ إظهار وعيا بالمشاكل الجارية والرؤى الحديثة فى مجال التخصص
 - ٥-١ تحديد المشكلات المهنية وإيجاد حلول لها
 - ٦-١ إتقان نطاق مناسب من المهارات المهنية المتخصصة واستخدام الوسائل التكنولوجية المناسبة بما يخدم ممارسته المهنية
 - ٧-١ التوصل بفاعلية والقدرة على قيادة فرق العمل
 - ٨-١ اتخاذ القرار فى سياقات مهنية مختلفة
 - ٩-١ توظيف الموارد المتاحة بما يحقق أعلى استفادة والحفاظ عليها
 - ١٠-١ إظهار الوعى بدوره فى تنمية المجتمع والحفاظ على البيئة فى ضوء المتغيرات العالمية والاقليمية
 - ١١-١ التصرف بما يعكس الالتزام بالنزهة والمصداقية والالتزام بقواعد المهنة
 - ١٢-١ تنمية ذاته أكاديميا ومهنيا وقادراً على التعلم المستمر

2- المعايير القياسية العامة

١-٢ المعرفة والفهم :

- بأنتهاء دراسة برنامج الماجستير يجب ان يكون الخريج على فهم ودراسة بكل من :
- ١-٢-١ النظريات والاساسيات المتعلقة بمجال التعلم وكذا فى المجالات ذات العلاقة
 - ٢-١-٢-٢- التأثير المتبادل بين الممارسة المهنية وانعكاسها على البيئة
 - ٣-١-٢-٢ التطورات العلمية فى مجال التخصص
 - ٤-١-٢-٢ المبادئ الاخلاقية والقانونية للممارسة المهنية فى مجال التخصص
 - ٥-١-٢-٢ مبادئ واساسيات الجودة فى الممارسة المهنية فى مجال التخصص
 - ٦-١-٢-٢ اساسيات واخلاقيات البحث العلمى

٢-٢ المهارات الذهنية :

- بأنتهاء دراسة برنامج الماجستير يجب ان يكون الخريج قادراً على :
- ١-٢-٢ تحليل وتقييم المعلومات فى مجال التخصص والقياس عليها لحل المشاكل
 - ٢-٢-٢ حل المشاكل المتخصصة مع عدم توافر بعض المعطيات
 - ٣-٢-٢ الربط بين المعارف المختلفة لحل المشاكل المهنية
 - ٤-٢-٢ اجراء دراسة بحثية او كتابة دراسة علمية منهجية حول مشكلة بحثية
 - ٥-٢-٢ تقييم المخاطر فى الممارسات المهنية فى مجال التخصص
 - ٦-٢-٢ التخطيط لتطوير الاداء فى مجال التخصص
 - ٧-٢-٢ اتخاذ القرارات المهنية فى سياقات مهنية متنوعة
 - ٣-٢ المهارات المهنية

- بأنتهاء دراسة برنامج الماجستير يجب ان يكون الخريج قادراً على :
- ١-٣-٢ إتقان المهارات المهنية الاساسية والحديثة فى مجال التخصص

٢-٣-٢ كتابة وتقييم التقارير المهنية
٣-٣-٢ تقييم الطرق والادوات القائمة فى مجال التخصص

- ٤-٢ المهارات العامة والمنتقلة :
- بانتهاى دراسة برنامج الماجستير يجب ان يكون الخريج قادراً على :
- ١-٤-٢ التواصل الفعال بأنواعه المختلفة
- ٢-٤-٢ استخدام تكنولوجيا المعلومات بما يخدم الممارسة المهنية
- ٣-٤-٢ التقييم الذاتى وتحديد احتياجاته التعليمية
- ٤-٤-٢ استخدام المصادر المختلفة لحصول على المعلومات والمعارف
- ٥-٤-٢ وضع قواعد ومؤشرات تقييم اداء الاخرين
- ٦-٤-٢ العمل فى فريق سياقات كهنية مختلفة
- ٧-٤-٢ إدارة الوقت بكفاءة
- ٨-٤-٢ التعلم الذاتى والمستمر

مرفق 3: Benchmarks (المعايير المرجعية الخارجية)

Academic Standards of Program of Master's Degree in
Biomolecular Sciences, University of Oxford
<https://weblearn.ox.ac.uk/access/content/group/252a2dc0-6c8b-4c30-a837->

Programme Specification For Oxford Courses

1. Awarding institution/body	University of Oxford
2. Teaching institution	University of Oxford
3. Programme accredited by	n/a
4. Final award	M.Biochem.
5. Programme name	Molecular and Cellular Biochemistry
6. UCAS code	C700 MBioc
7. Relevant subject benchmark statement	Biosciences
8. Date of programme specification	October 2011

9. Educational aims of the programme

The aims of the programme are:

- to educate high quality students on an equal opportunity basis by providing them with a learning environment which encourages them to achieve their academic and personal potential;
- to give a grounding in both the conceptual approaches and practical techniques used in modern biochemical research by teaching a curriculum that reflects modern research within a framework of established biochemical principles;
- to provide a course in line with the Biosciences Benchmark statement, and the Core Curriculum as set out by the Biochemical Society, but also drawing on specialisms within the teaching/research staff;
- to provide suitable training and application of acquired skills, enabling students to progress to careers in biochemical or medical research;
- to provide training in relevant transferable skills for careers in science, or other careers that require analytical problem-solving skills.

10. Programme Outcomes

10.1 Subject Knowledge and Understanding

At the end of the course students will have:

- acquired an understanding of the conceptual and practical aspects of modern biochemistry and its interdisciplinary nature;
- appreciated the insights into life processes to be gained from the application of both physicochemical and biological methods.

10.2 Cognitive / Intellectual Skills

At the end of the course students will have:

- developed a facility for independent learning from a range of sources, including critical analysis of the original literature, and a capacity for independent thought;
- developed conceptual and practical skills to define, analyse and solve problems;
- had experience of critically researching and analysing the research literature;
- appreciated and be practised in the numerical skills necessary to process, analyse and interpret experimental data;
- understood the principles of experimental design and safe use of materials and equipment in a laboratory context.

10.3 Practical Skills

At the end of the course students will have:

- gained hands-on experience in a range of practical skills and methodologies relevant to biochemical research;
- acquired basic skills in computing and data handling;
- acquired an appreciation of the three-dimensional structures of complex molecules, and have appropriate skills in handling molecular graphics and databases;
- completed an independent project of original research, involving a literature review and experimental design, culminating in a dissertation.

10.4 Transferable / Key Skills

At the end of the course students will have:

- developed skills in logical thinking and problem-solving;
- learned to precis large bodies of information, and present reasoned arguments both verbally and in writing;
- gained experience in designing and undertaking a research project;
- acquired computer and keyboard skills enabling them to present work to a high standard;
- acquired skills in general and technical communication, both through verbal and written reports in varying formats;
- developed time management skills in both study and laboratory contexts;
- had the opportunity to participate in a wide range of extra-curricular activities to

stimulate personal development.

11. Programme Structure and Features

Teaching, Learning and Assessment Strategies

The intended learning outcomes (using the codings above) are achieved using the following teaching, learning and assessment strategies.

Lectures (10.1, 10.2)

- impart key concepts, factual information ,and illustrative applications;
- review the literature in the different subject areas;
- stimulate interest and encourage further study.

Expert (guest) Lectures (10.1, 10.2)

- provide illustrative cases of the practical application of biochemical tools and techniques to novel research problems.

Classes (10.2)

- provide small group teaching (6-12) students for problem-based instruction and discussions;
- used to introduce students to new skills (e.g. library searches, use of computer presentation packages).

Tutorials (10.1, 10.2, 10.4)

- weekly meeting of 1 tutor to normally 1-3 students provides flexible "response-mode" teaching matched to individual abilities;
- test and consolidate understanding;
- develop critical independent thought and study;
- encourage synthesis of complex concepts from primary source literature;
- refine written and oral communication skills;
- develop independent use of IT and library resources;
- provide support and guidance according to need.

Practical Classes and Data Handling (10.2, 10.3, 10.4)

- complement the theoretical learning, and utilise the range of resources available in Oxford;
- provide training in laboratory techniques, and handling of a range of biological materials and organisms;
- train students to design and execute experimental work;

- encourage co-operation with peers.

Computer Based Learning (10.2, 10.3, 10.4)

- supplements practical teaching, using simulated experiments and interactive data handling exercises;
- familiarises students with techniques of bioinformatics, particularly the use of protein and sequence databases;
- gives experience in molecular graphics.

Multiple Choice Test (10.1)

- reinforces knowledge of core material at start of year III;
- identifies areas of competence/problem areas to student and tutor.

Supervised Research Project (10.1, 10.2, 10.3, 10.4)

- extends experience in design, planning, and execution of original research work;
- requires interpretation and analysis of original results;
- requires presentation of original research work both in writing and orally.

Formative Assessment

- Colleges monitor academic progress during the course and also discuss feedback on Examination performance directly with students:
 - Tutor gives oral and written feedback on tutorial work submitted, normally on a weekly basis;
 - Tutor submits termly reports to student's College, which are discussed with the student by the College tutor;
 - College sets examinations, 'Collections', normally at the beginning of each term. Revision for these exams over the vacation provides reinforcement of the previous term's learning; 'Collections' also provide examination practice, and incentives to consolidate and revise throughout the course. They provide the basis for the award of prizes and scholarships, but do not contribute to the final degree class;
 - Senior Tutor and/or Head of College discusses progress with student on a regular, usually annual, basis;
- The Department's demonstrators provide continuous grading on practicals and data handling and feedback to both students and Colleges (years 1-3);
- Departmental multiple choice test at the beginning of year 3 reinforces core material, and identifies problem topics for individual students;
- Research supervisors discuss practical project on a continuous basis (year 4).

Summative Assessment

The University sets the Public Examinations at the end of years 1 (Prelims.), 3 (Finals

Part I) and 4 (Finals Part II). The results of Finals Part I and II are combined in awarding an M.Biochem. Details of Public Examinations are given in the Programme Structure below.

For both Parts I and II, there is an External Examiner who ensures that marks are fair and equitable, particularly at borderlines, and reports in writing to the Vice-Chancellor. Detailed guidelines on the Examinations are set out in the *Examination Regulations* and the *Proctors' and Assessor's Memorandum* which are sent to all students on arrival. The marking schemes used in each examination are made available to students.

PROGRAMME STRUCTURE AND FEATURES:

The programme is offered as a four-year course leading to the degree of Master of Biochemistry (M.Biochem.) with Honours.

The First Year, Prelims. Course:

- provides a challenging, yet pragmatic transition from school to University and takes account of students' maths/biology A-level background;
- introduces the basic principles of biochemistry;
- establishes the groundwork necessary for progression on to the Final Honours course;
- gives practical experience covering basic experimental techniques in protein and small molecule chemistry, enzymology, genetics and microbiology.

The Second and Third Years, Final Honours School, Part I course:

- teaches the essential components of modern biochemistry;
- develops progressively from year to year;
- has the flexibility to incorporate recent developments in a rapidly changing subject area;
- widens the range of practical techniques used and introduces an element of experimental design which increases as the course progresses;
- introduces computer-based and problem-based data handling exercises in parallel throughout the two years.

The Fourth Year, Final Honours School, Part II course:

- allows the students a high degree of specialisation;
- gives students the opportunity to conduct an original research project for 18 weeks in a laboratory in one of many Departments in related subjects in the University, designing and performing experiments to produce results for a dissertation;
- provides lectures in six options, out of which students select two for further, advanced, study.

Learning Year 1

Five courses are taken, covering the subjects:

- Molecular cell biology;
- Biological chemistry;
- Biophysical chemistry;
- Organic chemistry;
- Mathematics and statistics.

- Examination at the end of the first year (**First Public Examination, Prelims.**):
 - Candidates must have a satisfactory practical record (continually assessed);
 - Candidates take five written papers, one in each of the five subjects;
 - Candidates must pass all five papers (in one sitting, or after one resit) to proceed to year 2;
 - Candidates are graded as Pass, Fail or Distinction;
 - Borderline scripts are double marked by the Examiners who meet to discuss and finalise marks and also produce a written report.

- Classification in Prelims. occurs under the following scheme:
 - Pass: 40% and over in each of the five papers;
 - Distinction: a weighted average mark of 70% or over in all five papers, with the three core papers (Molecular cell biology, Biophysical chemistry, Biological chemistry) weighted 1 and the two shorter papers (Organic chemistry, Mathematics and statistics) weighted 0.66;
 - For candidates with an average of over 40%, but a mark lower than 40% in one or two papers, cross compensation between papers is possible according to an agreed formula;
 - Candidates are allowed to resit papers once only.

Learning Years 2 and 3

All students take five core courses, developing the subjects in increasing depth over the two-year period, in:

- Structure and function of macromolecules;
- Energetics and metabolic processes;
- Genetics and molecular biology;
- Cell biology and integration of function;
- Data handling and interpretation.

- Examination at the end of the third year (**Final Honours School Examination Part I**):
 - Candidates must have a satisfactory practical record (continually assessed);
 - Candidates take six written papers, one in each of the five subjects plus a

- general, synoptic, paper to test candidates' ability to integrate information from different parts of the course;
 - Each question is double marked by an examiner and a specialist assessor. A mark is agreed for each question based on a common marking scheme.
- Classification in Finals Part I for candidates who do not go on to complete Part II occurs under the following scheme and results in the awarding of a BA:
 - Pass: mark rounded to the nearest integer of 40% or over in each of papers 1 to 4;
 - Candidates within 2% below the class boundary may be vivaed for an elevation in class;
 - No resits are allowed for candidates who have completed the examination, but mechanisms are available to allow candidates who have had to withdraw from the examination (e.g. through ill-health) to resit in the following year.

Learning Year 4

All students do a project plus two option courses, all focused on original research:

- An 18-week, full-time research project, chosen by the student out of approximately 100 on offer;
- Two theory topics, chosen from six option courses. The topics vary from year to year and are announced in the previous year.
- Examination at the end of the fourth year (**Final Honours School Examination Part II**):
 - Candidates produce a research project dissertation (8,000 words) and make a short a presentation on their research;
 - The dissertation and presentation are assessed by the examiners with assistance of an assessor and comments of the project supervisor;
 - Candidates take two written papers, one in each of the two chosen theory options.
 - Each question is double marked by an examiner and a specialist assessor. A mark is agreed for each question based on a common marking scheme.
- Classification in Finals Part II, which relates to the average marks over Parts I and II rounded to the nearest integer, occurs under the following scheme and results in the awarding of an M.Biochem.:
 - Class 1: 70% and over
 - Class 2.i: 60-69%
 - Class 2.ii: 50-59%
 - Class 3: 40-49%
 - Unclassified Honours: 36-39%
 - Candidates within 2% below a class boundary may be vivaed for an elevation in class.
 - No resits are allowed for candidates who have completed an individual

examination, but mechanisms are available to allow candidates who have had to withdraw from the examination (e.g. through ill-health) to resit in the following year.

12. Support for Students and their learning

Student support and guidance, both academic and pastoral, is shared between the Colleges, the Department and the University as set out below.

College Support:

- personal academic guidance and supervision; high degree of contact (at least once a week) with an academic tutor, and at least monthly with their College tutor;
- tutorials generally held with one tutor teaching one to three students who normally write a weekly essay or solve problems based on directed reading and personal exploration in libraries. This allows the level of teaching to match individual abilities and allows extensive discussion;
- continuous monitoring and testing of academic progress (both orally on a weekly basis and by termly written exams), including feedback from University Examinations (with a termly report kept by colleges);
- written references in fourth year and during the students' subsequent careers;
- basic library facilities - each College has its own library;
- IT provision - including central facilities, IT support staff and networked student rooms;
- pastoral support from Tutor, Senior Tutor, College Chaplain, Tutor for Women, JCR Welfare Officers;
- welfare support from College doctor, nurse, counsellors;
- support for students with financial concerns - discussions with Bursar, JCR Welfare Officers; "Hardship Funds" may be available in cases of real need;
- "Induction" activities/documentation, describing support available both from College and the University, arranged by colleges when students arrive;
- Sports, music and other recreational facilities.

Regular contact with Tutors and the supportive environment of College contributes to the low withdrawal rates of students from the University - less than 2% per year on average.

Department Support:

- arranges "Induction" course for new students in the week before Full Term;
- maintains a Virtual Learning Environment, which includes electronic access to course material and information, online tests, questionnaires and feedback;
- delivers lectures, which define the course and on which the University examinations are based;
- arranges and delivers problem classes for Maths, Statistics, Biophysical Chemistry and Biological Chemistry (First year); data handling, (Second and

Third years); Multiple Choice Quiz (Third year)

- provides laboratories for practical classes (First, Second and Third years);
- arranges research laboratory places for practical project (Fourth year) including places in Europe under ERASMUS Scheme and in the US under the Princeton exchange scheme;
- provides IT facilities;
- holds annual "Industry Day", organised by the Oxford University Biochemical Society, when people from industry lecture on industrial applications of biochemistry to those seeking a career in the commercial sector.

University Support:

- Radcliffe Science Library (RSL), a copyright library, receives copies of all UK scientific publications, and buys additional material, which is available for reference;
- Hooke Library has multiple copies of textbooks required for the course which are available for student borrowing;
- RSL runs a "library skills" course for 2nd year biochemists to complement and extend the basic course run during the 1st year "Induction" session;
- IT - the OU Computing Service provides computing and e-mail facilities, available to all students, a range of courses (free, only nominal charge for documentation), and a Help desk for individual problems;
- The Language Centre runs courses and has foreign language material and literature available for all students; of particular benefit to biochemistry students opting for the ERASMUS Exchange Scheme in Europe for their Fourth year project;
- Welfare counselling by professional team for cases unsuitable for the College support network;
- Disability team provides advice and support for students with physical or functional disabilities;
- Careers Service - 10 careers advisors, including a specialist advisor for biochemistry and related careers, delivers careers lecture to biochemists; gives individual advice on all aspects of career choice and job search, including CV preparation, interview techniques, and provides contacts with potential employers.

13. Criteria for Admission

Current admissions criteria can be found at

http://www.bioch.ox.ac.uk/aspsite/index.asp?sectionid=ug_admissions.

- Admissions decisions are the responsibility of the Colleges, but Biochemistry Tutors, who are also University Lecturers under the Joint Appointments system, co-operate to ensure that the best candidates are offered places;
- Applicants with qualifications other than A-level, e.g. IB, Eur.Bac, US qualifications, Scottish Highers etc. are considered in the same way;

- A2 (or equivalent) in Chemistry and another science or Maths are "essential";
- The Department recommends standard offers for A-levels (AAA) and other examination systems. Colleges are free to set offers which vary from the standard in specific cases, but are expected to explain their decisions to the Department;
- The Department operates an Open Offer scheme, available to all Colleges, to ensure that all places can be filled by candidates that have met their conditional offers;
- Candidates who are not predicted to get the necessary A-level results will not be called for interview, but the decision not to summon a candidate will be taken by all colleges, and not only by the college of first preference;
- Applicants from outside the UK, but from within Europe, are expected to attend interviews in Oxford.
- Special interview arrangements are in place for some candidates to be interviewed overseas; other overseas candidates from a great distance may be interviewed by telephone;
- All candidates who attend for interview will be interviewed by two Colleges;
- All applicants' UCAS forms are "scored" by a panel of 3 tutors and a ranking table is drawn up in the Department. Interviews at the applicants' "first choice" college are arranged by the College. Interviews for all applicants at a second college are arranged by the Department, using a "smart" allocation system to ensure all colleges see a range of good, average and poorer applicants. Each interview is scored. After each interview, candidates' scores are fed back to the Department for inclusion in the ranking table which is thus constantly updated. After both sets of interviews have taken place, a meeting of all tutors is held to decide on the final list of applicants to whom offers should be made;
- These admissions arrangements are intended to ensure that all applicants are offered equality of opportunity irrespective of gender, disability, race, religion, nationality or ethnic origin.

14. Methods for evaluating and improving the quality and standards of learning

- University and College examinations provide a mechanism to assess the effectiveness of teaching as a student progresses through the course;
- Examiners' reports - provide detailed comment on each question set and the level of answers submitted; detailed consideration of the comments focuses attention on any changes which could improve the course;
- Use of External Examiners allows the course to be evaluated in the context of the wider university field;
- Feedback from students, including replies to departmental questionnaires, are discussed, and followed up, by the Junior Members Consultative Group, and the Steering and Teaching Committees. Colleges also circulate feedback forms relating to tutorial teaching: problems are then taken up by the Senior Tutor of the College concerned;
- Feedback from external advisors (Honorary Members of the Department). The Honorary Members are drawn from local and national

pharmaceutical/biotech/management companies and leading academics; discussions are wide-ranging, on specific topics related to teaching practices, research and Departmental organisation;

- Feedback from employers. Graduates from the course are easily employable, and are in demand by a wide range of employers; fewer than 10% of graduates are still seeking employment six months after graduating;
- The Steering and Teaching committees of the Department regularly discuss, and are empowered to enact, changes in the course or teaching methods in the light of the various suggestions arising from the above bodies;
- The high standard of the course is maintained by aiming to attract high-calibre staff who contribute their knowledge and skills to the course;
- With the assistance of the Oxford Learning Institute, the Department provides introductory courses for new lecturers, for graduates and postgraduates taking teaching roles, and in methods of teaching/assessment and career development to existing staff. New lecturers are also given mentors who attend some of the lectures given, and are available to advise on their teaching, and to report back to the Medical Sciences Division on their quality;
- The Department has regular contacts with the Biochemical Society Education Group, and the HEA Centre for Bioscience (formally LTSN Biosciences) for exchange of ideas about new developments in teaching.

15. Regulation of Assessment

Overall Strategy:

- Responsibility for teaching is shared by the University and the Colleges;
- Through the Department, the University provides lectures, practicals and data handling classes;
- The Colleges direct and monitor the progress of individual students through tutorials, regular written tests and termly progress reports;
- The University regulates the degree course, sets syllabuses and examinations.

Methods:

- College assessment is mainly formative, keeping students aware of their progress on a regular basis and helping them to build on their strengths and rectify any weakness on an ongoing basis (see above).
- The University examinations provide summative assessment.
 - Examiners' Reports for Prelims, FHS Part I and FHS Part II are discussed by an Examinations Sub-committee of the Biochemistry Teaching Committee who report to the Biochemistry Steering and Teaching Committees. All reports, and responses by these committees, are sent to the Medical Sciences Divisional Board for consideration;
 - Examiners' Reports, which contain detailed comments on each question set, are sent out to College Tutors, Student Representatives and copies are

deposited in College libraries and also made available on the University website;

- Final Examination: For both Parts I and II, there is an External Examiner who ensures that marks are fair and equitable, particularly at borderlines, and reports in writing to the Vice-Chancellor;
- Use of External Examiners helps to ensure parity of standards with comparable degrees in other universities;
- The External Examiners report directly to the Vice-Chancellor each year. Their reports are first considered by the Examinations Committee and Teaching Committee, then make recommendations and institute action as required.

16. Indicators of quality and standards

- Teaching: TQA Assessment in March 2000 awarded the maximum score of 24;
- Research: Department rated 5 in the 2001 RAE, and was the highest ranked Biochemistry Department in the UK in the 2008 RAE with 75% of research rated as of international standard;
- Internal and External Examiners' Reports;
- Feedback from employers;
- Employers and former students are complimentary about the employability of graduates from the course; supported by the high level (over 90%) of graduates who are in employment six months after graduating;
- High student retention and completion; about 1.5% fail Prelims. while about 4% leave voluntarily, often through illness. There are a limited number of students who change courses, either into or out of Biochemistry, in Year 1 - the balance is close to zero;
- Biochemistry is a popular choice with visiting students from the US and Europe; in any one year, 5-10 students will be in this category.

مرفق ٤ : مصفوفة مضاهاة المعايير القياسية للدراسات العليا الصادرة عن الهيئة مع المعايير الأكاديمية المتبناه لبرنامج الماجستير في الكيمياء الحيوية الطبية

- مواصفات الخريج:

مواصفات الخريج بالمعايير القياسية للدراسات العليا (الماجستير)	مواصفات الخريج بالمعايير الأكاديمية للبرنامج
١-١	<p>2. Apply the basics and methodologies of scientific research and mastering the use of various tools in the field of Medical Biochemistry</p> <p>14. Apply the basics and methodologies of scientific research and mastering the use of various tools in the field of Medical Biochemistry</p>
1-2	<p>3. Apply the analytical method and use it in the field of Medical Biochemistry</p> <p>14. Apply the basics and methodologies of scientific research and mastering the use of various tools in the field of Medical Biochemistry</p>
1-3	<p>1. Understand the basics of Medical Biochemistry and Molecular Biology and good knowledge of the details that serve the medical field and integrate them to related medical knowledge</p> <p>14. Apply the basics and methodologies of scientific research and mastering the use of various tools in the field of Medical Biochemistry</p>
1-4	<p>4. Show awareness of current problems and the latest developments in the field of Medical Biochemistry</p>
1-5	<p>5. Identify any problems in the field of Medical Biochemistry during the performance of his duties and propose suitable solutions</p>

6. Master Medical Biochemistry related skills using appropriate technological methods that serve professional practice	1-6
7. Use various means of communication and information technology to serve the professional practice in the field of Medical Biochemistry and Molecular Biology 8. Work effectively as a team member and/ or lead a team of subordinates	1-7
9. Make the right decision according to the professional context	1-8
10. Employ and maintain the available resources to achieve the highest benefit from them	1-9
11. Work in light of his role in community development and environmental conservation taking global and regional variables in consideration	1-10
12. Act with integrity, credibility and scientific research follow the ethical code of medical practice	1-11
13. Develop himself academically and professionally, through continuous learning	1-12

أ - المعرفة والفهم:

المعايير الأكاديمية للبرنامج	المعايير القياسية العامة للدراسات العليا (درجة الماجستير)
2.1.1 Extensive medical biochemistry including molecular biology knowledge and related disciplines	١-١-٢ النظريات والاساسيات المتعلقة بمجال التعلم وكذا في المجالات ذات العلاقة
2.1.2 Extent of interaction and mutual influence between the biomedical and the surrounding environment Chemistry.	٢-١-٢-٢ التأثير المتبادل بين الممارسة المهنية وانعكاسها على البيئة
2.1.3 Scientific developments in the field of Medical Biochemistry and Molecular Biology.	٣-١-٢ التطورات العلمية في مجال التخصص
2.1.4 Moral and legal principles of professional and medical practice with special emphasis on medical biochemistry investigation	٤-١-٢ المبادئ الاخلاقية والقانونية للممارسة المهنية في مجال التخصص
2.1.5 Principles and the basics of quality assurance in professional practice in the field of Medical Biochemistry	٥-١-٢ مبادئ واساسيات الجودة في الممارسة المهنية في مجال التخصص
2.1.6 Basics and ethics of scientific research.	٦-١-٢ أساسيات وأخلاقيات البحث العلمي

ب - القدرات الذهنية :

المعايير الأكاديمية للبرنامج	المعايير القياسية العامة للدراسات العليا (درجة الماجستير)
2.2.1 Analyze and evaluate information in the field of Medical Biochemistry and use it to solve medical biochemical problems	١-٢-٢ تحليل وتقييم المعلومات في مجال التخصص والقياس عليها لحل المشاكل
2.2.2 Solve specialized problems in the field of Medical Biochemistry problems with the shortage of some data	٢-٢-٢ حل المشاكل المتخصصة مع عدم توافر بعض المعطيات
2.2.3 Link between the various professional knowledge to solve Medical Biochemistry related problems	٣-٢-٢ الربط بين المعارف المختلفة لحل المشاكل المهنية
2.2.4 Conduct a research study or write a problem based systematic scientific study in the field of Medical Biochemistry and Molecular Biology	٤-٢-٢ اجراء دراسة بحثية او كتابة دراسة علمية منهجية حول مشكلة بحثية
2.2.5 Assess risks in professional practices related to the field of Medical Biochemistry	٥-٢-٢ تقييم المخاطر في الممارسات المهنية في مجال التخصص

2.2.6 Plan to improve performance in the field of Medical Biochemistry and Molecular Biology	٦-٢-٢ التخطيط لتطوير الاداء في مجال التخصص
2.2.7 Make professional decisions in a variety of contexts	٧-٢-٢ اتخاذ القرارات المهنية في سياقات مهنية متنوعة
2.2.8 Encourage evidence -based learning and practice needed for experience acquisition	-----

ج. مهارات مهنية وعملية :

المعايير الأكاديمية للبرنامج	المعايير القياسية العامة للدراسات العليا (درجة الماجستير)
2.3.1 Master the basic and advanced professional techniques and skills in the field of Medical Biochemistry and Molecular Biology	١-٣-٢ إتقان المهارات المهنية الاساسية والحديثة في مجال التخصص
2.3.2 Write and evaluate Medical Biochemistry and Molecular Biology laboratory reports	٢-٣-٢ كتابة وتقييم التقارير المهنية
2.3.3 Assess established methods and tools in Medical Biochemistry	٣-٣-٢ تقييم الطرق والأدوات القائمة في مجال التخصص
2.3.4 Assess risks of using chemicals on society and the environment	-----
2.3.5 Apply safety principles in medical and Molecular Biology laboratories	-----

د . مهارات عامة و منتقلة :

المعايير الأكاديمية للبرنامج	المعايير القياسية العامة للدراسات العليا (درجة الماجستير)
2.4.1 Communicate effectively in various directions	١-٤-٢ التواصل الفعال بأنواعه المختلفة
2.4.3 Use information technology to serve the professional practice	٢-٤-٢ استخدام تكنولوجيا المعلومات بما يخدم الممارسة المهنية
2.4.2 Assess himself and determine the	٣-٤-٢ التقييم الذاتي وتحديد احتياجاته

educational needs	التعليمية
2.4.4 Use different resources to get the needed knowledge and information	٤-٤-٢ استخدام المصادر المختلفة لحصول على المعلومات والمعارف
2.4.5 Assess the performance of others using standards and indicators	٥-٤-٢ وضع قواعد ومؤشرات تقييم اداء الآخرين
2.4.6 Work in team in a variety of professional contexts	٦-٤-٢ العمل فى فريق سياقات كهنية مختلفة
2.4.7 Manage time efficiently	٧-٤-٢ ادارة الوقت بكفاءة
2.4.8 Learn continuously depending on himself	٨-٤-٢ التعلم الذاتى والمستمر

مرفق ٥: مصفوفة مضاهاة المعايير الأكاديمية للبرنامج و أهداف و نواتج تعلم البرنامج

أهداف البرنامج	المعايير الأكاديمية للبرنامج: (مواصفات الخريج)
١-١	1. Understand the basics of Medical Biochemistry and Molecular Biology and good knowledge of the details that serve the medical field and integrate them to related medical knowledge
١-٢	2. Apply the basics and methodologies of scientific research and mastering the use of various tools in the field of Medical Biochemistry
١-٤	3. Apply the analytical method and use it in the field of Medical Biochemistry
١-٣	4. Show awareness of current problems and the latest developments in the field of Medical Biochemistry
١-٣	5. Identify any problems in the field of Medical Biochemistry during the performance of his duties and propose suitable solutions
١-٤	6. Master Medical Biochemistry related skills using appropriate technological methods that serve professional practice
١-١١	7. Use various means of communication and information technology to serve the professional practice in the field of Medical Biochemistry and Molecular Biology
١-٨	8. Work effectively as a team member and/ or lead a team of subordinates
1-13	9. Make the right decision according to the professional context
١-٧	10. Employ and maintain the available resources to achieve

	the highest benefit from them
١-٩	11. Work in light of his role in community development and environmental conservation taking global and regional variables in consideration
١-٧	12. Act with integrity, credibility and scientific research follow the ethical code of medical practice
١-٥	13. Develop himself academically and professionally, through continuous learning
١-٦	14. Implement research projects in the field of Medical Biochemistry and Molecular Biology
1-10	15. Implement creative ideas in a way that serve his profession and career in Medical Biochemistry
1-12	-----

نواتج تعلم البرنامج							المعايير الأكاديمية للبرنامج
Knowledge and Understanding							المعرفة و الفهم
2.a.7	2.a.6	2.a.5	2.a.4	2.a.3	2.a.2	2.a.1	
						√	2.1.1 Extensive medical biochemistry including molecular biology knowledge and related disciplines
				√			2.1.2 Extent of interaction and mutual influence between the biomedical and the surrounding environment Chemistry.
		√					2.1.3 Scientific developments in the field of Medical Biochemistry and Molecular Biology.
			√				2.1.4 Moral and legal principles of professional and medical practice with special emphasis on medical

							biochemistry investigation
	√						2.1.5 Principles and the basics of quality assurance in professional practice in the field of Medical Biochemistry
√					√		2.1.6 Basics and ethics of scientific research.

نواتج تعلم البرنامج							المعايير الأكاديمية للبرنامج المهارات الذهنية
Intellectual skills							
2.b.7	2.b.6	2.b.5	2.b.4	2.b.3	2.b.2	2.b.1	
						√	2.2.1 Analyze and evaluate information in the field of Medical Biochemistry and use it to solve medical biochemical problems
					√	√	2.2.2 Solve specialized problems in the field of Medical Biochemistry
		√				√	2.2.3 Link between the various professional knowledge to solve Medical Biochemistry
				√			2.2.4 Conduct a research study or write a problem based systematic scientific
	√						2.2.5 Assess risks in professional practices related to the field of
			√	√			2.2.6 Plan to improve performance in the field of Medical
					√		2.2.7 Make professional decisions in a variety of contexts
			√				2.2.8 Encourage evidence -based learning and practice needed for experience acquisition

نواتج تعلم البرنامج						المعايير الأكاديمية للبرنامج المهارات المهنية
Practical/Professional skills						
2.c.6	2.c.5	2.c.4	2.c.3	2.c.2	2.c.1	
					√	2.3.1 Master the basic and advanced professional techniques and skills in the field of Medical Biochemistry and Molecular Biology
√		√		√		2.3.2 Write and evaluate Medical Biochemistry and Molecular Biology laboratory reports
			√			2.3.3 Assess established methods and tools in Medical Biochemistry
	√					2.3.4 Assess risks of using chemicals on society and the environment
	√					2.3.5 Apply safety principles in medical and Molecular Biology laboratories

نواتج تعلم البرنامج							المعايير الأكاديمية للبرنامج المهارات العامة والمنتقلة
General and transferable skill							
2.d.1	2.d.2	2.d.3	2.d.4	2.d.5	2.d.6	2.d.7	
	√						2.4.1 Communicate effectively in various directions
				√			2.4.2 Assess himself and determine the educational needs
						√	2.4.3 Use information technology to serve the professional practice
				√			2.4.4 Use different resources to get the needed knowledge and information
			√				2.4.5 Assess the performance of others using standards and indicators
						√	2.4.6 Work in team in a variety of professional contexts
				√			2.4.8 Learn continuously depending on himself

مرفق ٦ : مصفوفة المعارف والمهارات للبرنامج (مصفوفة المقررات والبرنامج)

Courses			المعرفة و الفهم
Thesis	Medical Biochemistry 2 nd part	Medical Biochemistry 1 st part	
	<	<	2. a.1. Describe the broad-based core concepts in Medical Biochemistry and Molecular Biology together with their clinical correlations
√	√	√	2. a.2 Know different research techniques, including information retrieval, experimental design and statistics, modeling, sampling, Medical Biochemistry and Molecular Biology techniques
	√	√	2. a.3 Know and understand the degree of impact of Medical Biochemistry and Molecular Biology science on surrounding environment and vice versa
	√	√	2. a.4 Recognize the legal and moral principles in professional practice in Medical Biochemistry field
√	√	√	2. a.5 Identify and follow scientific updates in Medical Biochemistry and Molecular Biology field
√	√	√	2. a.6 Highlight the importance of quality assurance in medical and professional practice related to Medical biochemistry and Molecular Biology
√			2. a.7 Describe the essential facts, concepts, principles and theories relevant to the student's project

courses			المهارات الذهنية
Thesis	Medical Biochemistry 2 nd part	Medical Biochemistry 1 st part	
	√	√	2. b.1 Analyze and solve problems related to Medical Biochemistry and Molecular Biology using an integrated multidisciplinary approach.
	√	√	2. b.2 Make decisions in various medical and professional context
√			2. b.3 Write-up and conduct a plan of original scientific research.
√			2.b.4 Develop plans to improve performance and encourage evidence based learning and practice.
	√	√	2. b.5 Integrate information and professional skills to interpret laboratory reports related to
	√	√	2. b.6 Evaluate risks in professional practice.
√	√	√	2. b.7 use creative and innovative methods and tools in medical and professional practice related to Medical Biochemistry

Courses			المهارات المهنية
Thesis	Medical Biochemistry 2 nd part	Medical Biochemistry 1 st part	
√	√	√	2. c.1 Analyze experimental results and determine their strength and validity.
	√	√	2.c.2 Evaluate established methods and develop tool and/or methods used in Medical Biochemistry investigations.
√	√	√	2.c.3 Use computational tools and packages to serve his professional career .
√	√	√	2. c.4 Plan and execute experiments and

			investigations according to quality and safety principles.
	√	√	2. c.5 write up and evaluate technical reports related to Medical Biochemistry and Molecular Biology

Courses			المهارات العامة والمنتقلة
Thesis	Medical Biochemistry 2 nd part	Medical Biochemistry 1 st part	
√	√	√	2. d.1 Communicate properly with staff members, colleagues and subordinates
√	√	√	2. d.2. Use information technology in a proper way that keeps him current with advances in knowledge and practice.
√	√	√	2. d.3 Use different teaching and evaluation methods to teach others and give feedback on their performance.
√	√	√	2. d.4 Manage time effectively in various contexts
√	√	√	2. d.5 develop and evaluate skills needed for continuing professional improvement.
√	√	√	2. d.6 Express respect the rules of laboratory work.
√	√	√	2. d.7 Work independently or as part of a team in different professional contexts related Medical Biochemistry

مرفق 7: توصيف مقررات الماجستير الجزء الأول

توصيف مقرر Medical Biochemistry

١- بيانات المقرر		
الفرقة / المستوى : 1 st part	اسم المقرر : Medical Biochemistry 1 st part	الرمز الكودي : BIO 601, 603- 606, 608-611 BIO 612-615
<input type="checkbox"/>	عدد الوحدات الدراسية : نظري 1 عملي 4	التخصص : master Medical Biochemistry

1. Overall Aim of the Course is to enable the student:

- 1.1 To be oriented with the biochemical importance of macro-, micronutrients, hormones and enzymes.
- 1.2 To illustrate and/or describe the metabolic pathways of macronutrients and nucleotides.
- 1.3 To identify the bioenergetics of the concerned metabolic pathways under different physiological circumstances and their integrator regulations with other working metabolic pathways.
- 1.4 To identify hereditary and acquired metabolic disturbances and their biochemical laboratory and clinical outcomes.
- 1.5 To be oriented with the importance of biological membranes, the role of free nucleotides in signal transduction control.
- 1.6 To interpret medical laboratory reports.
- 1.7 To be familiar with biotechnology methods and their clinical implications.

٢- هدف المقرر :

٣- المستهدف من تدريس المقرر :

<p>2.1- <u>Knowledge and understanding:</u> <i>By the end of the course, students should be able to:</i> 2.1.1. Describe the metabolic pathways of carbohydrates three main dietary sources of energy: carbohydrates, fats and proteins, their digestion absorption, their oxidation to release energy. 2.1.2 Illustrate the regulation of these pathways and the integration of their metabolism 2.1.3 Identify the biochemical alterations in related metabolic disorders. 2.1.4 discuss the role of vitamins and enzymes required for catalysis of these processes, in addition to the deficiency manifestation of each. 2.1.5 Illustrate the biochemistry of certain tissues like liver, kidney, muscles, cartilage, bone and nervous system and the correlation of their composition to function in health and disease. 2.1.6. explain the metabolism of the major minerals and trace elements their functions and alterations in metabolic processes met with in the in the deficiency or excess of these elements 2.1.7 Describe major body fluids composition and their clinical impact. 2.1.8. identify knowledge about nucleic acid metabolism with special emphasis on their role in protein synthesis.</p>	أ- المعلومات والمفاهيم :
<p>2.2. <u>Intellectual skills:</u> 2.2.1 Analyze pathological glucose tolerance curve 2.2.2 Interpret medical laboratory reports 2.2.3 Solve problems related to metabolic disturbances in a given case study report</p>	ب- المهارات الذهنية:
<p>2.3. <u>Professional and practical skills:</u> <i>By the end of the course, students should be able to:</i> 2.3.1 Perform chemical tests to detect abnormal constituents of blood and urine. 2.3.2 Perform kidney and liver function tests 2.3.3 Assess serum glucose and lipid profile</p>	ج- المهارات المهنية الخاصة بالمقرر :
<p>2.4. <u>General and transferable skills:</u> <i>By the end of the course, students should be able to:</i> 2.4.1. Communicate properly with the staff members as well as with each other. 2.4.2. Respects the rules of laboratory work. 2.4.3. Work effectively in groups.</p>	د - المهارات العامة :

Course contents:٤- محتوى
المقرر:

Subject	Lectures (hrs)	Practical (hrs)	Total (hrs)	% of Total
Biochemistry				
1-Carbohydrate chemistry	15	----	15	4.35
2-Lipid & protein chemistry	15	----	15	4.35
3-Vitamins	15	----	15	4.35
4-Enzymes	15	----	15	4.35
5-Digestion, biochemical changes in large intestine xenobiotics & biotransformations	15	----	15	4.35
6-Basics of carbohydrate metabolism	15	----	15	4.35
7-Basics of lipid metabolism	15	----	15	4.35
8-Basics of Protein & hemoglobin metabolism	15	----	15	4.35
9-Basics of purines, pyrimidines metabolism and protein synthesis	15	----	15	4.35
10-Mineral metabolism, body fluids & tissue chemistry	15	----	15	4.35
11-Hormones	15	----	15	4.35

Practical part				
Determination of: Plasma glucose, urea, creatine, creatinine and uric acid		45	45	13
Plasma cholesterol, triglycerides, total & phospholipids		45	45	13
Plasma calcium, urine calcium, plasma iron & total iron		45	45	13

binding capacity				
Urine exam & stone analysis		45	45	13
Total	165	180	345	100

3-A) TOPICS:

1. Physicochemical principles : Expression of concentration, Law of mass action, reaction of solutions, true and titrable acidity, pH and its determination, indicators, buffers, acidosis, alkalosis, diffusion, osmotic pressure & solution

2. Carbohydrate chemistry: definition & general function, classification, properties of monosaccharides, monosaccharides derivatives, glycosides, disaccharides and polysaccharides.

3. Lipid chemistry: definition & general functions, classification, glycerol, fatty acids, triacylglycerol, prostaglandins, waxes, derived lipids, steroids, sterols and bile acids.

4. Protein Chemistry: Definition and general functions, classification, properties, separation and identification of amino acids, protein structure and properties, protein classification and description of their types, hemoglobin and immunoglobulins.

5. Vitamins :Definition and classification, vitamins A, D, E, K, C, B complex, thiamine, riboflavin, niacin, pyridoxine, pantothenic acid, biotin, lipoic acid, folic acid, cobalamins.

6. Enzymes: chemical nature and classification of enzymes, zymogens, mechanism of action, coenzymes and activators, factors affecting their actions, enzyme inhibitors, enzyme kinetics.

7. Biochemical changes in large intestine and feces: intestinal fermentation and putrefaction, steatorrhea.

8. Xenobiotics, detoxication or biotransformations: oxidation, reduction, hydrolysis, conjugation.

9. Mineral metabolism: metabolism of calcium, phosphates, magnesium, sodium, potassium, chlorides, sulfur, iron, copper, zinc, manganese, selenium, chromium, iodine, fluorine, cobalt, molybdenum and Water.

10. Body fluids: milk, blood and related fluids, sweat, semen and urine.

11. Hormones: Mechanisms of action, classification, pituitary and hypothalamic hormones, thyroid, pancreatic, suprarenal, ovarian, testicular, placental, gastrointestinal, and parathyroid hormones.

12. Carbohydrate metabolism: Digestion and absorption of carbohydrates, major pathway of glucose oxidation, hexose monophosphate pathway, uronic acid pathway, galactose, fructose and aminosugars metabolism, gluconeogenesis, glycogen metabolism, blood glucose, clinical implications of carbohydrate metabolism with special emphasis on diabetes mellitus, glucosuria and hypoglycemia.

13. Lipid Metabolism: Lipid digestion and absorption, fate of absorbed lipids, tissue and depot fat, lipogenesis, lipolysis, fatty acids oxidation, ketone bodies metabolism, phospholipids and glycolipids metabolism, unsaturated fatty acids metabolism, lipoproteins and cholesterol metabolism, pathological aspects of lipid metabolism : fatty liver and lipotropic factors, hyperlipidemia.

14. Protein metabolism: protein digestion and absorption, biological value of proteins, nitrogen metabolism, fate of absorbed amino acids, deamination of amino acids, fate of ammonia produced from deamination, urea formation, fate of the carbon skeleton of amino acid, effect of hormones on protein metabolism, metabolism of individual amino acids, creatine metabolism.

15. Metabolism of heme: biosynthesis, catabolism and excretion, serum bilirubin, jaundice
16. Metabolism of purines: structure, biosynthesis, catabolism and excretion, gout, hypouricemia.
17. Metabolism of pyrimidines: structure, biosynthesis, catabolism and excretion, disorders of metabolism.
18. Metabolism of nucleic acids: digestion and absorption, biosynthesis, catabolism.

• - **Teaching and learning methods:**

METHODS USED:

1. Modified Lectures
2. Tutorials
3. Problem solving
4. Self learning
5. Practical classes

TEACHING PLAN:

Lectures: 3 lectures /week (2:20 hours each), Time: 10 a.m to 12:20 p.m

Practical: 3 classes / week, (2:30 hours each) with a total of 7.5 hours/week.

Time plan:

Item	Time schedule	Teaching hours	Total hours
Lectures	3 lectures / week	2:20 hours each	165
Practical	three classes / week	2:30 hours each	180
Total			345

٥- أساليب
التعليم والتعلم

6- تقويم الطلاب :

ATTENDANCE CRITERIA: attendance percentage of > 75% must be fulfilled before the final exam.

أ- الأساليب
المستخدمة

Assessment TOOLS:

Tool	Purpose (ILOs)
Written examination	To assess knowledge & intellectual skills.
Oral examination	To assess knowledge, intellectual skills& general& transferable skills.
Practical examination	To assess knowledge, intellectual skills, professional & general& transferable skills.
MCQ examination	To assess knowledge, intellectual skills

TIME SCHEDULE:

Exam	Date
1- First part	6 months from registration

ب- التوقيت

Weighting System:

Examination	Marks allocated	% of Total Marks
1. First part	300	30 % of total (1 st & 2 nd)
2. Final exam:		
a- Written	100	33.3 % of 1 st part
b- Practical	100	33.3 % of 1 st part
c- Oral	100	33.3 % of 1 st part

ج- توزيع الدرجات

- The minimum passing grade is 180 marks (60% of the total marks), provided that at least 75 marks (50%) are obtained in the final written exam.
- Passing grades are: EXCELLENT >85%, VERY GOOD 75- <85%, GOOD 65- <75% and FAIR 60- <65%.

5-E) Examination description:

Examination	Description	Marks
1- First part exam:		
a- Written	3-hours written exam composed of short essay questions.	100
b- Oral	One session of oral examination.	100
c- Practical	One session to perform chemical tests using variable techniques.	100

7- قائمة الكتب الدراسية والمراجع :

<p>▪ Essential books: Murray R.K., Bender D.A., Botham K.M., Kennelly P.J., Rodwell V.W. and Weil P.A (2009): Harper's Illustrated Biochemistry (Lange Medical Book). 28th edition. Pages: 1269. <i>Publisher:</i> McGraw-Hill Medical</p>	<p>أ- كتب ملزمة</p>
<p>▪ Recommended Books: Champe P.C., Harvey R.A. and Ferrier D.R. (2011): Lippincott's Illustrated Reviews: Biochemistry (Lippincott's Illustrated Reviews Series). 4th edition. Pages:528. <i>Publisher:</i> Lippincott Williams & Wilkins.</p>	<p>ب- كتب مقترحة</p>
<p>▪ Periodical websites: <i>www.clinchem.org</i></p>	<p>ج - دوريات علمية أو نشرات ... الخ</p>

<p>Course coordinator: Prof. Dr. Mahasen Abd Elsattar Dr. Inas Abdulmonem Dr. Shuzan Ali</p>	<p>Signature & date:</p>
<p>Head of Department: Prof. Dr. Amal Abou Elfadle</p>	<p>Signature & date:</p>

مرفق 8: توصيف مقرر الماجستير الجزء الثاني

١- بيانات المقرر		
الفرقة / المستوى : 2 nd part	اسم المقرر : Medical Biochemistry 2 nd part	الرمز الكودي : BIO 612, 616, 618-620, 622-624, 626-629 BIO 630-635
<input type="checkbox"/>	عدد الوحدات الدراسية : نظري 14 عملي 6 <input type="checkbox"/>	التخصص : Master Degree Medical Bhochemistry

<p>. Overall Aim of the Course is to enable the student:</p> <p>1.2 Illustrate and/or describe the metabolic pathways of macronutrients and nucleotides.</p> <p>1.3 Identify the bioenergetics of the concerned metabolic pathways under different physiological circumstances and their integrator regulations with other working metabolic pathways.</p> <p>1.4 Identify hereditary and acquired metabolic disturbances and their biochemical laboratory and clinical outcomes.</p> <p>1.5 Familiarize the student with basic principles of molecular biology and protein biosynthesis.</p> <p>1.6 Understand the role of macromolecules involved in transmission of information from gene expression to the formation of functioning protein.</p> <p>1.7 Interpret medical laboratory reports.</p> <p>1.8 Be familiar with biotechnology methods and their clinical implications.</p>	٢- هدف المقرر :
٣- المستهدف من تدريس المقرر :	

<p>2.1- <u>Knowledge and understanding:</u> <i>By the end of the course, students should be able to:</i></p> <p>2.1.1. Describe the metabolic pathways of carbohydrates three main dietary sources of energy: carbohydrates, fats and proteins, their digestion absorption, their oxidation to release energy.</p> <p>2.1.2 Illustrate the regulation of these pathways and the integration of their metabolism</p> <p>2.1.3 Identify biochemical alteration in related metabolic disorders.</p> <p>2.1.4 Illustrate the biochemistry of certain tissues like liver, kidney, muscles, cartilage, bone and nervous system and the correlation of their composition to function in health and disease.</p> <p>2.1.5. identify knowledge about nucleic acid metabolism with special emphasis on their role in protein synthesis.</p>					أ- المعلومات والمفاهيم :
<p>2.2. <u>Intellectual skills:</u></p> <p>2.2.1 Analyze pathological glucose tolerance curve</p> <p>2.2.2 Interpret medical laboratory reports</p> <p>2.2.3 Solve problems related to metabolic disturbances in a given case study report</p> <p>2.2.4 Interpret the photos of electrophoresis of PCR products.</p>					ب- المهارات الذهنية:
<p>2.3. <u>Professional and practical skills:</u> <i>By the end of the course, students should be able to:</i></p> <p>2.3.1 Perform chemical tests to detect abnormal constituents of blood and urine.</p> <p>2.3.2 Perform kidney and liver function tests</p> <p>2.3.3 Assess serum glucose and lipid profile.</p> <p>2.3.4 extract DNA according to the basic principles of further techniques using extracted DNA.</p>					ج- المهارات المهنية الخاصة بالمقرر
<p>2.4. <u>General and transferable skills:</u> <i>By the end of the course, students should be able to:</i></p> <p>2.4.1. Communicate properly with the staff members as well as with each other.</p> <p>2.4.2. Respect the rules of laboratory work.</p> <p>2.4.3. Work effectively in groups.</p>					د - المهارات العامة :
<u>Course contents:</u>					٤ -
Subject	Lectures (hr)	Practical (hrs)	Total (hrs)	% of	محتوى المقرر:

Biochemistry and Molecular Biology					
Bioenergetics, biological oxidation & respiratory chain	30	---	30	3.13	
Carbohydrates & lipid of physiological significance	30	---	30	3.13	
Intermediary metabolism	30	---	30	3.13	
Citric acid cycle, glycolysis & pyruvate oxidation, glycogen metabolism, gluconeogenesis, pentose phosphate & Hexose metabolism pathways	30	---	30	3.13	
Metabolism of fatty acids, and lipid metabolism	30	---	30	3.13	
Metabolism of amino acids, porphyrins & bile pigments	30	---	30	3.13	
Nucleotides, metabolism of purines. Pyrimidnes, nucleic acid structure & function	30	---	30	3.13	
DNA organization, replication and repair	30	---	30	3.13	
RNA synthesis, processing & modification	30	---	30	3.13	
Protein Synthesis and the genetic code	30	---	30	3.13	
Regulation of gene expression	30	---	30	3.13	
Recombinant DNA technology	30	---	30	3.13	
Cancer genes and growth factors	30	---	30	3.13	
Biochemical and genetic basis of disease	30	---	30	3.13	
Practical part					
Spectrophotometry	---	90	90	9.4	
Flame photometry	---	90	90	9.4	
Chromatography	---	90	90	9.4	
Electrophoresis	---	90	90	9.4	
Colorimetric assays	---	90	90	9.4	
Competitive binding assays (RIA, ELISA)	---	90	90	9.4	
Total	420	540	960	100	

3-A) TOPICS:

1. Physicochemical principles : Expression of concentration, Law of mass action, reaction of solutions, true and titrable acidity, pH and its determination, indicators, buffers, acidosis, alkalosis, diffusion, osmotic pressure & solution

2. Carbohydrate metabolism: Digestion and absorption of carbohydrates, major pathway of glucose oxidation, hexose monophosphate pathway, uronic acid pathway, galactose, fructose and aminosugars metabolism, gluconeogenesis, glycogen metabolism, blood glucose, clinical implications of carbohydrate metabolism with special emphasis on diabetes mellitus, glucosuria and hypoglycemia.

3. Lipid Metabolism: Lipid digestion and absorption, fate of absorbed lipids, tissue and depot fat, lipogenesis, lipolysis, fatty acids oxidation, ketone bodies metabolism, phospholipids and glycolipids metabolism, unsaturated fatty acids metabolism, lipoproteins and cholesterol metabolism, pathological aspects of lipid metabolism : fatty liver and lipotropic factors, hyperlipidemia.

4. Protein metabolism: protein digestion and absorption, biological value of proteins, nitrogen metabolism, fate of absorbed amino acids, deamination of amino acids, fate of ammonia produced from deamination, urea formation, fate of the carbon skeleton of amino acid, effect of hormones on protein metabolism, metabolism of individual amino acids, creatine metabolism.

5. Metabolism of heme: biosynthesis, catabolism and excretion, serum bilirubin, jaundice

6. Metabolism of purines: structure, biosynthesis, catabolism and excretion, gout, hypouricemia.

7. Metabolism of pyrimidines: structure, biosynthesis, catabolism and excretion, disorders of metabolism.

<p>8. Nucleic Acids: structure , functions and protein biosynthesis, nucleosides and nucleotides structure, polynucleotide structure of nucleic acids, DNA structure, structure of different types of RNAs, importance and functions of nucleic acids, DNA replication, protein biosynthesis, free nucleotids of biological importance</p> <p>9. Metabolism of nucleic acids: digestion and absorption, biosynthesis, catabolism.</p> <p>10. Recombinant DNA Technology: Restriction endonucleases, cloning, gene preparation, vectors, formation of recombinant DNA, applications of recombinant DNA</p> <p>11. Gene expression and its regulation.</p> <p>12. Biochemical and genetic basis of disease.</p> <p>13. Biochemistry of cancer, oncogenes, growth factors.</p> <p>14. Biochemistry of tumor markers.</p>	
<p>- <u>Teaching and learning methods:</u></p> <p><u>METHODS USED:</u></p> <p>6. Modified Lectures</p> <p>7. Tutorials</p> <p>8. Problem solving</p> <p>9. Self learning</p> <p>10. Practical classes</p> <p><u>TEACHING PLAN:</u></p> <p><i>Lectures: 8.45 total teaching hours / week as follow; 3 lectures / week (3 and 2:45 hours according to the subject), from <u>10 a.m to 1 p.m</u></i></p> <p><i>Practical classes: 11:15 total teaching hours / week as follow; four classes / week [three classes / week (3:00 hours each) and one class / week (2:15h)]</i></p>	<p>-٥ أساليب التعليم والتعلم</p>

Time plan:			
Item	Time schedule	Teaching hours	Total hours
Lectures	3 times / week	2 lectures (3 hours each) and one lecture (2.45 h)	420
Practical	four times / week	3 classes (3 hours each) and one class (2:15 h)	540
Total			960
6- تقويم الطلاب :			
A) ATTENDANCE CRITERIA: attendance percentage of > 75% must be fulfilled before the final exam.			أ- الأساليب المستخدمة
5-B) Assessment TOOLS:			
Tool		Purpose (ILOs)	
Written examination		To assess knowledge & intellectual skills.	
Oral examination		To assess knowledge, intellectual skills& general transferable skills.	
Practical examination		To assess knowledge, intellectual skills, professional & general& transferable skills.	
C) TIME SCHEDULE:			ب- التوقيت
Exam		Date	
3- Second part		12 months apart from the 1 st part exam	
5- Thesis		6 months	
د) Weighting System:			ج- توزيع الدرجات
Examination	Marks allocated	% of Total Marks	
3- Second part	700	70 % of total (1 st & 2 nd)	
5- Final exam:			
a- Written	350	50 % of 2 nd part	
b- Practical	175	25% of 2 nd part	
c- Oral	175	25% of 2 nd part	
<ul style="list-style-type: none"> ▪ The minimum passing grade is 420 marks (60% of the total marks), provided that at least 175 marks (50%) are obtained in the final written exam. ▪ Passing grades are: EXCELLENT >85%, VERY GOOD 75- <85%, GOOD 65- <75% and FAIR 60- <65%. 			
5-E) Examination description:			
Examination	Description		Marks
3- Second part exam:			
Written	Two written exams (3- hours each)		350

b- Practical	Perform chemical tests using variable techniques	175		
c- Oral	One session of oral examination	175		
Total		700		

7- قائمة الكتب الدراسية والمراجع :

<ul style="list-style-type: none"> ▪ Essential books: Murray R.K., Bender D.A., Botham K.M., Kennelly P.J., Rodwell V.W. and Weil P.A (2009): Harper's Illustrated Biochemistry (Lange Medical <i>Book</i>). 28th edition. Pages: 1269. <i>Publisher:</i> McGraw-Hill Medical 	أ- كتب ملزمة
<ul style="list-style-type: none"> ▪ Recommended Books: Champe P.C., Harvey R.A. and Ferrier D.R. (2011): Lippincott's Illustrated Reviews: <i>Biochemistry</i> (Lippincott's Illustrated Reviews Series). 4th edition. Pages:528. <i>Publisher:</i> Lippincott Williams & Wilkins. 	ب- كتب مقترحة
<ul style="list-style-type: none"> ▪ Periodical websites: www.clinchem.org 	ج- دوريات علمية أو نشرات ... الخ

Course coordinator: Prof. Dr. Mahasen Abd Elsattar Dr. Inas Abdulmonem Dr. Shuzan Ali	Signature & date:
Head of Department: Prof. Dr. Amal Abou Elfadle	Signature & date: