كلية الطب

Faculty of Medicine

Master (MSc) Program &Courses Specification of Medical Biochemistry (2022-2023)

Program Specifications for Master's degree in Medical Biochemistry (2022-2023)

University: MINIA

Faculty(s): MEDICINE

Department: BIOCHEMISTRY

A- Basic Information

1. **Program title and code:** Program Specification for Master's degree in Medical Biochemistry, **BC 200**
2. **Program type:** single √ double multiple
3. **Department (s):** Major = 1 + Minor = 1 (Biochemistry and Molecular Biology + 1 Minor: Medical Microbiology and immunology.
4. **Department (s) involved in the program:** Medical Biochemistry department and Medical Microbiology and immunity department.
5. **Department responsible for offering the degree:** Medical Biochemistry department.
6. **Program duration:** 2 years.
7. **Number of program courses:** Two (One Medical Biochemistry course and one Medical Microbiology and immunology course).
8. **Coordinator:** Dr. Heba Marey.
9. **External evaluator (s):** Prof.Dr Abdelraheim Mohamed Professor of Medical Biochemistry, Faculty of Medicine, Assuit University.
10. **Last date of program specifications update:** 5/3/2023.
11. **program management team:**

B-Professional information

1- Program aims:

Graduate of Master Degree in Biochemistry should be able to:

1.1 Provide with the advanced medical knowledge and skills essential for the mastery of practice of specialty and necessary to provide further training and practice in the field of Biochemistry and Molecular Biology.

1.2 Understand all molecular basics and diseases.

1.3 Know different molecular techniques and their advanced applications.

1.4 Better understand and use the research tools including internet and different laboratory equipment.

1.5 Know retrieving the literature and understanding the evidence-based medicine

1.6 Demonstrate competency in practical use of basics, methods and tools of scientific

research in the field of biochemistry.
1.7 Apply the analytical scientific way in the field of professional practice in biochemistry.
1.8 Apply the specialized knowledge essential for the practice of Biochemistry according to the international standards and be able to correlate such knowledge with related basic subjects during professional practice of biochemistry.
1.9 Demonstrate a satisfactory level of awareness as regards the current & common problems and recent updates in the field of biochemistry.
1.10 Identify and solve common health problems in biochemistry.
1.11 Acquire all essential competencies necessary to enable the graduate to practice in a safe, scientific & ethical approach as well as using efficiently the suitable information technology to improve the professional practice in the field of biochemistry.
1.12 Exhibit a practically effective communication skill that enables exchange of information with other health professionals, colleagues, students and develop the skills of leadership.
1.13 Acquire the skills of decision-making in different situations during the professional practice.
1.14 Allocate & make use properly of the available resources and ensure maintaining them.
1.15 Show adequate awareness of public health and health policies and actively share in and in assessment of community needs & solve their problems in view of the continuous national and international changes.
1.16 Manifest appropriate attitude and professionalism that comply with the adopted standards of code of practice.
1.17 Acquire essential skills of life-long learning and continuous medical education and professional self-development.

2-Intended learning outcomes (ILOs)

2.1- (a) Knowledge and understanding:

A1. Discuss metabolic pathways of carbohydrate, lipid and protein. Identify integration metabolism, all molecular basics and diseases, different molecular techniques and their applications and know the principles, methodologies tools and ethics of scientific research
A2. Define metabolic and molecular diseases to help in their diagnosis
A3. Identify recent and more advanced methods and techniques of PCR to help in scientific research
A4. Define Ethical and medico- legal principles of medical practice related to the field of biochemistry.
A5. State Principles and measurements of quality in the field of biochemistry
A6. Define basics and ethics of scientific research
A7. Explain the role of minerals and hormones in metabolism.

2.2- (b) Intellectual skills

Upon completion of the master program (MSc) in Biochemistry and molecular biology, the graduate must be able to:
B1. Analyze different diseases to reach a final diagnosis.
B2. Solve special problems even in absence of some data

B3. Appraise knowledge and information in biochemistry to identify Biochemistry problems.

B4. Interpret research studies that add to knowledge & formulate scientific papers in the area of Biochemistry and Molecular Biology.

B5. Estimate problems in biochemistry and manage it.

B6.a. Carry out a Plan for the professional acquisition of essential skills of basic & modern laboratory techniques in biochemistry.

B6.b. Demonstrate the skills of critical appraisal.

B7. Analyze critical problems related to biochemistry and make a proper decision.

2.3. Skills:

2.3.1 (c) Professional and practical skills

Upon completion of the master program of Biochemistry, the graduate must be able to:

C.1. Prepare extraction procedures of DNA and RNA from different tissues.

C.2. Analyze scientific reports by determination of DNA polymorphism by RFLP technique

C.3. Solve problems in the laboratory as measuring DNA, RNA and Protein samples concentration using Spectrophotometer and performing ELIZA techniques for detection of different antigens.

C.4. Apply the basic knowledge by detection of DNA by conventional PCR and visualization of DNA bands on gel documentation system.

C.5. Practice biochemical techniques as performing biochemical urine analysis and basic biochemical blood tests.

2.3.2. (d) General and transferable skills

Upon completion of the master program of Biochemistry, the graduate should be able to:

D1. Communicate effectively using a written medical record, electronic medical record, or other digital technology.

D2. Use of information technology (computer to create, process, store, secure and exchange electronic
data) in the field of medical practice.

D3. Assess himself and identify personal learning needs

D4. Use various sources for information (physical and digital sources).

D5. Setting indicators for evaluating the performance of others

D6. Work in a team, and Apply leadership skills to enhance team functioning, the learning environment, and/or the health care delivery system

D7. Set up and combine in student teaching and assessment, or research points under supervision

D8. Demonstrate skills of self-evaluation a continuous learning

3-Program academic reference standards

Faculty Academic Reference Standards (ARS) for Master's Program of Medical Biochemistry

Academic standards:

MINIA faculty of medicine adopted the general Academic Reference Standards (ARS) provided by the national authority for quality assurance and accreditation of education (NAQAA) for all postgraduate programs (Faculty Council Decree

No.6854, in its cession No.177 Dated: 18\5\2009).

MINIA faculty of medicine has developed the academic standards (ARS) provided for master (MSc) program and approved in faculty Council decree No.7528, in its cession No.191, dated: 15\3\2010), last update: 20-2-2023 **{Annex 1}.**

Then Medical biochemistry department has developed the intended learning outcomes (Ilos) for Master (MSc) program in medical biochemistry and Date of program specification first approval was by department council: 13/5/2013, last update: 5/3/2023 **{Annex 2}.**

4-Program structure and contents

4.A Program duration: 2 years

4.B Program structure:

(Lectures 127 hrs. Practical 64 hrs.)

- No of hours/week:
  - Lecture: 4hrs/w
  - Practical: 2-4 hrs. /w
  - Tutorial: 2hrs/w
  - Total: 8-10 hrs./w
- Basic (compulsory) sciences courses: No: 1 Percentage: 70%
- Specific courses related to the specialty: No. 1 Percentage: 30%
- Training programs, scientific activities workshops, Field visits & seminars: Distributed all through the whole program.
- **Other courses: No: Nil Percentage: 0%**

4. C. Levels of program in credit hours system: Not applicable

4. D Program courses:

Number of courses: 2

- Two courses are compulsory **{Annex 3}.** To ensure complete coverage of all program ILOs by courses, a correlation between them has been done **{Annex 4}**.

Annex 3

1st part				
Course	**Hours/week**			**Program ILOS covered**
	Lectures	**practical**	**Tutorial**	
Medical Microbiology and Immunology	40 hours	10 hours	-	A1, A2, A3, A6, A7, B1, B2, B3, B4, B5, B6 a, B6 b, B7, C1, C2, C3, C4, C5, D1, D2, D3, D4, D5, D6, D7, D8
2nd part:				

Course	**Lecture (hours)**	**Practical/Clinical (hours)**	**Total No. of hours**	
General Metabolism and Molecular Biology				
	87 hours	54 hours	141	A1, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, B5, B6 a, B6 b, B7, C1, C2, C3, C4, C5, D1, D2, D3, D4, D5, D6, D7, D8
Training programs, workshops and seminars	Continuous			

5-Program admission requirements

A. General requirements:

A. Candidates should have either:

1. MBBCH degree from any Egyptian faculty of medicine or
2. Equivalent degree from medical schools abroad approved by the ministry of higher education

B. Candidate should complete the house office training year.

C. Follows postgraduate regulatory rules of Minia faculty of medicine.

B. Specific requirements:

A. Candidates graduated from Egyptian universities should "Good Rank" in their final year/cumulative years examination and grade "Good Rank "in biochemistry course too.

B. Candidate should know how to speak and write English well.

C. Candidate should have computer skills.

6-Regulations for progression and program completion

Duration of program is (2 years), starting from registration till acceptance of the thesis; divided to:

First Part: (12 months):

1. At least 12 months after registration should pass before the student can ask for examination in the 1st part.
2. Two set of exams: First in October and Second in April.
3. For the student to pass the first part exam, a score of at least 60% in each curriculum is needed with at least 40% in the written exam)
4. Those who fail in one curriculum need to re-exam it only.

Thesis/essay:

- Start from registration and should be completed and accepted at least after passing the thesis 1st part examination and at least one month before allowing to enter 2nd part final exam.
- Accepting the thesis occurs after publishing one thesis-based paper in local or international journal and is enough to pass this part.

Second Part: (12 months):

1. Program related specialized courses science Biochemistry and Molecular Biology Courses and ILOs. Actual work for 12 months as a demonstrator /trainee in the department of biochemistry the student should pass the 1st part before asking for examination in the 2nd part.
2. Two set of exams: First in October and Second in April.
3. For the student to pass the second part exam, a score at least 60% of the written exam in each curriculum is needed (with at least 40% in the written exam) to be admitted to the oral and practical exams.
4. 4 times of oral and practical exams are allowed before the student has to reattend the written exam.

5. Fulfillment of the requirements in each course as described in the template and registered in the logbook is a prerequisite for candidates to be assessed and undertake part 1 and part 2 examinations; as following:
    a. Journal club
    b. Training courses along the duration of the program
    c. Case presentation
    d. Conference attendance at least one conference
    e. Seminars at least 10 seminars
    f. Thesis discussion at least 10 discussions
    g. Workshops
    h. Other scientific activities requested by the department

7-Teaching and learning methods

1. Lectures per week throughout the course.
2. Assignments
3. Attending and participating in scientific conferences and workshops to acquire the general and transferable skills needed.
4. Practical lessons, training and demonstration weekly throughout the course.
5. Self-learning activities such as use of internet and multimedia
6. Regular weekly seminars and presentation
7. Thesis discussion.

Additional lectures, adjusting time and place of lectures according to their schedule and capacity.

Teaching and learning methods	The assessed ILOs
● **Lectures**	A1, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, B5, B6 a, B6 b, B7

• **Practical sessions**	C1, C2, C3, C4, C5, D2, D6, D7
• **Self-training activities** • **seminars, presentations and assignments.** • **Training courses & workshops.** • **Thesis discussion.** • **Conference attendance**	D1, D2, D3, D4, D5, D6, D7, D8

8- Methods of student assessment and weighting of assessment

Method of assessment	The assessed ILOs
1- Written Exams: - **Short essay** - **Problem solving** - **MCQ** - **Complete** - **True or False and correct the wrong**	A1, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, B5, B6 a, B6 b, B7
2- Practical Exams clinical	C1, C2, C3, C4, C5
3- Oral Exams	A1, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, B5, B6 a, B6 b, B7
4- Seminars, presentation, assignments, and logbook assessment	D1, D2, D3, D4, D5, D6, D7, D8

Weighing of assessment It is mandatory to pass all the papers of written exams separately				
Course	**written**	**oral**	**Practical**	**Total**
Microbiology and Immunity	**120**	**90**	**90**	**300**
Medical biochemistry	**280 (40%)** **1st paper 140** **2nd paper 140**	**210**	**210**	**700**

9-Methods of Program Evaluation:

Evaluator (By whom)	Method/tool	Sample
1. Senior students (Students of last year	Questionnaires	Attached to the file
1. Graduates (Alumni)	Questionnaires	Attached to the file
2. Stakeholders	Meeting Questionnaires	Attached to the file Attached to the file
3. External & Internal evaluators and external examiners	Reports	Attached to the file
4. Quality Assurance Unit	Reports Questionnaires Site visits	Attached to the file Attached to the file Attached to the file

Program Coordinators: Dr. Heba Marey

Head of Department: Prof.Dr. Salama Rabie Abd El Rahiem

Date of program specifications 1st approval by department council: 13/5/2013.

Date of last update & approval by department council: 5 / 3/ 2023

Annex (1): Comparison between National Academic Quality Assurance & Accreditation (NAQAAE) General Academic Reference Standards (GARS) and Faculty Academic Reference Standards (ARS)

NAQAAE برامج الماجستير	**Faculty** **Master (MSC) Program**
١. مواصفات الخريج: خريج برنامج الماجستير في أي تخصص يجب أن يكون قادرا على	**1. Graduate Attributes:** Graduate of master (MSC) program should be able to:
١,١ إجادة تطبيق أساسيات ومنهجيات البحث العلمي واستخدام أدواته المختلفة.	1.1. understanding and applying of basics of research method and research tools
٢,١ تطبيق المنهج التحليلي واستخدامه في مجال التخصص	2.1. Critically analyze, evaluate, and effectively communicate findings, theories, and methods
٣,١ تطبيق المعارف المتخصصة ودمجها مع المعارف ذات العلاقة في ممارسته المهنية.	3.1. Apply integrated professional and general knowledge in his scholarly field and at the interface between different fields.
٤,١ إظهار وعيا بالمشاكل الجارية والرؤى الحديثة في مجال التخصص.	4.1. Demonstrate awareness of community health needs related to the field of specialization by understanding the beneficial interaction with the society to improve quality of life
٥,١ تحديد المشكلات المهنية وإيجاد حلولا لها.	5.1. Demonstrating proficiency, required to solve current complex problems in his scholarly field.
٦,١ إتقان نطاق مناسب من المهارات المهنية المتخصصة واستخدام الوسائل التكنولوجية المناسبة بما يخدم ممارسته المهنية.	6.1. Master a variety of technical skills in his scholarly field and expert relevant equipment, technology, and software.
٧,١ التواصل بفاعلية والقدرة على قيادة فرق العمل.	7.1. Gain leadership skills and be able to communicate efficiently with colleagues and get the best results.
٨,١ اتخاذ القرار في سياقات مهنية مختلفة.	8.1. Take professional situational decisions and logically support them.
٩,١ توظيف الموارد المتاحة بما يحقق أعلي استفادة و الحفاظ عليها	9.1. Optimal use of available resources to achieve research or best patient health care and ensure its maintenance.
١٠,١ إظهار الوعي بدوره في تنمية المجتمع والحفاظ على البيئة في ضوء المتغيرات.	10.1. Demonstrate awareness of its role in community health development and
١١,١ التصرف بما يعكس الالتزام بالنزاهة والمصداقية والالتزام بقواعد المهنة.	11.1. Exhibit ethical behavior that reflect commitment to the code of practice
١٢,١ تنمية ذاته أكاديميا ومهنيا وقادرا علي التعلم المستمر.	12.1. demonstrate the ability to sustain a lifelong personal and professional growth.

٢.المعايير القياسية العامة: **NAQAAE General Academic Reference Standards "GARS" for Master Programs**	**2. Faculty Academic Reference Standards (ARS) for Master Program**
٢,١. المعرفة والفهم: بانتهاء دراسة برنامج الماجستير يجب أن يكون الخريج قادرا علي الفهم والدراية بكل من:	**2.1. Knowledge & Understanding:** Upon completion of the Master Program , the graduate should have sufficient knowledge and understanding of:
٢,١,١. النظريات والأساسيات والحديث من المعارف في مجال التخصص والمجالات ذات العلاقة	2.1.1. Understand the scientific basis and modern knowledge in the field of specialization and related medical sciences
٢,١,٢. التأثير المتبادل بين الممارسة المهنية وانعكاسها على البيئة	2.1.2. The mutual influence of professional practice on work environment, working conditions, and job characteristics.
٢,١,٣. التطورات العلمية في مجال التخصص	2.1.3. Scientific developments in the field of specialization
٢,١,٤. المبادئ الأخلاقية والقانونية للممارسة المهنية في مجال التخصص	2.1.4. Recognize basics of medico-legal aspects of practice, malpractice and avoid common medical errors
٢,١,٥. مبادئ وأساسيات الجودة في الممارسة المهنية في مجال التخصص	2.1.5. Quality principles in the scholarly field
٢,١,٦. أساسيات وأخلاقيات البحث العلمي	2.1.6. Basis of research methodology and medical ethics.
٢,٢ المهارات الذهنية: بانتهاء دراسة برنامج الماجستير يجب أن يكون الخريج قادرا على:	**2.2. Intellectual Skills:** Upon completion of the master program, the graduate should be able to:
٢,٢,١ تحليل وتقييم المعلومات في مجال التخصص والقياس عليها لحل المشاكل	2.2.1. Use judgment skills for analytical and critical problem solving
٢,٢,٢ حل المشاكل المتخصصة مع عدم توافر بعض المعطيات	2.2.2. Capable of integrating knowledge and dealing with complex subjects to solve problems
2.2.3الربط بين المعارف المختلفة لحل المشكلات المهنية	2.2.3. Be capable of integrating research results and/or results of history, physical and laboratory test findings to solve research or a clinical problem.
٢,٢,٤ إجراء دراسة بحثية و/أو كتابة دراسة علمية منهجية حول مشكلة بحثية	2.2.4. Effectively apply research methods and carrying out a medical research thesis
٢,٢,٥ تقييم المخاطر في الممارسات المهنية في مجال التخصص	2.2.5. Be aware of risk management principles, and patient safety.
٢,٢,٦ التخطيط لتطوير الأداء في مجال التخصص	2.2.6. Establish goals, commitments, and strategies for improved professional performance in the field of specialty
٢,٢,٧ اتخاذ القرارات المهنية في سياقات مهنية متنوعة.	2.2.7. Take professional situational decisions and logically support them.

3.2. المهارات المهنية: بانتهاء دراسة برنامج الماجستير يجب أن يكون الخريج قادرا على:	**3.2. Professional Skills:** Upon completion of the master program, the graduate must be able to:
3.2.1 إتقان المهارات المهنية الأساسية والحديثة في مجال التخصص	3.2.1. Master the basic and some advanced professional skills in his scholarly field.
٣,٢,٢كتابة وتقييم التقارير المهني.	3.2.2. Write and evaluate medical or scientific reports
٢,٣,٣ تقييم الطرق والأدوات القائمة في مجال التخصص	3.2.3. Assess and evaluate technical tools during research
٤,٢ المهارات العامة والمنتقلة: بانتهاء دراسة برنامج الماجستير يجب أن يكون الخريج قادرا على:	4.2. **General and transferable skills** Upon completion of the master program, the graduate should be able to:
٤,٢,١. التواصل الفعال بأنواعه المختلفة	4.2.1. Communicate effectively using a written medical record, electronic medical record, or other digital technology.
٤,٢,٢. استخدام تكنولوجيا المعلومات بما يخدم الممارسة المهنية	4.2.2. Use of information technology (computer to create, process, store, secure and exchange electronic data) in the field of medical practice.
٤,٢,٣. لتقييم الذاتي وتحديد احتياجاته التعلمية الشخصية	4.2.3. Assess himself and identify personal learning needs
٤,٢,٤. استخدام المصادر المختلفة للحصول على المعلومات والمعارف	4.2.4. Use various sources for information (physical and digital sources).
٤,٢,٥. وضع قواعد ومؤشرات تقييم أداء الآخرين	4.2.5. Setting indicators for evaluating the performance of others
٤,٢,٦. العمل في فريق، وقيادة فرق في سياقات مهنية مختلفة	4.2.6. Work in a team, and Apply leadership skills to enhance team functioning, the learning environment, and/or the health care delivery system
٤,٢,٧. إدارة الوقت بكفاءة	4.2.7. Manage time efficiently
٤,٢,٨. التعلم الذاتي والمستمر	4.2.8. Demonstrate skills of self-learning and lifelong learning needs of medical profession.

Annex (II): Comparison between Faculty Academic Reference Standards (ARS) and MSc PROGRAM of Biochemistry and Molecular Biology (ILOS)

ARS VS. MSc PROGRAM of Biochemistry and Molecular Biology (ILOS)

2. Faculty Academic Reference Standards (ARS) for Master Program	**2.Intended Learning Outcomes of MSc program in Biochemistry and Molecular Biology**
2.1. Knowledge & Understanding: **Upon completion of the Master Program the graduate should have sufficient knowledge and understanding of:**	**2.1. Knowledge and Understanding** **Upon completion of the master Program (MSc) in Biochemistry and molecular biology, the graduate should have be able to:**
2.1.1. Understand the scientific basis and modern knowledge in the field of specialization and related medical sciences	A1 Discuss metabolic pathways of carbohydrate, lipid and protein. Identify integration metabolism, all molecular basics and diseases, different molecular techniques and their applications and know the principles, methodologies tools and ethics of scientific research A7. Explain role of minerals and hormones in metabolism
2.1.2. The mutual influence of professional practice on work environment, working conditions, and job characteristics.	A2. Define metabolic and molecular diseases to help in their diagnosis
2.1.3. Scientific developments in the field of specialization	A3 Identify recent and more advanced methods and techniques of PCR to help in scientific research
2.1.4. Recognize basics of medico-legal aspects of practice, malpractice and avoid common medical errors	A4. Define Ethical and medico- legal principles of medical practice related to the field of biochemistry.
2.1.5. Quality principles in the scholarly field	A5. State Principles and measurements of quality in the field of biochemistry
2.1.6. Basis of research methodology and medical ethics.	A6. Define basics and ethics of scientific research

2.2. Intellectual Skills: Upon completion of the master program, the graduate should be able to:	**2.2. Intellectual skills Upon completion of the master program (MSc) in Biochemistry and molecular biology, the graduate must be able to:**
2.2.1. Use judgment skills for analytical and critical problem solving	B1. Analyze different diseases to reach a final diagnosis.
2.2.2. Capable of integrating knowledge and dealing with complex subjects to solve problems	B2. Solve special problems even in absence of some data
2.2.3. Be capable of integrating research results and/or results of history, physical and laboratory test findings to solve research or a clinical problem.	B3. Appraise knowledge and information in biochemistry to identify Biochemistry problems
2.2.4. Effectively apply research methods and carrying out a medical research thesis	B4 Interpret research studies that add to knowledge & formulate scientific papers in the area of Biochemistry and Molecular Biology
2.2.5. Assess risk in professional practices in the area of Biochemistry and molecular biology	B5 Estimate risk in biochemistry and manage it
2.2.6. Plan for the development of professional performance in the area of Biochemistry and molecular biology	B6.a. Carry out a Plan for the professional acquisition of essential skills of basic & modern laboratory techniques in biochemistry B6.b. Demonstrate the skills of critical appraisal.
2.2.7. Take professional situational decisions and logically support them.	B7 Analyze critical problems related to biochemistry and make a proper decision
3.2. Professional skills Upon completion of the master program (MSc) in Biochemistry and molecular biology the graduate must be able to:	**3.2.1 Professional Skills:** Upon completion of the master program of Biochemistry, the graduate must be able to:
3.2.1. Master the basic & modern professional skills in Biochemistry and molecular biology	C1. Appraise the basic and some advanced professional skills in his scholarly field.
3.2.2. Write and evaluate/comment on professional reports	C2. Analyze and evaluate medical or scientific reports C5. Practice biochemical techniques in biochemistry labs

3.2.3. Evaluate & demonstrate relevant skills of existing methods and tools in the area of Biochemistry and molecular biology	C3. Solve problems in the laboratory and evaluate technical tools during research C4 Apply and adopt the basic knowledge acquire during the course into diagnosis of different metabolic and molecular diseases.
4.2. General & transferable skills Upon completion of the doctorate program (MSc) in Biochemistry and molecular biology, the graduate must be able to:	**3.2.2. General and transferable skills** Upon completion of the master program of Biochemistry, the graduate should be able to:
4.2.1. Demonstrate effective communication skills in its different forms	D1. Communicate effectively using a written medical record, electronic medical record, or other digital technology.
4.2. 2.Use information technology to serve the professional practice	D2. Use of information technology (computer to create, process, store, secure and exchange electronic data) in the field of medical practice.
4.2.3. Demonstrate skills of self-assessment and identify personal learning needs	D3. Assess himself and identify personal learning needs
4.2.4. Use different sources to get information and knowledge	D4. Use various sources for information (physical and digital sources).
4.2.5. Develop rules and indicators for appraisal of others	D5. Setting indicators for evaluating the performance of others
4.2.6. Work in a team and demonstrate leadership of teams in various professional contexts	D6. Work in a team, and Apply leadership skills to enhance team functioning, the learning environment, and/or the health care delivery system
4.2.7. Manage time efficiently	D7. Set up and combine in student teaching and assessment, or research points under supervision
4.2.8. Demonstrate skills of self-learning and continuous learning	D8. Demonstrate skills of self-evaluation a continuous learning

Date of last update & approval by department council: 5 / 3/ 2023

MSC in Medical biochemistry	مسمى البرنامج
BC 200	كود البرنامج

جامعة/أكاديمية: جامعة المنيا.....
كلية / معهد: كلية الطب.....
قســــــــم: الكيمياء الحيوية

A. Annex (4): Correlations between Program ILOs &Courses

Matrix of Coverage of MSC Program ILOs By Course

Courses (List of courses in 1st and 2nd parts)	Program Intended Learning Outcomes (ILOs)			
	A. Knowledge & Understanding	B. Intellectual Skills	C. Professional & Practical skills	D. General & Transferable Skills
	A	B	C	D
1- Medical Microbiology and immunology 1st part	A1, A2, A4, A6	B1, B2, B3, B4, B5, B6	C1, C2, C5	D1, D2, D3, D4, D5, D6, D7, D8
2- General metabolism & Molecular Biology 2nd part	A1 A2 A3 A4 A6 A7	B1, B2, B3, B4, B5 , B6, B7	C1, C2, C3, C4, C5	D1, D2, D3, D4, D5, D6, D7, D8

Date of last update & approval by department council: 5 / 3/ 2023

B. Matrix of Coverage of Course ILOs by Methods of teaching and learning

Methods of Teaching & Learning	Intended Learning Outcomes (ILOs)			
	A. Knowledge & Understanding	B. Intellectual Skills	C. Professional & Practical skills	D. General & Transferable Skills
	A	B	C	D
Lecture	A1, A2, A3, A4, A5, A6, A7	B1, B2, B3, B4, B5, B6 B7		
Practical			C1, C2, C3, C4 C5,	D1, D2, D3, D4, D5, D6, D7, D8
Presentation/seminar Journal club Thesis discussion Training courses & workshops				D1, D2, D3, D4, D5, D6, D7, D8

Date of last update & approval by department council: 5 / 3/ 2023

C. Matrix of Coverage of Course ILOs by Methods of Assessment

Methods of Assessment	Intended Learning Outcomes (ILOs)			
	A. Knowledge & Understanding	**B. Intellectual Skills**	**C. Professional & Practical skills**	**D. General & Transferable Skills**
	A	**B**	**C**	**D**
Written exam	A1, A2, A3, A4, A5 A6, A7	B1, B2, B3, B4, B5, B6 a, B6 b, B7		
Practical exam			C1, C2, C3, C4, C5	
Oral Exam	A1, A2, A3, A4, A5 A6, A7	B1, B2, B3, B4, B5, B6a, B6 b, B7		
Seminars, presentations, Assignments, Logbook Assessment				D1, D2, D3, D4, D5, D6, D7, D8

Date of last update & approval by department council: 5 / 3/ 2023

Course Specifications of Medical Microbiology and Immunology for medical biochemistry 1st part of master program (BC 200)

University: Minia

Faculty: Medicine

Department: Medical Microbiology and Immunology

1. Course Information		
Academic Year/level: postgraduate students	Course Title: Medical Microbiology and Immunology for Medical biochemistry postgraduate master students.	**Code**: **BC200**
Number of teaching hours: - **Lectures:** Total of 40 hours; 2 hours/week - **Practical/clinical:** Total of 10 hours		
2.Overall Aims of the course	By the end of the course the student must be able to: 1. Know the different types of pathogens, their structure and pathogenesis 2. Know the different methods for laboratory diagnosis and control of different infectious agents. 3. Know the different molecular microbiological techniques and their applications. 4. Know the basics of the host-parasite relationships and the role of the immune system in defending the body against different pathogens and its role in health and disease. 5. Know the principles of biosafety measures and aseptic precautions.	
3.Intended learning outcomes of course (ILOs): ***Upon completion of the course, the student should be able to:***		

A-Knowledge and Understanding	A1 Identify microbial morphology, structure, metabolism and physiology of medically significant microorganisms. A2- Discuss the basics of microbial genetics and biotechnology techniques and their applications. A3 - Explain different methods for in vivo and in vitro control of different microorganisms A4- Recognize the taxonomy and classification of different microorganisms. A5- Identify the natural habitat, source of infection and mode of transmission of the different classes of pathogens. A6- Define the different laboratory methods for identification of different infectious agents and acquire the skills for their performance. A7- Explain the different methods for treatment, prophylaxis, and control measures of common infectious agents. A8- Recognize SARS-COV-2 (causative organism of COVID-19) structure, replication, pathogenesis, and mutations. A9- Identify the different levels of host parasite relationship and recognize the microbial virulence factors. A10-Define the natural barriers for infection (innate immunity). A11- Explain the structure and functions of different components of the immune system. A12-Define the role of the immune system in health and disease of the human being. A13- Discuss the different methods for assessment of the immune response. A14- Explain the different methods of immunomodulation and their applications. A15- List the causes, sources, mode of transmission and treatment of nosocomial infections. A16- Identify the different methods for infection control A17- Explain the principles of biosafety measures and aseptic precautions during practical and clinical settings.
B-Intellectual Skills	B1. Analyze different cases of infection to reach a final diagnosis and microbiological identification of the causative organism B2. Solve problems associated with different infections such as microbial resistance to antimicrobial agents, reach a final diagnosis of a certain pathological condition caused by an infectious organism.
C- Professional and Practical Skills	C1. Apply the standard protocol in collection of pathological samples C2- Acquire skills to perform basic laboratory techniques required for identification of different microbes C3- practice measures of infection control in microbiology

	laboratory C4 Perform molecular techniques.
D-General and transferable Skills	D1. Manipulate microbiological samples and reach a microbiological diagnosis of an infection. D2. Write protocols for identification of a given microorganism. D3. Communicate with colleagues and patients regarding a case caused by a microorganism. D4. Work in/with different groups. D5. Manage a microbiological laboratory.

4.Course Contents

Topic	Lecture hours/week	Practical/Clinical hours/week	Total No. of hours hours/week
1. Introduction and collection of pathological samples		2	2
2. Cleaning, sterilization and disinfection		2	2
3. Antimicrobial chemotherapy	2		2
4. Staining and culture media		2	2
5. Normal flora	2		2
6. Basic immunology I	2		2
7. Basic immunology II	2		2
8. Investigations of immunological diseases		2	2
9. Tumor Immunology	2		2
10. Bacterial and viral vaccines	2		2
11. Mycobacterial infections.	2		2
12. General virology	2		2
13. Viral hepatitis	2		2
14. Covid-19	2		2
15. Human immunodeficiency virus	2		2
16. Bacterial, viral and fungal respiratory tract infections.	2		2
17. Bacterial viral and fungal GIT infections.	2		2
18. Infection control and Occupational safety	2		2
19. Nosocomial infections	2		2
20. Bacterial, viral and fungal CNS infections	2		2
21. Bacterial, viral and fungal skin infections	2		2

22. Vector-transmitted diseases	2		2
23. Bacterial genetics	2		2
24. Molecular biology	2	2	4
Total	40	10	50

5.Teaching and Learning Methods	Lectures Practical sessions Seminars
6.Teaching and Learning Methods for students with limited Capacity	Self-learning activities such as use of internet and multimedia.
7.**Student Assessment**	
A. Student Assessment Methods	End of course written exam: A paper-based exam **to assess** the student's comprehension and understanding of the class work Oral exam: to assess student's intellectual and communication abilities regarding basic knowledge and understanding of the course topics. Practical exam: objective structured practical examination to assess student professional and practical skills
B. Assessment Schedule (Timing of Each Method of Assessment)	End of course exam (written, oral and practical exams) Week 23
C. Weighting of Each Method of Assessment	Final written Examination: 120 marks (40%) Oral Examination: 90 marks (30%) Practical exam: 90 marks (30 %) Total 300 marks (100%)
8.List of References	
A. Course Notes/handouts	Department Books, and notes on Medical Microbiology and Immunology by microbiology department, Faculty of medicine, Minia university
B. Essential Books	Jawetz, Melnick and Adelberg's Medical Microbiology 27th edition by Riedel. S (2019); McGraw-Hill Education Review of Medical Microbiology and Immunology 17th edition by warren levinson (2022); McGraw-Hill Education
C. Recommended Textbooks	Janeway's Immunobiology 9th edition by Kenneth Murphy and Casey Weaver, (2016); Garland Publishing Inc. NY, London.
D. Periodicals, websites	TBD and updated during the course work

Course Coordinator: Dr. Dalia Nabil

Head of Department: Prof. Dr. Wafaa Khairy

Date of last update & approval by department council: 5 / 3 /2023

A. Matrix between ILOs and course topics

Contents (List of course topics)	Intended Learning Outcomes (ILOs)			
	A. Knowledge & Understanding	B. Intellectual Skills	C. Professional & Practical skills	D. General & Transferable Skills
	A	B	C	D
1. **Introduction and collection of pathological samples**	A3 A5 A7	B1	C1	D4 D5
2. **Cleaning, sterilization and disinfection**	A3 A5 A6	B2	C1	D2 D3
3. **Antimicrobial chemotherapy**	A1 A5 A6	B1	C2	D2 D3

4. Staining and culture media	A14 A15 A17	B1	C2	D3, D4
5. Normal flora	A1 A9	B1	C1, C3	D1
6. Basic immunology 1	A11 A12 A13	B2	C1	D3
7. Basic immunology 2	A11 A12 A13	B2	C1	D2 D3 D4
8. Investigations of immunological diseases	A12 A13 A14	B1 B2	C1 C4	D3 D4
9. Tumor Immunology	A7 A10 A15 A17	B1	C2	D3 D4 D5
10. Bacterial and viral vaccines	A2 A8 A10 A11	B2	C2 C3	D3 D4 D5
11. Mycobacterial infections	A2 A5	B1 B2	C1	D2 D3 D4
12. General virology	A3 A4	B2	C1	D3
13. Viral Hepatitis	A1 A3	B1 B2	C1	D2 D3
14. Covid-19	A1 A8 A16	B1 B2	C1 C2 C4	D3 D4
15. Human immunodeficiency virus	A5 A6	B1	C1 C2	D2 D3 D4
16. Bacterial, viral, and fungal respiratory tract infections	A4 A5 A6	B2	C1 C2	D3 D4
17. Bacterial, viral, and fungal GIT infections	A3 A4 A11 A12 A13	B2	C1 C2	D3 D4
18. Infection control and Occupational safety	A1 A2 A4 A6 A15	B2	C1 C3	D3 D5

19. Nosocomial infections	A4 A5 A7 A10 A13	B1	C1 C2 C3	D3
20. Bacterial, viral and fungal CNS infections	A2 A11 A13 A17	B2	C1 C2	D4 D5
21. Bacterial, viral and fungal skin infections	A1 A2 A3	B1	C1 C2	D4
22. Vector transmitted diseases	A1 A2 A3	B1	C1 C2 C3	D3 D4
23. Bacterial genetics	A1 A15	B2	C2	D1 D2 D3
24. Molecular biology	A13 A14 A17	B1	C1 C2 C3	D3 D4

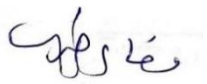
Date of last update & approval by department council: 6 / 3 /2023

B. Matrix of Coverage of Course ILOs by Methods of Teaching

Methods of Teaching & Learning	**Intended Learning Outcomes (ILOs)**			
	A. Knowledge Understanding	**B. Intellectual Skills**	**C. Professional & Practical skills**	**D. General & Transferable Skills**
	A	**B**	**C**	**D**
Lecture	**A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17**	**B1**		

Practical			**C1 C2 C3 C4**	**D1 D3 D4**
Presentation/seminar				**D1 D2 D5**

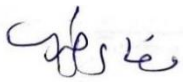
Date of last update & approval by department council: 5 / 3 /2023



C. Matrix of Coverage of Course ILOs by Methods of Assessment

Methods of Assessment	**Intended Learning Outcomes (ILOs)**			
	A. Knowledge & Understanding	**B. Intellectual Skills**	**C. Professional & Practical skills**	**D. General & Transferable Skills**
	A	**B**	**C**	**D**
Written exam	**A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17**	**B1**		
Practical exam			**C1 C2 C3 C4**	**D3 D4**
Oral Exam				**D2**

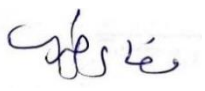
Date of last update & approval by department council: 6 / 3 /2023



Blueprint of Medical Microbiology and Immunology Exam paper for 1st part of Master of Biochemistry (BC200) (120 marks)

Blueprint of Medical Microbiology and Immunology Exam paper for 1st part of Master of Biochemistry (BC200) (120 marks)											
(List of course topics)	**Hrs**	**Intended learning outcomes ILOS**		**N of item per topic**	**% of topic**	**Knowledge & Understanding**		**Intellectual Skills**		**Total mark**	**Actual mark**
Contents		**Knowledge & Understanding**	**Intellectual Skills**			**No of items**	**mark**	**No of items**	**mark**		
1. General Microbiology	6	70%	30%	3	15	4	**12**	2	**6**	**18**	18
2.Immunology	8	70%	30%	4	20	4	**16**	2	**8**	**24**	24
3.Bacteriology	6	70%	30%	3	15	4	**12**	2	**6**	**18**	18
4. Virology	6	70%	30%	3	15	4	**12**	2	**6**	**18**	18
5. Applied Microbiology	10	70%	30%	5	25	4	**20**	2	**10**	**30**	30
6. Infection control	4	70%	30%	2	10	4	**8**	2	**4**	**12**	12
Total	40				100%					**120**	120

Date of last update & approval by department council: 6 / 3 /2023



Course Specifications of Medical Biochemistry for 2nd part of master program

2022-2023

University: Minia
Faculty: Medicine
Department: Biochemistry

	1. Basic Information		
	● **Academic Year/level:** 2nd part of MSC in Biochemistry	● **Course Title:** Medical Biochemistry	• **Program Code: Bc200**
	● **Number of teaching hours:** **Lectures**: Total of 87 hours; 2 hours/week **Practical/clinical:** Total of 54 hours; 2 hours/week		
	2. Overall Aims of the course	By the end of the course the student must be able to: 1- To acquire sufficient knowledge in medical biochemistry. 2- To prepared highly trained biochemists in biomedical investigations and laboratory fields. 3- To introduce candidates to the basics of scientific medical research and its ethics to provide an educational environment that encourages creativity and research both fundamental and applied. 4- To enable students to improve their skills.	
	3. Intended learning outcomes of course (ILOs): **Upon completion of the course, the student should be able to:**		
	A. Knowledge and Understanding	A1-Describe common clinical conditions related to General Biochemistry such as: Biochemical considerations of different types of carbohydrates. A2-Explain biochemical properties, classification and physiological significance of different types of lipids and their biochemical and laboratory importance. A3-Identify different types of amino acids and their significance with their genetic and metabolic relevance. A4 Describe structure and different types of different monomers that form nucleic acid. A5-Mention the following factual basics, principle, fundamentals of ethics and legal aspects of professional practice in the field of medical biochemistry. A6-State update and evidence-based knowledge related to general biochemistry. Mode of action and kinetics of enzymes and their role in diagnosis of diseases. A7-Recognize various metabolic processes of carbohydrate, lipid,	

		protein and their oxidation in respiratory chain. A8-List the role of minerals and hormones in metabolism. A9-Explain how the information in living cells is transferred from DNA to RNA and finally translated to functional proteins. A10-Memorize the facts and principles of the other relevant basic and clinically supportive sciences related to general biochemistry. A11- Discuss the composition of different body fluids, milk, blood, CSF, sweat, semen, and urine in healthy individuals. A12-Mention the ethical and scientific principles of medical research and medicolegal principles revenant to general biochemistry A13-State the impact of common problems related to the field of general biochemistry on the society and how good practice can improve these problems.
	B. Intellectual Skills	B1-Correlates the facts of relevant basic and clinically supportive sciences with conditions and diseases of genetics, metabolism and oncology. B2-Design and present cases, seminars in common problems related to biochemical study. B3-Formulate management plans and alternative decisions in different situations in the field of general biochemistry. B4 -Apply molecular biology which provides a useful point for examining the effect of the research too B5-correlates pathophysiologic principles with general principles common to medical oncology. B6-Analyze problems associated with molecular diseases that will be treated in the future by gene therapy.
	C. Professional and Practical Skills	C1-Perform some basic lab skills essential to general biochemistry. C2- Laboratory reagents and instruments used in biochemistry laboratory colorimetric estimation of some blood parameters and urine analysis. C3-Interpret the symptoms and signs and biochemical laboratory findings of vitamins deficiency diseases. C4-Write and evaluate the laboratory reports. C5-Use information technology to support decisions in common situations related to general biochemistry. C6-Counsel and educate students and junior staff in the lab about conditions related to general biochemistry. C7-Solve health care problems and better understanding of the normal structure and function.

		C8- Perform the following basic lab skills related to Molecular Biology as: - Basic concepts of recombinants technology. - DNA and RNA isolation. - Different types of electrophoresis. - Polymerase chain reaction and restriction enzymes.
	D. General and transferable skills	Upon completion of the master program of Biochemistry, the graduate should be able to: D1. Communicate effectively using a written medical record, electronic medical record, or other digital technology. D2. Use of information technology (computer to create, process, store, secure and exchange electronic data) in the field of medical practice. D3. Assess himself and identify personal learning needs D4. Use various sources for information (physical and digital sources). D5. Setting indicators for evaluating the performance of others D6. Work in a team, and Apply leadership skills to enhance team functioning, the learning environment, and/or the health care delivery system D7. Manage time efficiently D8. Demonstrate skills of self-evaluation a continuous learning.

4. Course Contents

Topic	**Lecture (hours)**	**Practical/Clinical (hours)**	**Total No. of hours**
General metabolism			
1-Bioenergetics	4	4	8
2-Carbohydrate Metabolism	11	6	17
3-Lipid metabolism	8	4	12
4-Protein metabolism	8	4	12
5-Purines and pyrimidine metabolism	2	2	4
6-Integration of metabolism	1	2	3
7-Minerals	2	2	4
8-Hormones	2	2	4
9-Enzymes	2	2	4
10-Vitamins	2	3	5

	11-Body fluids	1	4	8
	Molecular Biology			
	1. Nucleic acid Structure	2	2	4
	2. DNA synthesis	4	2	6
	3. DNA repair	2	2	4
	4. RNA synthesis	4	2	6
	5. Protein synthesis	4	2	6
	6. Regulation of gene expression	6	2	8
	7.Molecular biology techniques	8	4	12
	8.Recombinant DNA techniques	8	6	14
	9. Human genome project	6	2	8
	Total hours	87	54	141

5. Teaching and Learning Methods	5.1.Lectures. 5.2.Practical lessons 5.3.Self-learning activities 5.4.Regular weekly seminars.
6. Methods of student assessment	
A. Student Assessment Methods	**1. Written exam** to assess the acquired knowledge & understanding as well as intellectual skills and essential professional skills. **2. Practical exam** to assess ability of the candidate for applying information studied in the course in diagnosis. **3. Oral exam** to assess the student intellectual and communication skills regarding basic knowledge and understanding of the course topics, and to help the teaching staff to evaluate the % of achievement of the intended learning outcomes of the course.
B. Assessment Schedule (Timing of each method of assessment)	● **Assessment 1: 2 written exams** by the end of the course. ● **Assessment 2**: **Practical exam** by the end of the course. ● **Assessment 3: Oral exam,** after the written exam

7-Weighting of Each Method of Assessment	**Written examination: 280 marks two exam papers 140 mark each (40%)** **Oral examination: 210 marks 30%** **Practical examination: 210 marks 30%** **Total: 700 marks 100%**
8. List of References	
A. Course Notes/handouts	1 -General and systemic biochemistry course notes prepared by the department staff & printed material of recorded lectures. 2- Lectures' handouts
B-Essential Books	Harper's Biochemistry, Robert K. Murray, Daryl K. Granner, PeterA.Mayes, and VictorW. Rodwell (32th edition, 2022)
C. Recommended Textbooks	a. Lubert Stryer, Biochemistry (9 th edition, 2019) b. Lehninger, Biochemistry (8th edition, 2021) c. Lippincott, Biochemistry (7th edition, 2017)
D. Periodicals, websites	To be determined and update during the course work. 1- Journal of biochemistry 2-www.pubmed.com

Program Coordinators: Dr. Heba Marey

Head of Department: Prof. Dr. Salama Rabie Abd El Rahiem

Date of program specification 1st approval by department council: 13/5/2013.

Date of last update & approval by department council: 5 / 3 /2023

مسمى المقرر	**Medical Biochemistry**
كود البرنامج	**Bc200**

جامعة/أكاديمية.....: جامعة المنيا.....

كلية / معهد: .....كلية الطب.....

قســـم: .....الكيمياء الحيوية.....

A. Matrix of Coverage of Course ILOs By Courses topics

Contents (List of course topics)	**Intended Learning Outcomes (ILOs)**			
	A. Knowledge & Understanding	**B. Intellectual Skills**	**C. Professional & Practical skills**	**D. General & Transferable Skills**
	A	**B**	**C**	**D**
I. General Metabolism				
1-Bioenergetics	A1 A7	B1 B5	C1	D2 D4
2-Carbohydrate Metabolism	A1 A6 A7	B1 B2	C1 C7	D1 D2 D3
3-Lipid Metabolism	A2 A6 A7	B1 B2 B5	C1 C7	D2 D3
4-Protein Metabolism	A3 A6 A7	B1 B3	C1 C7	D1 D2 D3 D4

5-Purine and Pyrimidine metabolism	A4 A10	B1 B4 B6	C7 C1, C3	D2 D4
6-Integration of Metabolism	A1 A2 A3 A7	B1 B2 B3	C1 C4 C8	D1 D3
7-Minerals	A5 A8	B3	C1 C4	D2 D3 D4
8-Hormones	A5 A8 A10 A13	B1 B3	C1 C4	D3 D4
9-Enzymes	A8 A12 A13	B1	C2 C4	D3 D4 D5
10-Vitamins	A2 A8 A10 A11	B1 B3	C3 C4	D2 D3 D4
11-Body fluids	A11 A12 A13	B1 B2	C2 C4	D2 D3 D4 D5
II. Scientific activities (Journal club, Training courses, Case presentation, Conference attendance Seminars & Workshops).	A10 A12 A13	B2	C5 C6	D5 D6 D7 D8
III. Molecular Biology				
1. Nucleic acid structure	A4 A6	B1 B2	C7 C8 C2 C4	D1 D2
2. Nucleic acid synthesis	A4 A6 A9	B4 B6	C8 C4	D1 D2 D4
3. DNA synthesis	A4 A6 A9	B2 B4 B6	C8 C5	D2 D4
4. DNA repair	A4 A6 A9 A10	B1 B4 B6	C8 C6	D1 D3 D4
5. RNA synthesis	A9 A10 A12	B1 B4	C8 C4 C5	D3 D5
6. Protein synthesis	A9 A10 A13	B1 B6	C8 C5 C6	D2 D3

7. Regulation of gene expression	A9 A13 A5 A6	B4 B6	C8 C4 C5 C6	D4 D5
8. Molecular biology techniques	A5 A6 A10 A12 A13	B1 B4 B6	C8	D5 D6 D7 D8
9. Recombinant DNA techniques	A6 A9 A10 A13	B1 B4	C1 C6 C8	D1 D5 D6
10. Human genome Project	A5 A9 A10 A13	B1 B6	C8	D1 D5 D7 D8

Date of last update & approval by department council: 5 / 3 /2023

B. Matrix of Coverage of Course ILOs by Methods of Teaching & Learning

Methods of teaching	Intended Learning Outcomes (ILOs)			
	A. Knowledge & Understanding	**B. Intellectual Skills**	**C. Professional & Practical skills**	**D. General & Transferable Skills**
	A	**B**	**C**	**D**
Lecture	A1 A2 A3 A4 A7 A8 A9 A11 A12 A13	B1 B2 B.3 B4 B5 B6		
Practical			C1 C2 C3 C4 C5 C6 C7 C8	D2 D3 D5 D6
Presentation/seminar				D2 D3 D6 D7 D8
Journal club			C1 C5 C7	D2 D3 D5 D6 D7 D8

Training courses & workshops			C1 C2 C8	D1 D5 D6 D7 D8

Date of last update & approval by department council: 5 / 3 /2023

Methods of Assessment	**Intended Learning Outcomes (ILOs)**			
	A. Knowledge & understanding	**B. Intellectual Skills**	**C. Professional & Practical skills**	**D. General & Transferable Skills**
	A	**B**	**C**	**D**
Written exam	A1 A2 A3 A4 A7 A8 A9 A11	B1 B2 B3 B5 B6		
Practical exam			C1 C2 C3 C4 C8	
Oral Exam	A1 A2 A3 A4 A8 A9	B1 B2 B3		
Logbook	A4 A5 A6 A8 A10 A12 A13	B1 B2 B3 B4 B5 B6	C1 C5 C6 C7 C8	D1 D2 D3 D4 D5 D6 D7 D8

C. Matrix of Coverage of Course ILOs by Methods of Assessment

Date of last update & approval by department council: 5 / 3 /2023

Blueprint of Medical Biochemistry Department
Blueprint of General Metabolism Examination Paper
(140 marks)

	Topic	Hours	Knowledge %	Intellectual %	% of topic	No of items per topic	Knowledge		Intellectual		Marks	Actual mark
							No of Items	*Mark*	*No of Items*	*Mark*		
1	**Bioenergetics**	4	70	30	**9.3**	4	3	9.765	1	3.255	**13.02**	**13**
2	**Carbohydrate metabolism**	11	75	25	**25.6**	6	4	23.9	2	12.1	**35.84**	**36**
3	**Lipid metabolism**	8	75	25	**18.6**	6	4	17.36	2	8.64	**26.04**	**26**
4	**Protein metabolism**	8	75	25	**18.6**	6	4	17.36	2	8.64	**26.04**	**26**
5	**Purine and pyrimidine metabolism**	2	70	30	**4.6**	2	1	3.22	1	3.22	**6.44**	**6.5**
6	**Integration of metabolism**	1	80	20	**2.3**	2	1	1.61	1	1.61	**3.22**	**3.5**
7	**Minerals**	2	75	25	**4.6**	2	1	3.22	1	3.22	**6.44**	**6.5**
8	**Hormones**	2	75	25	**4.6**	2	1	3.22	1	3.22	**6.44**	**6.5**
9	**Enzymes**	2	75	25	**4.6**	2	1	3.22	1	3.22	**6.44**	**6.5**
10	**Vitamins**	2	75	25	**4.6**	2	1	3.22	1	3.22	**6.44**	**6.5**
11	**Body fluids**	1	75	25	**2.3**	2	1	1.6	1	1.6	**3.22**	**3**
	Total	**43**			**100 %**						**140**	**140**

Date of last update & approval by department council: 5 / 3 /2023

Blueprint of Medical Biochemistry Department
Blueprint of Molecular Biology Examination Paper

	Topic	Hrs	Knowledge %	Intellectual %	% of topic	No of items per topic	Knowledge		Intellectual		Marks	Actual mark
							No of Items	Mark	No of Items	Mark		
1	**Nucleic acid structure**	**2**	70	30	**4.5**	2	1	3.15	1	3.15	**6.3**	**6**
2	**DNA synthesis**	**4**	70	30	**9.09**	4	2	6.363	2	6.363	**12.726**	**13**
3	**DNA repair**	**2**	75	25	**4.5**	2	1	3.15	1	3.15	**6.3**	**6**
4	**RNA synthesis**	**4**	75	25	**9.09**	4	2	6.363	2	6.363	**12.726**	**13**
5	**Protein synthesis**	**4**	80	20	**9.09**	4	2	6.363	2	6.363	**12.726**	**13**
6	**Regulation of gene expression**	**6**	80	20	**13.6**	4	2	9.52	2	9.52	**19.04**	**19**
7	**Molecular biology techniques**	**8**	75	25	**18.18**	6	3	12.726	3	12.726	**25.452**	**25.5**
8	**Recombinant DNA techniques**	**8**	70	30	**18.18**	6	3	12.726	3	12.726	**25.452**	**25.5**
9	**Human genome project**	**6**	80	20	**13.6**	4	2	9.52	2	9.52	**19.04**	**19**
	Total hours	**44**			**100 %**						**140**	**140**

(140 marks)

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