جامعة بنها
كلية الطب البشرى
قسم الكيمياء الحيوية الطبية

توصيف برنامج دكتوراة الكيمياء الحيوية الطبية
(عام ٢٠١٤-٢٠١٣)

أ- معلومات أساسية : a- Basic information

١ - اسم البرنامج : **MD of Medical Biochemistry**

٢ - طبيعة البرنامج : single (احادي)

٣ القسم المانح للدرجة والمسئول عن البرنامج: **Department of Medical Biochemistry**

٤- تاريخ إقرار البرنامج فى مجلس القسم : ٣ / ٩ / ٢٠١٣

٥- تاريخ إقرار البرنامج فى مجلس الكلية ٣٥٦: ١٥ / ٩ / ٢٠١٣

٦- مسئول البرنامج: **Prof. Dr. Mahasen Abd Elsattar, Dr. Inas Abdulmonem Elsayed,**

٧- المراجة الداخلية للبرنامج: **Prof. Dr. amal Abou Elfadl**

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

ب- معلومات متخصصة: b- Professional information

١ - الأهداف العامة للبرنامج :

1- Program aims:

The overall aims of the program are to

1. Understanding basics of Medical Biochemistry and Molecular Biology and apply it in scientific research.
2. Apply analytical method and criticism of knowledge in the field of Medical Biochemistry and Molecular Biology and integrate them with related medical knowledge
3. Correlate knowledge in the field of Medical Biochemistry and Molecular Biology with related knowledge in other fields
4. Master a wide range of professional skills in the field of medical biochemistry.

5. Develop methods and tools and new techniques for professional practice in the principles of medical biochemistry and molecular biology.
6. Practice efficiently all available biochemical and molecular biology techniques either for laboratory diagnosis or research and find new sources.
7. Take decision according to circumstances
8. Learn knowledge that is informed and inspired by the research and scholarship of the staff and according to the international standards.
9. Understand molecular biosciences together with more detailed and critical knowledge in selected areas.
10. Aquitaine Well-developed practical, analytical skills necessary for proper detection of ongoing provisional problems and finding of innovative solutions for them.
11. Communicate properly with others and acquire ability to lead a team consisting of different provisional context
12. Stimulate educational experience that prepares students for future employment and is orientated towards a professional career.
13. Maintain learning abilities necessary for continuous medical education and transfer of knowledge to others.
14. Add knowledge and follow recent theories in medical biochemistry and molecular biology
15. Show awareness and active participation in community progress assessment and environmental health problems identification.
16. Behave with commitment to integrity and credibility and follow the ethical code of medical practice
17. understand the basic knowledge of life sciences at the molecular level
18. Be aware of safe laboratory practice

2-Intended Learning Outcomes (ILOS):

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

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

2.a.1. Understand the broad-based core biochemistry and molecular biology of different body tissues and organs and related disciplines.
2.a.2 . Know the function of the different intermediary metabolism (anabolic and catabolic).

2.a.3. Recognize the biochemical importance of hormones, vitamins, minerals and enzymes integrating in the metabolism.
2.a.4 . Illustrate the regulation of the metabolic pathways and the integration of their metabolism.
2.a.5 . Identify the biological membrane structure, their role in transport mechanisms as well as their biochemical, clinical and laboratory importance.
2.a.6. Identify alterations in related metabolic disorders at biochemical and molecular level.
2.a.7. Explain effect of his clinical practice on environment and principles of environmental development and saving.
2.a.8. Illustrate and define basic concepts of molecular biology.
2.a.9. Know and follow most recent advances, in selected areas relevant to each subject.
2.a.10. Understand scientific background of laboratory equipment and methods used in the Medical Biochemistry and Molecular Biology, and safe working practices.
2.a.11. Recognize different techniques and tools for searching the scientific literature.
2.a.12. Know range of presentation techniques.
2.a.13. Describe numerical, graphical, statistical and other methods for analyzing experimental data.
2.a.14 . Explain basics of ethics and scientific, medico legal aspects of health problems during practice related to biomedical investigations
2.a.15. Know principles and basics of quality assurance and ways to improve them in the field of Medical Biochemistry
2.a.16. Know principles and techniques of Molecular Biology

2.b. Intellectual Skills: **٢. ب ـ القدرات الذهنية :-**

On successful completion of the program, the graduate will be able to:
2.b.1. Integrate various metabolic pathways together with their regulation.
2. b.2.Evaluate of hazards in clinical practice, safety procedures.
2.b.3. Design hypotheses and experiments to test these hypotheses, including the design of appropriate controls.
2.b.4. Develop primary and secondary scientific literature relevant to a specific topic.
2.b.5 .integrate different presentation methods (written, numerical, graphical and visual methods) so that subjects can be effectively conveyed.

2.b.6. Analyze and evaluate information related to Medical Biochemistry and Molecular Biology in scientific researches.then, use statistical methods to express data
2.b.7. Design studies that add to the knowledge with application of efficient approaches in the field of Medical Biochemistry
2.b.8 Solve problems of relevant situations related to medical Biochemistry and Compare properly the biochemical information from a variety of sources.
2.b.9. Suggest accurately possible investigations needed for diagnosis
2.b.11. Recommend laboratory reagents and instruments that could be used in biochemistry and molecular labs .
2.b.10 Construct scientific research papers related to medical Biochemistry
2.b.12. Take provisional decision based on knowledge in the field of Medical Biochemistry.
2.b.13. relate knowledge based on reasoning and evidence.
2.b.14. Plan for development of performance in the field of medical biochemistry and molecular biology
2.b.15. solve various health problems based on biochemical and molecular creative thinking.

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. Use relevant laboratory equipment competently.
2.C.2. Experiment and apply various techniques used in Medical Biochemistry and Molecular Biology.
2.c.3. Apply safety measure in the laboratory.
2.c.4. Use technological methods to serve the professional practice.
2.c.5 .Write up reports related to medical laboratory tests.
2.c.6 . write scientific papers in the area of medical biochemistry and molecular biology.
2.c.7. Use different teaching methods, and student evaluation methods
2.c.8. Select methods for development of practice

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. Manage his own learning, including time management skills to learn effectively from a range of resources.
2.d.2. Work effectively as a member or leader of a team.
2.d.3. Communicate properly with colleagues and staff members.
2.d.4. Use different teaching and evaluation methods to teach others and give feedback on their performance.
2.d.5. Manage scientific meetings according to the available time.
2.d.6. Use Information Technology that serve professional career in Medical Biochemistry
2.d.7. Use available resources to learn independently and continuously.

3. Academic Standards ٣ -المعايير الأكاديمية للبرنامج:

Academic Standards of MD Program of Medical Biochemistry, approved in department council no (190) date 6 / 2013, and in Faculty council no. (354) date 16/ 6 / 2013 is attached in **ملحق ١**

4-العلامات المرجعية:

4.a)Reference standard
المعايير القياسية لبرامج الدراسات العليا (درجة الدكتوراة) الصادرة عن الهيئة القومية لجودة التعليم والإعتماد (مارس ٢٠٠٩)

Academic reference standards (ARS) , MD Program (March 2009) , issued by the National Authority for Quality Assurance & Accreditation of Education NAQAAE **(ملحق ٢)**

5- Program structure and contents ٥ ـ هيكل ومكونات البرنامج :

a) Program duration:

- four Semesters (2 years) + **Thesis** from the beginning

ب ـ هيكل البرنامج:

b) Program structure
Total hours of program 69 credit hours

- **Theoretical 25 credit hours**
- **Practical 4 credit hours**
- **Thesis : 40 credit hours**

- **Electiveاختياري : 4 credit hours**
- **Selective انتقائي :non**

ج- مستويات ومقررات البرنامج:

البند	المقررات	الكود	الساعات المعتمدة
إجباري Medical Biochemistry include BIO 701-719	يشمل الجزء النظري المواضيع الآتية:		٢١ ساعة
	Eucaryotic Cell structure تركيب الخلية	BIO 701	١
	Proteins: composition & structure Structure-function relationship of protein families تركيب ووظائف البروتينات	BIO 702	١
	Enzymes: classification, kinetics, control تقسيم وفعل الأنزيمات	BIO 703	١
	Carbohydrate metabolism: Major and special pathways, and their control. أيض التمثيل للنشويات	BIO 704	٢
	Lipids: Utilization, storage metabolism of special lipids أيض الدهون	BIO 705	٢
	Amino Acids: General pathways and individual a.a. metabolism أيض الأحماض الأمينية	BIO 707	١
	Metabolic interrelations علاقة الأيض بعضها ببعض	BIO 708	١
	DNA: The replicative process & repair عمل الجينات الوراثية	BIO 709	١
	RNA: Structure, transcription and posttranscriptional modification تركيب وعمل الجينات الوراثية	BIO 710	١
	Protein synthesis: translation and posttranslational modifications تصنيع البروتينات	BIO 711	١
	Recombinant DNA and Biotechnologyطريقة تحديد الجينات	BIO 712	١
	Regulation of gene expression تنظيم الجينات	BIO 713	١
	Biochemistry of peptide and steroid hormones كيمياء الهرمونات	BIO 714	١

	Molecular cell biology, biotransformations, the cytochrome P-450 تركيب الخلية الدقيق وتحويلاتها	BIO 715	١
	Iron and Ham Metabolism, Gos Transport and PH Regulation أيض الحديد والهيموجلوبين	BIO 716	١
	Digestion and Absorption of basic nutritional constituents الهضم والإمتصاص للمواد المختلفة	BIO 717	١
	Updates in Medical Biochemistry and Molecular Biology		1
	Principles of nutrition, macronutrients and micronutrients أساسيات التغذية	BIO 718	١
الجزء العملي	Spectrophotometry- Flame photometry- chromatography- Electrophoresis- Colorimetric assays- Competitive binding assays (RIA, ELISA molecular Biology techniques قياس المواد المخلقة بطرق مختلفة لها الكروماتوجراف	BIO 719	٤ ساعات
إختياري	Subcellular fractionation- Nutrition- and 3 out of the following six topics: Biochemistry of vision, of connective tissue, of liver, of muscle of nervous tissue, and of adipose tissue. القياس الدقيق لتفاعلات الخلية	BIO 720	٤ ساعات
الرسالة			٤٠ ساعة
الإجمالي			٦٩ ساعة

a- Compulsory courses:

Course Title	Course Code	NO. of hours per week			Total teaching hours weeks
		Theoretical Lectures	Tutorials	Laboratory /practical Total	
Medical Biochemistry Practical Part	**Bio701-719**	**13:07**		**13:07**	**765**
		----	**----**	**7:30**	**540**
Total					**1305**
Thesis					**40 credit h.**

b-Elective courses:

Course Title	Course Code	NO. of hours per week			Total teaching hours
		Theoretical Lecture	Seminars	Laboratory /practical Total	
Subcellular fractionation- Nutrition- and 3 out of the following six topics: Biochemistry of vision, of connective tissue, of liver, of muscle of nervous tissue, and of adipose tissue.	**BIO 720**	**2**	**-----**	**-----**	**180**
Total:		**2**			**180 Hours**

Selective: none

6- course content

6- محتويات المقررات (راجع ملحق ٧)

- كود أو رقم المقرر :
- اسم المقرر :
- المحتويات:

7- program admission requirements

٧- متطلبات الإلتحاق بالبرنامج

مادة (٢٣) : يشترط لقيد الطالب لدرجة الدكتوراه فى الطب أو الجراحة أو العلوم الطبية الأساسية أن يكون حاصلا على درجة الماجستير فى مادة التخصص بتقدير جيد على الأقل من إحدى جامعات ج. م . ع أو على درجة معادلة لها من معهد علمى أخر معترف به من الجامعة .

☒ **مدة الدراسة لنيل الدكتوراه سنتان ونصف موزعة كا لاتى :**

- **جزء أول : علوم أساسية . فصل دراسى لمدة ستة شهور (٦ ساعات معتمدة) ومن يرسب يعيد مادة الرسوب فقط .**

- **الجزء الثانى : ثلاث فصول دراسية لمدة سنة ونصف (٣٩) ساعة معتمدة يستوفى خلالها الطالب الساعات المعتمدة ثم يسمح له بالتقدم لامتحان التحريرى وإذا اجتاز الامتحان التحريرى بنجاح يحق له التقدم الى الامتحان الشفهى والعملى والإكلينيكي خلال شهر من تاريخ الامتحان التحريرى.**

- **رسالة (١٥ ساعة معتمدة)**

تبدأ الدراسة عند بداية التسجيل تنتهى بامتحان شامل فى نهاية كل أربع فصول دراسية بعد اجتياز الطالب امتحانات الجزء الأول بنجاح يسمح له بتسجيل رسالة لمدة أربعة فصول دراسية تبدأ عند بداية الفصل الدراسى الثانى وتناقش بعد مرور عامين على الأقل من تاريخ تسجيل الرسالة على أن تكون المناقشة بعد ستة اشهر على الأقل مع اجتياز الامتحان التحريرى والإكلينيكية والشفهى (الامتحان الشامل) .

يمنح الطالب الدرجة بعد مناقشة الرسالة واجتياز الامتحان الشامل.

- **يكون التقدم للقيد لدرجة الدكتوراه مر تين فى السنة خلال شهرى مارس وأكتوبر من كل عام.**

8- القواعد المنظمة لإستكمال البرنامج :

مادة (٢٤) : يشترط فى الطالب لنيل درجة الدكتوراه فى الطب أو الجراحة أو العلوم الطبية الأساسية ما يلى :

- **حضور المقررات الدراسية بصفة مرضية طبقا للساعات المعتمدة.**
- **أن يقوم ببحث فى موضوع تقره الجامعة بعد موافقة مجلس الكلية والقسم لمدة سنتان على الأقل.**
- **أن يتقدم بنتائج البحث فى رسالة تقبلها لجنة الحكم بعد مناقشة علنية للرسالة . اجتياز الطالب ثلاث دورات فى الحاسب الآلى (دورة فى مقدمة الحاسب الألى – دورة تدريبية " متوسطة " – دورة فى تطبيقات الحاسب الألى) . وذلك قبل مناقشة الرسالة.**
- **اجتياز الطالب اختبار التويفل بمستوى لا يقل عن ٥٠٠ وحدة وذلك قبل مناقشة الرسالة.**
- **أن يجتاز بنجاح الاختبارات التحريرية والإكلينيكية والشفهية المقررة وفقا لما هو مبين باللائحة.**

مادة (٢٥) : على الطالب أن يقيد اسمه للامتحان قبل موعده بشهر على الأقل .

مادة (٢٦) : يشترط لنجاح الطالب فى امتحان الدكتوراه الحصول على الحد الأدنى للنجاح فى جميع الاختبارات المقررة وفى كل جزء من أجزاءها على حدة ذلك بأخذ المتوسط لتقديرات أعضاء اللجنة اذا رسب الطالب فى أى مقرر من المقررات بعد الامتحان فى جميع المقررات.

مادة (٢٧) : يعقد الامتحان التحريرى لدرجة الدكتوراه فى شهرى نوفمبر ومايو من كل عام – لمن يجتاز الامتحان التحريرى فى نفس الدور يتقدم الامتحان الشفهى والاكلينكى والعملى

مادة (٢٨) : لا يجوز للطالب أن يبقى مقيدا لدرجة الدكتوراه لأكثر من أربع سنوات دون أن يتقدم لمناقشة الرسالة ويجوز لمجلس الكلية أن يعطى الطالب مهلة لمدة سنتين فى حالة قبول العذر

مادة (٢٩) : تضاف درجات التحريرى ووصف الحالة لبعضها ويعتبر النجاح والرسوب فى المجموع الكلى للتحريرى (٦٠% على الاقل من الدرجة النهائية للتحريرى) ومن ينجح فى الامتحان التحريرى يصرح له بدخول باقى الامتحانات الإكلينيكية والشفوية والعملية وعدد الرسوب يعيد الطالب الامتحان الشفوى والاكلينيكى. لا يحق للطالب التقدم للامتحان التحريرى أكثر من أربع مرات.

9- Students Assessment Methods 9- طرق وقواعد تقييم اللتحقين بالبرنامج

م	الطريقة	ما تقيسة من مخرجات التعلم المستهدفة
1	Written examination	To assess knowledge and understanding & From 2.a.1 to 2.a.16 intellectual skills: from 2.b.1 to 2.b.15
2	Oral examination	To assess knowledge and understanding, From 2.a.1 to 2.a.16 intellectual skills & from 2.b.1 to 2.b.15 General & transferable skills From 2.c.1. to 2.c.8
3	Practical examination	To assess knowledge and understanding, From 2.a.1 to 2.a.16 intellectual skills & from 2.b.1 to 2.b.15 General & transferable skills From 2.c.1. to 2.c.8 Practical skills from 2.d.1 to2.d.1
	Thesis Discussion	To assess knowledge and understanding, From 2.a.1 to 2.a.16 intellectual skills & from 2.b.1 to 2.b.15 General & transferable skills From 2.c.1. to 2.c.8 Practical skills from 2.d.1 to2.d.1

المقرر	الاختبار	الـــدرجة			إجمالي
		تحريري	شفهي	عملي	
Medical Biochemistry BIO 701-719	اختباران تحريريان مدة كل منهما ثلاث ساعات + اختبار شفهي + اختبار عملي	350 350	200	100	1000
إجمالي الدرجة					1000

١٠ ـ طرق تقويم البرنامج: Evaluation of Program:

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

Program Coordinator:

Name: prof. Dr. Mahasen Abd Elsattar

Name :Dr. Inas Abdulmonem

Date ٢٠١٣/٩

الملحقات :

ملحق ١: Academic standard of the program

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

ملحق 3: Benchmarks (المعاييرالمرجعية الخارجية)

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

ملحق ٥: مصفوفة البرنامج مع المعايير الأكاديمية للبرنامج.

ملحق ٦: مصفوفة المقررات مع البرنامج Program-Courses ILOs Matrix

ملحق ٧: توصيف المقرر

Academic standard of the program: ملحق ١

جامعة بنها
كلية الطب
قسم الطب الشرعى و السموم الأكلينيكية

وثيقة المعايير الأكاديمية المرجعية لبرنامج الدكتوراة

Academic Reference Standards (ARS) for MD Degree in Medical Biochemistry

Graduate attributes:

Graduate for MD Biochemistry should be able to:

1. **Apply properly the principles of scientific research in the field of Medical Biochemistry and related disciplines**
2. **Continuously add to his knowledge in the field of Medical Biochemistry .**
3. **Provide students with a comprehensive background in of Medical Biochemistry and Molecular Biology which is necessary to understand the basic knowledge of life sciences at the molecular level**
4. **Master a wide range of professional skills in the field of Medical Biochemistry using appropriate technological methods that serve professional practice.**
5. **Apply of the analytical method and criticism of knowledge in the field of Medical Biochemistry and related fields such as.**
6. **Integrate specialized knowledge in Medical Biochemistry and Molecular Biology with related knowledge in medical field to find suitable solutions for encountered problems**
7. **Show a deep awareness of the ongoing problems and modern theories in the field of Medical Biochemistry and Molecular Biology.**
8. **Identify professional problems in Medical Biochemical labs and find innovative solutions.**
9. **Develop new methods and tools of professional practice and provide basic training on principles of Medical Biochemistry and Molecular Biology**
10. **Use appropriate technological means related to Molecular Biology**
11. **Communicate effectively and lead a team in different professional contexts**
12. **Take decision in light of available information**
13. **Make use of available resources in labs and departments, develop and work to find new resources**
14. **Develop community and conserve environment through awareness of safe practice in Medical Biochemistry laboratories**
15. **Behave with commitment to integrity and credibility and follow the ethical code of medical practice**
16. **Continuously develop himself and transfer knowledge /experience to others**

2. Standard criteria:

2.1 Knowledge and understanding

By the end of the MD program in Medical Biochemistry graduate should understand and be aware of the following:

2.1.1 Basics and advanced knowledge of Medical Biochemistry and Molecular Biology and their link with related disciplines

2.1.2 Metabolic disorders and their biochemical and molecular basis

2.1.3 Principles and techniques of Molecular Biology

2.1.4 Laboratory equipment and modern methods used in Medical Biochemistry and Molecular Biology, including safe work practices

2.1.5 Ethical, scientific and legal principles of research with special emphasis on biomedical investigations.

2.1.6 Principles and basics of quality assurance and their applications in the field of Medical Biochemistry

2.1.7 Legal and ethical considerations related to professional practice

2.1.8 Extent of interaction and mutual influence between the biochemical and the surrounding environmental chemistry

2.2 Intellectual skills

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

2.2.1Analyse and evaluate information in the field of Medical Biochemistry and use statistical methods to express data

2.2.2 Suggest accurately the possible investigations needed for diagnosis of diseases

2.2.3 Solve specialized problems based on available data and compare information from a variety of sources

2.2.4 Carry out research studies that add to the knowledge with application of different approaches in various fields of Medical Biochemistry

2.2.5 Drafting scientific research papers

2.2.6 Assess risks in professional practices and the application of information for solving professional problems in the field of Medical Biochemistry

2.2.7 Plan for the performance improvement in the field of Medical Biochemistry and Molecular Biology.

2.2.8 Take special textured Biochemistry career decisions in different professional contexts

2.2.9 Promote innovative & creative mode of thinking in different professional contexts

2.2.10 Support evidence based arguments and discussions

2.3 Professional skills

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

2.3.1 Master various basic and advanced laboratory techniques

2.3.2 Writing and evaluating professional reports in the field of Medical Biochemistry and Molecular Biology

2.3.3 Assess established methods and develop new methods and tools related to Medical Biochemistry and Molecular Biology

2.3.4 Use technological means to serve the professional practice in the field of Medical Biochemistry

2.3.5 Plan for the improvement of professional practice

2.3.6 Estimate the risk of the use of chemicals on society and the environment as part of the safe laboratory practice

2.3.7 Master laboratory tests related to environmental improvement e.g. diagnostic tests for endemic and epidemic diseases

2.4 General and transferable skills

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

2.4.1 Effective communication with different types of patients, students, colleagues and technicians.

2.4.2 Use information technology in order to develop professional practice

2.4.3 Teach and assess the performance of the others {e.g. students, staff and technicians}

2.4.4 Assess himself and add to his knowledge by continuous education

2.4.5 Use different sources to get information and knowledge

2.4.6 Work in team and/or lead professional colleagues and work teams

2.4.7 Manage scientific meetings and manage time efficiently

اعتماد مجلس القسم رقم (190) ، بتاريخ ٦/٢٠١٣

رئيس مجلس القسم

اعتماد مجلس الكلية رقم ٣٥٤ بتاريخ ٢٠١٣/٦/١٦

ملحق 2:المعايير القياسية العامة للدراسات العليا الصادرة عن الهيئة

برامج االدكتوراة

١- مواصفات الخريج :

خريج برنامج الدكتوراة في اى تخصص يجب ان يكون قادرا على

١-١ اتقان اساسيات ومنهجيات البحث العلمى

١-٢ العمل المستمر على الاضافة للمعارف فى مجال التخصص

١-٣ تطبيق المنهج التحليلى والناقد للمعارف فى مجال التخصص والمجالات ذات العلاقة

١-٤ دمج المعارف المتخصصة مع المعارف ذات العلاقة مستنبطا ومطورا للعلاقات البينية بينها

١-٥ اظهار وعيا عميقا بالمشاكل الجارية والنظريات الحدية فى مجال التخصص

١-٦ تحديد المشكلات المهنية وايجاد حلولا مبتكرة لحلها

١-٧ اتقان نطاقا واسعا من المهارات المهنية فى مجال التخصص

١-٨ التوجة نحو تطوير طرق وادوات واساليب جديدة للمزاولة المهنية

١-٩ استخدام الوسائل التكنولوجية المناسبة بما يخدم ممارستة المهنية

١-١٠ التواصل بفاعلية وقيادة فريق عمل فى سياقات مهنية مختلفة

١-١١ اتخاذ القرار فى ضل المعلومات المتاحة

١-١٢ توظيف الموارد المتاحة بكفاءة وتنميتها والعمل على ايجاد موارد جديدة

١-١٣ الوعى بدوره فى تنمية المجتمع والحفاظ على البيئة

١-١٤ التصرف بما يعكس الالتزام بالنزاهة والمصداقية وقواعد المهنة

١-١٥ الالتزام بالتنمية الذاتية المستمرة ونقل علمه وخبراته للاخرين

٢- المعايير القياسية

٢-١ المعرفة والفهم

بانتهاء دراسة برنامج الدكتوراة يجب ان يكون الخريج قادرا على الفهم والدراية بكل من

٢-١-١ النطريات والاساسيات والحديث من المعارف فى مجال التخصص والمجالات ذات العلاقة

٢-١-٢ اساسيات ومنهجيات واخلاقيات البحث العلمى واداواته المختلفة

٢-١-٣ المبادئ الاخلاقية والقانونية للممارسة المهنية فى مجال التخصص

٢-١-٤ مبادئ واساسيات الجودة فى الممارسة فى مجال التخصص

٢-١-٥ المعارف المتعلقة بأثار ممارسته المهنية على البيئة وطرق تنمية البيئة وصيانتها

٢-٢ المهارات الذهنية

بانتهاء دراسة برنامج الدكتوراه يجب ان يكون الخريج قادرا على

٢-٢-١ تحليل وتقييم المعلومات فى مجال التخصص والقياس عليها والاستنباط منها

٢-٢-٢ حل المشاكل المتخصصة استنادا على المعطيات المتاحة

٢-٢-٣ اجراء دراسات بحثية تضيف الى المعارف

٢-٢-٤ صياغة أوراق علمية
٢-٢-٥ تقييم المخاطر فى الممارسات المهنية
٢-٢-٦ التخطيط لتطوير الاداء فى مجال التخصص
٢-٢-٧ اتخاذ القرارات المهنية فى سياقات مهنية مختلفة
٢-٢-٨ الابتكار/الابداع
٢-٢-٩ الحوار والنقاش المبنى على البراهين والادلة

٢-٣ المهارات المهنية
بانتهاء دراسة برنامج الدكتوراة يجب ان يكون الخريج قادرا على
٢-٣-١ اتقان المهارات المهنية الاساسية والحديثة فى مجال التخصص
٢-٣-٢ كتابة وتقييم التقارير المهنية
٢-٣-٣ تقييم وتطوير الطرق والادوات القائمة فى مجال التخصص
٢-٣-٤ استخدام الوسائل التكنولوجية بما يخدم الممارسة المهنية
٢-٣-٥ التخطيط لتطوير الممارسة المهنية وتنمية اداء الاخرين

٢-٤ المهارات العامة والمنتقلة
بانتهاء دراسة برنامج الدكتوراه يجب أن يكون الخريج قادرا على
٢-٤-١ التواصل الفعال بأنواعه المختلفة
٢-٤-٢ استخدام تكنولوجيا المعلومات بما يخدم تطوير الممارسة المهنية
٢-٤-٣ تعليم الاخرين وتقييم ادائهم
٢-٤-٤ التقييم الذاتى والتعليم المستمر
٢-٤-٥ استخدام المصادر المختلفة للحصول على المعلومات والمعارف
٢-٤-٦ العمل فى فريق وقيادة فرق العمل
٢-٤-٧ ادارة اللقاءات العلمية والقدرة على ادارة الوقت

ملحق 3: Benchmarks (المعايير /العلامات المرجعية)

1. academic standards of Program of Master's Degree in Biomolecular Sciences, Imperial College of Science, Technology & Medicine, University of London.
   http://www3.imperial.ac.uk/pls/portallive/docs/1/55459.PDF.

(Benchmarks)

1. Awarding Institution / Body University of London
2. Teaching Institution Imperial College of Science, Technology & Medicine
3. External Accreditation by: Not applicable
4. Final Award MRes
5. Programme Title Biomolecular Sciences
6. UCAS Code (or other coding system if relevant) Not applicable
7. Relevant QAA Subject Benchmarking Group(s) Chemistry
8. Date of production/revision October 2004

9. Educational Aims of the Programme
The programme aims to:
• Produce physical sciences postgraduates equipped to pursue careers at the interface between the physical and life sciences, in industry, the public sector and non-governmental organisations;
• develop the ability to undertake research in multidisciplinary teams at this interface;
• develop a knowledge of a range of basic and advanced biomolecular concepts;
• develop research and analytical skills related to biomolecular research;
• develop oral and written scientific presentation skills;
• attract the most motivated physical sciences graduates, both from within the UK and from overseas;
• develop new areas of teaching in response to the advance of scholarship and the needs of vocational training

10. Programme Outcomes - *the programme provides opportunities for postgraduate students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas.*

Knowledge and understanding

Knowledge and understanding of:	**Teaching/learning methods and strategies**
1. core concepts in chemical biology – essential cell biology, physical techniques in biomolecular science, bioanalytical methods, molecular basis odisease and computational methods; 2. a selection of three of the following areas of biomolecular science – chemistry of	Acquisition of A1 to A5 is through a combination of lectures, seminars, coursework and research Throughout the students are encouraged to undertake independent reading both to

proteins and nucleic acid, medical intervention at the molecular level, cybernetics of signalling, trafficking, theoretical methods and instrumentation and analysis; 3. research techniques, including information retrieval, experimental design and statistics, modelling, sampling, biomolecular techniques, molecular biology, and laboratory safety; 4. detailed knowledge and understanding of the essential facts, concepts, principles and theories relevant to the student's project; 5. management and communication skills, including problem definition, project design, decision processes, teamwork, written and oral reports, scientific publications.	supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject. Assessment of the knowledge base is through a combination of unseen written examinations (A1-2) and assessed project work (A3-4).

Skills and other attributes

B Intellectual (thinking) skills - able to: **1. analyse and solve biomolecular problems using an integrated multidisciplinary approach;** 2. integrate and evaluate information; 3. formulate and test hypotheses using appropriate experimental design and statistical analysis of data; 4. plan, conduct and write-up a programme of original research	**Teaching/learning methods and strategies** **Intellectual skills are developed through the teaching and learning methods outlined above and in section 11.** **Experimental design and statistical skills are developed in lectures and and subsequently in the individual research project. Individual, formative and summative feedback is given to students by the project team. The feedback on the literature survey submitted in January, provides important summative feedback on student progress.** **Assessment is through literature report, unseen written examinations and the individual research project.**
C Practical skills **– able to:** **1. plan and execute safely a series of experiments;**	Teaching/learning methods and strategies **Practical skills are developed through the teaching and learning programme**

2. use laboratory–based methods to generate data; **3. analyse experimental results and determine their strength and validity;** **4. prepare technical reports;** **5. give technical presentations;** **6. use the scientific literature effectively;** **7. use computational tools and packages**.	**outlined above (and in section 11).** **Practical experimental skills (C1 to C3) are developed through project work.** **Skills C4 and C5 are taught and developed through feedback on reports written and presentations made as part of coursework assignments.** **Skill C6 is developed through the literature report, journal club and supervised research project.** **Skill C7 is taught and developed through project work.**
D Transferable skills – **able to:** **1. communicate effectively through oral presentations, computer processing and presentations, written reports and scientific publications;** **2. apply statistical and modelling skills;** **3. management skills: decision processes, objective criteria, problem definition, project design and evaluation, risk management, teamwork and coordination;** **4. integrate and evaluate information from a variety of sources;** **5. transfer techniques and solutions from one discipline to another;** **6. use Information and Communications Technology;** **7. manage resources and time;** **8. learn independently with open-mindedness and critical enquiry;** **9. learn effectively for the purpose of continuing professional development.**	Teaching/learning methods and strategies **Transferable skills are developed through the teaching and learning programme outlined above and in section 11.** **Skill D1 is taught through coursework and developed through feedback on assessed reports and oral presentations.** **Skill D2 is taught through lectures and practical work and developed, as appropriate, during individual research project.** **Skill D3 is developed in the bi-weekly research team meetings.** **Skill D4 is developed through feedback on a literature report.** **Skill D5 is a core activity of the research projects and is additionally taught in lectures.** **Skill D6 is taught in lectures developed through project work and individual learning.** **Skill D7 is developed throughout the course within a framework of staged coursework deadlines.** **Although not explicitly taught, skills D8 and D9 are encouraged and developed throughout the course, which is structured and delivered in**

	such a way as to promote this. D1-D9 are all assessed in the student's research project and literature survey. The

following reference point was used in creating the Programme Specification:

• Student Handbook for Course approved by Senate of Imperial College

• Programme description in the EPSRC grant proposal which funds the course

The programme is only offered as a full-time, one-year course and leads to the MRes degree. Students begin their lecture programme with core courses mostly in the first term (October-December) and follow this up in second term (January-March) with optional courses. Coursework is examined in May/June. In second term students also participate in a weekly journal club. In October students choose a 10 month (November-August) multidisciplinary research project. They present a literature report on the topic of their research in January and a final report and talk on the research in September. This is followed by an oral examination of the thesis. The overall pass mark is 50%. and the research project (including talk and oral exam), written examinations and the literature report contribute 70%, 20% and 10%

11. Programme structures and features, curriculum units (modules), credit and award requirements

Students choose 4 possible research projects after discussion with academic staff in first three weeks. They are given their project from this selection at the end of October. Under the supervision of their project team they start researching and writing their literature report, for hand in at the end of term. Students start their core courses, which cover the following topics, each give in 8 lecture modules: Essential Cell Biology, Physical Techniques in Chemical Biology, Proteins, Lipids and Nucleic Acid, Bioanalytical Techniques in Chemical Biology, The Molecular Basis of Disease, Basic Computational Methods in Chemical Biology.

Term 1

Students will by this time have started their research (generally after handing in their literature report). Students must choose three of the six selective lecture courses given in this term. The selection is from: Selected Topics in the Chemistry of Proteins and Nucleic Acid, Medical Intervention at the Molecular Level, The Cybernetics of Signalling, Trafficking, Theoretical Methods, Instrumentation and Analysis. Each week one student will choose a scientific article from his or her area of research for discussion in the Journal Club.

Term 2

At the beginning of the summer term students are examined in two three-hour papers on their lecture courses. Project assessment is based on a written dissertation, scientific talk and oral examination in early September. A selection of students have a viva on their project and other aspects of the course with the External Examiner, prior to the MSc Examination Board meeting in late September.

Term **3**

At the beginning of the summer term students are examined in two three-hour papers on their lecture courses. Project assessment is based on a written dissertation, scientific talk and oral examination in early September. A selection of students have a viva on their project and other aspects of the course with the External Examiner, prior to the MSc Examination Board meeting in late September.

12. Support for students and their learning:

• MSc Student Handbook, which includes course and project descriptions.
• Staff:student ratios for research training of 2:1 or greater.
• A large community of postgraduate research students and postdoctoral research workers working in biomolecular sciences at Imperial College and the Institute for Cancer Research.
• Library and other learning resources and facilities at South Kensington campus.
• Dedicated student computing facilities in the Chemistry and Biological Sciences Departments.
• Extensive research facilities for biophysical and biochemical research.
• A postgraduate staff - student committee, which meets three times per year.
• Visiting speaker, seminar series on topics in biomolecular science, which run weekly in the Chemistry Department during term-time.
• In addition to the postgraduate tutor the Course Director assist students with personal problems and advises on pastoral and academic issues.
• Student email and open personal access to staff including the Course Director.
• Access to student counsellors on the South Kensington site.
• Access to Teaching and Learning Support Services, which provide assistance and guidance, e.g. on careers.

13. Criteria for admission

The minimum qualification for admission is normally an upper Second Class Honours degree in a Physical Sciences-based subject from an UK academic institution or an equivalent overseas qualification. All UK applicants (and where possible overseas applicants) are invited to Imperial College for a site tour and interview, offers made to students are initiated by the Course Director. Where an applicant has a lesser degree qualification but has presented well at interview, a special cases for admission may be submitted to the Dean of the Royal College of Science by the Course Director.

14. Methods for evaluating and improving the quality and standards of teaching and learning Mechanisms for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards

• Annual course review prepared by the Course Director and considered by the Board of Examiners.
• Postgraduate Staff – Student Committee, held each term, with report to Departmental Teaching Committee.

• Biennial staff appraisal.
• Peer review of lectures (at random intervals).
• External Examiner reports.
• Periodic Review by Quality and Academic Review Committee.
• Review by EPSRC every year.
• Periodic review of departmental teaching by an external panel (approximately 6 year interval).
• Employer needs and opinions feed into the programme through frequent guest lecturers from industry, student placements inrelevant industries, industry- based projects, an Industry-Academic Advisory Board and collaboration between academic staff and industry inresearch and consultancy

Committees with responsibility for monitoring and evaluating quality and standards
• Postgraduate Staff – Student Committee (three meetings annually).
• Departmental Teaching Committee (Chemistry).
• Board of Examiners.
• Imperial College, Quality and Academic Review Committee.
• Imperial College, Senate.

Mechanisms for gaining student feedback on the quality of teaching and their learning experience:
• Postgraduate Staff – Student Committee.
• Meetings with project supervisors.
• Meetings with Course Director.
• Viva with External Examiner.

Staff development priorities include:
• Development of multidisciplinary research programmes between life science and physical science researchers.
• Staff appraisal scheme and institutional staff development courses.

15. Regulation of assessment
Assessment rules & degree classification
1. Minimum standards (i.e. 40%) in each assessment (detailed in point 3) will be required with an overall pass mark of 50%.
2. To qualify for the award of MRes, students must complete all the course requirements and must achieve an overall pass mark in the combined examinations, literature report, research report, research presentation and oral defence.
3. The weighting of marks contributing to the degree is 10% for the literature report, 20% for the examined coursework and 70% for the research project. The latter is broken up as follows: 60% from the report and oral examination and 10% from the research talk.

Summary of grades, marks and their interpretation for the MRes degree classification

GRADE	MARKS	INTERPRETATION
A	70% - 100%	Marks represent a distinction performance
B/C	50% - 69%	Marks represent a pass
D	40% - 49%	Marks represent a fail performance at MRes level
E	0% - 39%	Marks represent a fail performance (with major shortcomings)

Role of External Examiners (Visiting Examiners)

The visiting examiner (from another university or research institutes in the UK) is nominated by the Course Director and approved by the Quality and Academic Review Committee. Visiting examiners normally serve for 3 years. The role of visiting examiner is that of moderator and to review the course content and structure. In order to do this they:

- Approve examination papers.
- Review coursework.
- See all examination scripts and research project dissertations.
- Viva a selection of students on their course and project work.
- Attend the Board of Examiners
- Complete a report to the College

Please note. This specification provides a concise summary of the main features of the programme and learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if she/he takes full advantage of the learning opportunities that are provided. The accuracy of the information contained in this document is reviewed by the College and may be checked by the Quality Assurance Agency for Higher Education (QAA) and by the Engineering and Physical Sciences Research Council (EPSRC).

Key sources of information about this course can be found in:

- Postgraduate Prospectus, Imperial College of Science, Technology & Medicine (available on-line www.ic.ac.uk)
- MRes course booklet (available on-line www.ch.ic.ac.uk).

ملحق 4: مصفوفة مضاهاة المعايير القياسية للدراسات العليا الصادرة عن الهيئة مع المعايير الأكاديمية لبرنامج الدكتوراة فى الكيمياء الحيوية

مواصفات الخريج بالمعايير القياسية للدراسات العليا (درجة الدكتوراة)	مواصفات الخريج بالمعايير الأكاديمية للبرنامج
١.١. اتقان اساسيات ومنهجيات البحث العلمى	1-1 **Apply properly the principles of scientific research in the field of Medical Biochemistry and related disciplines**
١.٢. العمل المستمر على الاضافة للمعارف فى مجال التخصص	**1-2 Continuously add to his knowledge in the field of medical biochemistry**
١.٣. تطبيق المنهج التحليلى والناقد للمعارف فى مجال التخصص	**1-5 Apply of the analytical method and criticism of knowledge in the field of Medical Biochemistry and related fields.**
١.٤. دمج المعارف المتخصصة مع المعارف ذات العلاقة مستنبطا ومطورا للعلاقات البينية بينها	**1-6 Integrate specialized knowledge in Medical Biochemistry and Molecular Biology with related knowledge in medical field to find suitable solutions for encountered problems**
١.٥. اظهار وعيا عميقا بالمشاكل الجارية والنظريات الجديدة فى مجال التخصص	**1-7 Show a deep awareness of the ongoing problems and modern theories in the field of Medical Biochemistry and Molecular Biology.**
١.٦. تحديد المشكلات المهنية وايجاد حلولا مبتكرة لحلها	**1-8 Identify professional problems in Medical Biochemical labs and find innovative solutions.**
١.٧. اتقان نطاقا واسعا من المهارات المهنية فى مجال التخصص	**1-4 Master a wide range of professional skills in the field of Medical Biochemistry using appropriate technological methods that serve professional practice.**
١.٨. التوجة نحو تطوير طرق وادوات واساليب جديدة للمزاولة المهنية	**1-9 Develop new methods and tools of professional practice and provide basic training on principles of Medical Biochemistry and Molecular Biology**
١.٩. استخدام الوسائل التكنولوجية المناسبة بما يخدم ممارستة المهنية	**1-10 Use appropriate technological means related to Molecular Biology**
١.١٠. التواصل بفاعلية وقيادة فريق عمل فى سياقات مهنية مختلفة	**1-11 Communicate effectively and lead a team in different professional contexts**

1-12 Take decision in light of available information	**١.١١. اتخاذ القرار فى ضل المعلومات المتاحة**
1-13 Make use of available resources in labs and departments, develop and work to find new resources	**١.١٢. توظيف الموارد المتاحة بكفاءة وتنميتها والعمل على ايجاد موارد جديدة**
1-14 Develop community and conserve environment through awareness of safe practice in Medical Biochemistry laboratories	**١.١٣. الوعى بدوره فى تنمية المجتمع والحفاظ على البيئة**
1-15 Behave with commitment to integrity and credibility and follow the ethical code of medical practice	**١.١٤. لتصرف بما يعكس الالتزام بالنزاهة والمصداقية وقواعد المهنة**
1-16 Continuously develop himself and transfer knowledge /experience to others	**١.١٥. الالتزام بالتنمية الذاتية المستمرة ونقل علمه وخبراته للاخرين**
1-3Provide students with a comprehensive background in of Medical Biochemistry and Molecular Biology which is necessary to understand the basic knowledge of life sciences at the molecular level	**--**

المعايير الأكاديمية للبرنامج	**المعايير القياسية العامة للدراسات العليا (درجة الدكتوراة)**
2.1.1. Basics and advanced knowledge of Medical Biochemistry and Molecular Biology and their link with related disciplines 2.1.2 Metabolic disorders and their biochemical and molecular basis 2.1.3 Principles and techniques of Molecular Biology 2.1.4 Laboratory equipment and modern methods used in Medical Biochemistry and Molecular Biology, including safe work practices	**أ ـ المعرفة والفهم:** **2-١-١ النظريات والاساسيات المتعلقة بمجال التعلم وكذا فى المجالات ذات العلاقة**

٢-١-٢ اساسيات ومنهجيات واخلاقيات البحث العلمى واداواته المختلفة	2-١-5 Ethical, scientific and legal principles of research with special emphasis on biomedical investigations.
٢-١-٣-المبادئ الاخلاقية والقانونية للممارسة المهنية فى مجال التخصص	2.1.٧ Legal and ethical considerations related to professional practice
٢-١-٤ مبادئ واساسيات الجودة فى الممارسة فى مجال التخصص	2.1.٤ Laboratory equipment and modern methods used in Medical Biochemistry and Molecular Biology, including safe work practices 2.1.6 Principles and basics of quality assurance and their applications in the field of Medical Biochemistry
٢-١-٥- المعارف المتعلقة بأثار ممارسته المهنية على البيئة وطرق تنمية البيئة وصيانتها	2.1.8 Extent of interaction and mutual influence between the biochemical and the surrounding environmental chemistry

ب - القدرات الذهنية :

المعايير القياسية العامة للدراسات العليا (درجة الدكتوراة)	المعايير الأكاديمية للبرنامج
2-٢-١ تحليل وتقيم المعلومات فى مجال التخصص والقياس عليها لحل المشاكل	2.2.1. Analyze and evaluate information in the field of Medical Biochemistry and use statistical methods to express data 2.2.2 Suggest accurately the possible investigations needed for diagnosis of diseases
٢-٢-٢ حل المشاكل المتخصصة استنادا على المعطيات المتاحة	2.2.2 Suggest accurately the possible investigations needed for diagnosis of diseases 2.2.3 Solve specialized problems based on available data and compare information from a variety of sources
2-2-3 اجراء دراسات بحثية تضيف الى المعارف	2.2.4 Carry out research studies that add to the knowledge with application of different approaches in various fields of Medical Biochemistry 2.2.7 Plan for the performance improvement in the field of Medical Biochemistry and Molecular Biology. 2.2.8 Take special textured Biochemistry career decisions in different professional contexts

2.2.5 Drafting scientific research papers	**2-2-4 صياغة أوراق علمية**
2.2.6 Assess risks in professional practices and the application of information for solving professional problems in the field of Medical Biochemistry	**2-2-5 تقييم المخاطر فى الممارسات المهنية**
2.2.7 Plan for the performance improvement in the field of Medical Biochemistry and Molecular Biology.	**2-2-6 التخطيط لتطوير الاداء فى مجال التخصص**
2.2.8 Take special textured Biochemistry career decisions in different professional contexts	**2-2-7 اتخاذ القرارات المهنية فى سياقات مهنية مختلفة**
2.2.9 Promote innovative & creative mode of thinking in different professional contexts	**2-2-8 الابتكار/الابداع**
2.2.10 Support evidence based arguments and discussions	**2-٢-٩ الحوار والنقاش المبنى على البراهين والادلة**

ج. مهارات مهنية وعملية :

المعايير الأكاديمية للبرنامج	**المعايير القياسية العامة (Generic) للدراسات العليا (درجة الدكتوراة)**
2.3.1 Master various basic and advanced laboratory techniques 2.3.6 Estimate the risk of the use of chemicals on society and the environment as part of the safe laboratory practice 2.3.7 Master laboratory tests related to environmental improvement e.g. diagnostic tests for endemic and epidemic diseases	**٢-٣-١ اتقان المهارات المهنية الاساسية والحديثة فى مجال التخصص**
2.3.2 Writing and evaluating professional reports in the field of Medical Biochemistry and Molecular Biology	**٢-٣-٢ كتابة وتقييم التقارير المهنية**
2.3.3 Assess established methods and develop new methods and tools related to Medical Biochemistry and Molecular Biology	**3-3-2 تقييم وتطوير الطرق والادوات القائمة فى مجال التخصص**
2-3-٤ Use technological means to serve the professional practice in the field of Medical Biochemistry	**4-3-2 استخدام الوسائل التكنولوجية بما يخدم الممارسة المهنية**
2-3-5 Plan for the improvement of professional practice	**5-3-2 التخطيط لتطوير الممارسة المهنية وتنمية اداء الاخرين**

د . مهارات عامة ومتنقلة :

المعايير الأكاديمية للبرنامج	المعايير القياسية العامة (Generic) للدراسات العليا (درجة الدكتوراة)
2.4.1. Effective communication with different types of patients, students, colleagues and technicians.	**٢-٤-١ التواصل الفعال بانواعة المختلفة**
2.4.2 Use information technology in order to develop professional practice	**2-4-2 استخدام تكنولوجيا المعلومات بما يخدم تطوير الممارسة المهنية**
2.4.3 Teach and assess the performance of the others {e.g. students, staff and technicians}	**3-4-2 تعليم الاخرين وتقييم ادائهم**
2.4.4 Assess himself and add to his knowledge by continuous education	**4-4-2 التقييم الذاتى والتعليم المستمر**
2.4.5 Use different sources to get information and knowledge	**5-4-2 استخدام المصادر المختلفة للحصول على المعلومات والمعارف**
2.4.6 Work in team and/or lead professional colleagues and work teams	**٢-٤-٦ العمل فى فريق وقيادة فرق العمل**
2.4.7 Manage scientific meetings and manage time efficiently	**7-4-2 ادارة اللقاءات العلمية والقدرة على ادارة الوقت**

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

أهداف البرنامج	المعايير الأكاديمية للبرنامج (مواصفات الخريج):
1-1, 1-9	1.1 Apply properly the principles of scientific research in the field of Medical Biochemistry and related disciplines
1-8, 1-13, 1-14	1-2 Continuously add to his knowledge in the field of medical biochemistry
1-17	1-3Provide students with a comprehensive background in of Medical Biochemistry and Molecular Biology which is necessary to understand the basic knowledge of life sciences at the molecular level
1-2	1-4 Master a wide range of professional skills in the field of Medical Biochemistry using appropriate technological methods that serve professional practice.
1-3	1-5 Apply of the analytical method and criticism of knowledge in the field of Medical Biochemistry and related fields such as.
1-10	1-6 Integrate specialized knowledge in Medical Biochemistry and Molecular Biology with related knowledge in medical field to find suitable solutions for encountered problems
1-10	1-7 Show a deep awareness of the ongoing problems and modern theories in the field of Medical Biochemistry and Molecular Biology.
1-4, 1-10	1-8 Identify professional problems in Medical Biochemical labs and find innovative solutions.
1-5	1-9 Develop new methods and tools of professional practice and provide basic training on principles of Medical Biochemistry and Molecular Biology
1-6	1-10 Use appropriate technological means related to Molecular Biology

1-11	1-11 Communicate effectively and lead a team in different professional contexts
1-7	1-12 Take decision in light of available information
1-6	1-13 Make use of available resources in labs and departments, develop and work to find new resources
1-15, 1-18	1-14 Develop community and conserve environment through awareness of safe practice in Medical Biochemistry laboratories
1-16	1-15 Behave with commitment to integrity and credibility and follow the ethical code of medical practice
1-13	1-16 Continuously develop himself and transfer knowledge /experience to others
1-12	----

المعايير الأكاديمية للبرنامج	**نواتج تعلم البرنامج**										
	المعرفه و الفهم										
	2.a.1.	**2.a.2.**	**2.a.3**	**2.a.4**	**2.a.5**	**2.a.6**	**2.a.7**	**2.a.8**	**2.a.9**		**2.a.10**

المعايير الأكاديمية للبرنامج	نواتج تعلم البرنامج										
	Intellectual skills										
المهارات الذهنية	2.b.1.	2.b.2.	2.b.3	2.b.4	2.b.5	2.b.6	2.b.7	2.b.8			

المعايير الأكاديمية للبرنامج المهارات المهنية	نواتج تعلم البرنامج Practical/Professional skills											
	2.c.1.	2.c.2.	2.c.3	2.c.4	2.c.5	2.c.6	2.c.7					

المعايير الأكاديمية للبرنامج المهارات العامة والمنتقلة	نواتج تعلم البرنامج 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.d.8				

ملحق (٦) مصفوفة المقررات مع البرنامج

knowledge and understanding																ILOs Courses and codes	
2.a.16	2.a.15	2.a.14	2.a.13	2.a.12	2.a.11	2.a.10	2.a.9	2.a.8	2.a.7	2.a.6	2.a.5	2.a.4	2.a.3	2.a.2	2.a.1		
■								■		■					■	BIO 709	DNA: The replicative process & repair
■										■					■	BIO 710	RNA: Structure, transcription and posttranscriptional modification
■								■		■					■	BIO 711	Protein synthesis: translation and posttranslational modifications
■						■	■	■		■					■	BIO 712	Recombinant DNA and Biotechnology
■								■		■					■	BIO 713	Regulation of gene expression
										■	■				■	BIO 701	Eucaryotic Cell structure
										■		■		■	■	BIO 702	Proteins: composition & structure, Structure-function relationship of protein families
										■			■		■	BIO 703	Enzymes: classification, kinetics, control

													■	■	BIO 704	Carbohydrate metabolism: Major and special pathways, and their control.
										■		■		■	■	BIO 705	Lipids: Utilization, storage metabolism of special lipids
										■		■		■	■	BIO 707	Amino Acids: General pathways and individual a.a. metabolism
										■		■		■	■	BIO 708	Metabolic interrelations
										■		■	■		■	BIO 709	Biochemistry of peptide and steroid hormones
										■		■			■	BIO 715	Molecular cell biology, biotransformations, the cytochrome P-450
										■		■		■	■	BIO 716	Iron and HaemMetabolism, Gas Transport and PH Regulation
										■					■	BIO 717	Digestion and Absorption of basic nutritional constituents
										■			■		■	BIO 718	Principles of nutrition, macronutrients and micronutrients
							■								■	BIO 720	Subcellular fractionation-Nutrition- and 3 out of the following six topics: Biochemistry of vision, of

																connective tissue, of liver, of muscle of nervous tissue, and of adipose tissue.
						■									BIO 719	Practical: Spectrophotometry - Flame photometry- chromatography- Electrophoresis- Colorimetric assays- Competitive binding assays (RIA, ELISA molecular Biology techniques
	■	■	■	■												thesis

Intellectual skills															ILOs	
2.a.15	2.a.14	2.a.13	2.a.12	2.a.11	2.a.10	2.a.9	2.a.8	2.a.7	2.a.6	2.a.5	2.a.4	2.a.3	2.a.2	2.a.1	Courses and codes	
															BIO 709	DNA: The replicative process & repair
															BIO 710	RNA: Structure, transcription and posttranscriptional modification
															BIO 711	Protein synthesis: translation and posttranslational

																modifications
				■								■			BIO 712	Recombinant DNA and Biotechnology
															BIO 713	Regulation of gene expression
															BIO 701	Eucaryotic Cell structure
														■	BIO 702	Proteins: composition & structure, Structure-function relationship of protein families
														■	BIO 703	Enzymes: classification, kinetics, control
														■	BIO 704	Carbohydrate metabolism: Major and special pathways, and their control.
														■	BIO 705	Lipids: Utilization, storage metabolism of special lipids
														■	BIO 707	Amino Acids: General pathways and individual a.a. metabolism
														■	BIO 708	Metabolic interrelations
														■	BIO 709	Biochemistry of peptide and steroid hormones
								■						■	BIO 715	Molecular cell biology, biotransformations, the cytochrome P-450
														■	BIO 716	Iron and HaemMetabolism, Gas Transport and PH Regulation
														■	BIO 717	Digestion and Absorption of basic nutritional

																constituents
															BIO 720	Subcellular fractionation- Nutrition- and 3 out of the following six topics: Biochemistry of vision, of connective tissue, of liver, of muscle of nervous tissue, and of adipose tissue.
■	■					■			■				■		BIO 719	Practical: Spectrophotometry - Flame photometry- chromatography- Electrophoresis- Colorimetric assays- Competitive binding assays (RIA, ELISA molecular Biology techniques
					■	■		■		■	■	■				thesis

Professional skills								ILOs	
2.a.8	2.a.7	2.a.6	2.a.5	2.a.4	2.a.3	2.a.2	2.a.1	Courses and codes	
								BIO 709	DNA: The replicative process & repair
								BIO 710	RNA: Structure, transcription and posttranscriptional modification
								BIO 711	Protein synthesis: translation and posttranslational modifications
					■	■		BIO 712	Recombinant DNA and Biotechnology
								BIO 713	Regulation of gene expression
								BIO 701	Eucaryotic Cell structure
								BIO 702	Proteins: composition & structure, Structure-function relationship of protein families
								BIO 703	Enzymes: classification, kinetics, control
								BIO 704	Carbohydrate metabolism: Major and special pathways, and their control.
								BIO 705	Lipids: Utilization, storage metabolism of special lipids
								BIO 707	Amino Acids: General pathways and individual a.a. metabolism
								BIO 708	Metabolic interrelations
								BIO 709	Biochemistry of peptide and steroid hormones
								BIO 715	Molecular cell biology, biotransformations, the cytochrome P-450
								BIO 716	Iron and HaemMetabolism,Gas Transport and PH Regulation
								BIO 717	Digestion and Absorption of basic nutritional constituents
								BIO 718	Principles of nutrition, macronutrients and micronutrients
								BIO 720	Subcellular fractionation- Nutrition- and 3 out of the following six topics: Biochemistry of vision, of connective tissue, of liver, of muscle of nervous tissue, and of adipose tissue.
■	■	■	■	■	■	■	■	BIO 719	Practical: Spectrophotometry- Flame photometry- chromatography- Electrophoresis- Colorimetric assays- Competitive binding assays (RIA, ELISA molecular Biology techniques
				■					Thesis

general skills							ILOs	
2.a.7	2.a.6	2.a.5	2.a.4	2.a.3	2.a.2	2.a.1	Courses and code	
							BIO 709	DNA: The replicative process & repair
							BIO 710	RNA: Structure, transcription and posttranscriptional modification
							BIO 711	Protein synthesis: translation and posttranslational modifications
							BIO 712	Recombinant DNA and Biotechnology
							BIO 713	Regulation of gene expression
							BIO 701	Eucaryotic Cell structure
							BIO 702	Proteins: composition & structure, Structure-function relationship of protein families
							BIO 703	Enzymes: classification, kinetics, control
							BIO 704	Carbohydrate metabolism: Major and special pathways, and their control.
							BIO 705	Lipids: Utilization, storage metabolism of special lipids
							BIO 707	Amino Acids: General pathways and individual a.a. metabolism
							BIO 708	Metabolic interrelations
							BIO 709	Biochemistry of peptide and steroid hormones
							BIO 715	Molecular cell biology, biotransformations, the cytochrome P-450
							BIO 716	Iron and HaemMetabolism,Gas Transport and PH Regulation
							BIO 717	Digestion and Absorption of basic nutritional constituents
							BIO 718	Principles of nutrition, macronutrients and micronutrients
							BIO 720	Subcellular fractionation- Nutrition- and 3 out of the following six topics: Biochemistry of vision, of connective tissue, of liver, of muscle of nervous tissue, and of adipose tissue.
■	■	■	■	■	■	■	BIO 719	Practical: Spectrophotometry- Flame photometry- chromatography- Electrophoresis- Colorimetric assays- Competitive binding assays (RIA, ELISA molecular Biology techniques
■	■	■	■	■	■	■		Thesis

ملحق ٧

توصيف المقررات

Program courses

جامعة : بنـها
كلية : طب بنـها
قسم : الكيمياء الحيوية الطبية

توصيف مقرر الكيمياء الحيوية الطبية

١- بيانات المقرر		
الرمز الكودي :BIO ٧٠٠	**اسم المقرر** : الكيمياء الحيوية الطبية	الفرقة/ المستوي: جزء اول درجة الدكتوراة
التخصص : **دكتوراة الكيمياء الحيوية الطبية**	**عدد الوحدات الدراسية**: نظري ٢١ عملى٤	

This course aims to enable students: 1.1 Describe and understand the structure, function and biochemical importance of macro-, micronutrients, hormones and enzymes 1.2 describe and relate the metabolic pathways of macronutrients and nucleotides 1.3 illustrate the contribution of the organs in metabolic process under different physiological circumstances. 1.4 Identify and use biotechnology methods and tools and their clinical implication in the field of Medical Biochemistry and Molecular Biology 1.5 Describe structure and function of the subcellular structures e.g. nucleus, mitochondria 1.6 Correlate hereditary and acquired metabolic disturbances with biochemical and molecular basis and understand their biochemical laboratory and clinical implications 1.7 Apply analytical method and criticism of knowledge in medical biochemistry and related fields 1.8 Interpret medical laboratory reports. 1.9 Practice practical, analytical skills necessary for proper detection of ongoing provisional problems and find innovative solutions for them 1.10 Act with integrity and credibility and follow the ethical code of medical practice 1.11 Participate in community progress & assess and solve environmental health problems 1.12 Master wide range of skills and be aware of safe laboratory practice 1.13 Take decision based according to availability of data 1.14 Communicate with others and lead them properly with team spirit 1.15 Continues education with addition to knowledge and transfer of this knowledge and experience to the others	**٢ـ الهدف من المقرر**
٣ـ المستهدف من تدريس المقرر:	
By the end of the course the students should be able to: 1. Describe the metabolic pathways of the main dietary sources of energy: carbohydrates, fats and proteins, their digestion absorption, their oxidation to release energy. 2. Illustrate the regulation of these pathways and the integration of their metabolism. 3. Identify biochemical alteration in related metabolic disorders 4. Illustrate the biochemistry of certain tissues like liver, kidney, muscles, cartilage, bone and nervous system and 5. explain the role of vitamins and enzymes required for catalysis of these processes, in addition to the deficiency manifestation of each. 6. Describe the metabolism of the major minerals and trace	**أ ـ المعلومات والمفاهيم :**

elements their functions and alterations in metabolic processes met with in the deficiency or excess of these elements 7. Describe the components of some body fluids e.g. blood, urine, milk, semen, CSF and sweat 8. Acquire knowledge about nucleic acid metabolism with special emphasis on their role in protein synthesis 9. Describe the structure of DNA and RNA as well as the processes of replication, transcription, translation, 10. discuss principles and techniques molecular biology and their medical applications 11. List the characteristics of the genetic code 12. Identify various types of mutations and their relation to genetic diseases and cancers. 13. Describe structure and functions of biological membranes and their role in transport and in biochemical , clinical and laboratory importance 14. Recall effect of his clinical practice on environment and principles of environmental development and saving. 15. identify most recent advances, in selected areas relevant to each subject 16. explain scientific background and function of laboratory equipment and methods used in Medical Biochemistry and Molecular Biology, 17. discuss different techniques and tools for searching the scientific literature. 18. identify the basics of ethics and scientific, medico legal aspects of health problems and clinical practice with special emphasis on biomedical investigations.	
By the end of the course the students should be able to: 1. Integrate various metabolic pathways together with their regulation 2. Correlate metabolic role of certain organs (liver, kidney ,brain and CNS) to function in health and disease 3. Search for primary and secondary scientific literature relevant to a specific topic 4. Analyze and interpret the results of various medical investigations related to Medical Biochemistry 5. Suggest accurately possible biochemical and /or	**ب- المهارات الذهنية :**

molecular investigations needed for diagnosis 6. Solve problems related to Medical Biochemistry and Molecular Biology in a given case study report 7. Formulate hypotheses and design experiments to test these hypotheses and carry out research studies 8. Take provisional decision based on knowledge in the field of Medical Biochemistry 9. Plan for continuous development of performance in the field of Medical Biochemistry and Molecular Biology 10. Evaluate of hazards in clinical practice, safety procedures.	
1. Perform various investigations and techniques related to Medical Biochemistry efficiently 2. Use competently relevant laboratory equipment 3. Apply and Interpret results of basic techniques used in molecular biological tests 4. Master numerical, graphical, statistical and other methods for analyzing experimental data. 5. Write up and interpret reports related to Medical Biochemistry investigations 6. Formulate and write scientific papers in the area of Medical Biochemistry and Molecular Biology 7. Apply safety measure in the laboratory 8. Use of technological methods to serve the professional practice. 9. Plan for development of practice	**ج- المهارات المهنية :**
1. Communicate properly with the staff members as well as with each other. 2. Respect the rules of laboratory work 3. Work effectively as member or leader to team. 4. Manage his own learning, including time management skills and learn effectively from a range of resources. 5. Use different teaching and evaluation methods to teach others and give feedback on their performance. 6. Perform scientific meetings according to the available time. 7. Use various technological methods and tools to gain information 8. Make use of available resources to learn independently and continuously.	**د- المهارات العامة:**

9. Discuss and dialogue based on reasoning and evidence 10. Retrieve and compare properly the biochemical information from a variety of sources					
					محتوى المقرر
Subjects	**lectures**	**practical**	**Total**	**% of total**	
DNA: The replicative process & repair	60	---		**4.76**	
RNA: Structure, transcription and posttranscriptional modification	60	---		**4.76**	
Protein synthesis: translation and posttranslational modifications	120	--		**9.5**	
Recombinant DNA and Biotechnology	60	---		**4.76**	
Regulation of gene expression	60	---		4.76	
Eucaryotic Cell structure	60	---		4.76	
Proteins: composition & structure, Structure-function relationship of protein families	60	---		4.76	
Enzymes: classification, kinetics, control	60	---		4.76	
Carbohydrate metabolism: Major and special pathways, and their control.	120	---		**9.5**	
Lipids: Utilization, storage metabolism of special lipids	120	---		**9.5**	
Amino Acids: General pathways and individual a.a. metabolism	120	---		**9.5**	
Metabolic interrelations	60	---		4.76	
Biochemistry of peptide and steroid hormones	60	---		4.76	
Molecular cell biology,	60	---		4.76	

biotransformations, the cytochrome P-450					
Iron and Haem Metabolism,Gas Transport and PH Regulation	60	---		4.76	
Digestion and Absorption of basic nutritional constituents	60	---		4.76	
Principles of nutrition, macronutrients and micronutrients	60	---		4.76	
Subcellular fractionation-Nutrition- and 3 out of the following six topics: Biochemistry of vision, of connective tissue, of liver, of muscle of nervous tissue, and of adipose tissue.	240	---		16	
Spectrophotometry-Flame photometry-chromatography-Electrophoresis-Colorimetric assays-Competitive binding assays (RIA, ELISA molecular Biology techniques	240	----		**100**	
1. lectures **2. Problem solving.** **3. Self-learning.** **4. Practical & clinical classes.**					٥- اساليب التعلم والتعليم

٦- تقويم الطلاب

مخرجات التعلم المستهدفة	الوسيلة		
To assess knowledge & intellectual skills.	Written examination	1	أ-الاساليب المستخدمة
To assess knowledge, intellectual skills & General & transferable skills	Oral examination	2	
To assess Practical & Clinical skills	Practical examination	3	

Two written exam+ oral exam + practical exam at the end of the course		ب- التوقيت
1- Written exam a) First paper b) Second paper 2- oral exam 3 practical exam	 350 350 200 100	ج- وزيع الدرجات
قائمة الكتب الدراسية والمراجع		
Harper's Biochemistry by: Murray, R K, Bender, DA., Botham, KM., Kennelly, PG., Rondwell, VW., Weil, PA : Harper's Illustrated Biochemistry (28th edition), McGraw Hill companies, Inc. (2009)		أ- كتب ملزمة
Lippincott's illustrated Biochemistry by Champe, PC., Harvey, RA., Ferrier, DR : Lippincott's Illustrated Reviews: Biochemistry (4th edition), Lippincott 's Williams &Wilkins (2008).		ب - كتب مقترحة
Periodical websites: *www.clinchem.org*		ج- دوريات علمية

Course Professor: **Prof. Dr. Mahasen Abd Elsattar**	Signature & date: **Mahasen Abd Elsattar**
Head of department: Prof. Dr.Amal abou Elfadl	Signature & date: **Mahasen Abd Elsattar**