Program and Course specifications
for

Medical Doctorate (M.D) Degree
of

Clinical Biochemistry and Molecular Diagnostics

(According to currently applied law)

Clinical Biochemistry and Molecular Diagnostics Department

National Liver Institute

Menoufia University

2023 - 2024

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A. **Basic Information:**

a.1 Program Title: M.D. degree of Clinical Biochemistry and Molecular Diagnostics.

a.2 Nature of the program: Single.

a.3 Responsible Department: Clinical Biochemistry and Molecular Diagnostics.

a.4 Program credit hours: 48 hours

a.5 Program Last Updates Approval Date: November, 2023.

B. **Professional Information:**

1-Program overall aims:

1.1 In order to meet the health challenges of the 21st century in Egypt, the primary educational goal of the M.D. Program in Clinical Biochemistry and Molecular Diagnostics offered by the Clinical Biochemistry and Molecular Diagnostics Department at the National Liver Institute is to prepare Doctoral students to become independent researchers who will be capable to advance the field of Clinical Biochemistry (CHO, proteins, lipids, hormones….etc). In addition, other main goal of the M.D. Program is to prepare Doctoral students to become independent researchers who will advance the field of Molecular Biology diagnostics (including: Bioinformatics, Cancer genetic bases, Screening and early detection…..etc).

1.2 The program emphasizes development of methodology that incorporates the features of health-related problems, effective collaboration and communication with scientists, leadership, and ability to teach clinical Biochemistry and Molecular Biology and different techniques and assays for diagnosis.

1.3 To train students to develop new biochemical methodology, so they can develop into independent researchers and thought leaders in the field of Biochemistry and Molecular Biology.

1.4 To foster the highest quality biochemical research to assess the distribution and determinants of various diseases with special emphasis on GIT system cancers especially hepatocellular carcinoma with the aim of establishing predictive and early diagnosis methods through traditional, molecular, and clinical biochemistry assays.

1.5 To promote translational research, including personalized medicine (risk prediction, early diagnosis, and response), improved screening modalities, pre-malignant genome atlas, survivorship and quality of life to bridge the gap between biochemistry and clinic and public health applications.

1.6 To develop and maintain institution-wide biochemical data, bio-specimens, genomic resources and methodologies to support research initiatives and serving as an institutional resource for biochemical consultation, collaboration, and service to connect biochemistry basic science and applied clinical research.

1.7 To nurture a top mentoring and educational program providing training for the next generation of high-quality scientists who can master the different laboratory assays and know how to implement them in cancer risk assessment, prevention, and translational research.

1.8 To generate community-based prospective research in high-risk and minority/underserved populations and being a magnet for global collaboration.

2- Program Intended Learning Outcomes (ILOs)

2.a Knowledge and understanding skills:

By the end of this program, the graduate must be able to:

a1 Recognize the advanced updates of evidence based- theories, principles of Clinical Biochemistry and Molecular Diagnostics and related biomedical sciences in various diseases in comparison to the normal population.

a2 Describe various advanced biochemical and laboratory techniques and assays principles and understand biostatistics codes.

a3 Identify the advanced research methodology and ethics of medical research.

a4 Identify the ethical and medico-legal principle related to Clinical Biochemistry and Molecular Diagnostics practice and scientific research.

a5 Recognize principles of laboratory quality assurance and continuous quality improvement of the medical practice and medical education.

a6 Designate the links between environmental issues and the development and progression of different diseases.

2.b Intellectual skills:

By the end of this program, the graduate must be able to:

b1 Comprehend the biochemical and molecular basis of different diseases and validate their various outcomes

b2 Identify the basis of different inborn errors of metabolism in children and evaluate the different aspects of the disease.

b3 Recognize the basis of biochemical methods and assays and how they can help studying the determinants of different health problems and trying to find solutions to overcome the different problems that could be encountered in the field of molecular biology.

b4 Identify the causes of various diseases how they reflect by changing the metabolism of various substances.

b5 Perform good structured research studies deal with the determinants of different health problems that could be the basis for planning, screening, early diagnosis and follow up protocols which could serve as control measures improving health services.

b6 Formulate a research question, plan a health research, and write a scientifically-based research proposal and learn how to write and publish scientific in the field of biochemistry.

b7 Specify current risk assessment methods and approaches for assessing, preventing and controlling biochemical and laboratory hazards, fallacies and pitfalls.

b8 Plan for the design, development, implementation, and evaluation of activities to help improve diagnosis, follow up and improve individual health.

b9 Identify the basis of healthy nutrition in different diseases and how to help the patients through nutritional therapy. Special care is given to understanding the requirement for prevention and control of malnutrition diseases in children.

b10 Describe quality improvement concepts which address challenges of the different laboratory techniques aiming to reach highly precise applicable and easily implemented assays in the health field services

b11 Express the principles of new biochemical and laboratory techniques in an attempt to improve and creatively solve different problems in the field of clinical biochemistry.

b12 Identify basis of different inborn errors of metabolism in children and the different assays used in the diagnosis and how to interpret them to reach definitive diagnosis.

b13 Hold brainstorming seminars to which could develop better understanding of different biochemical aspects of diseases.

b14 Describe the evidence-based principles and the scientific knowledge that could be used in critical evaluation and decision-making in biochemical scientific aspects.

2.c Professional and practical skills:

By the end of this program, the graduate must be able to:

c1 Develop professional skills in the area of clinical biochemistry and molecular biology for diagnosis of various diseases.

c2 Implement clinical biochemical research projects to address community health problems and needs.

c3 Formulate a research question, plan a health research, and write a scientifically-based research proposal, which could be used for screening, early diagnosis and follow up protocols to serve as control measures improving health services.

c4 Collect, organize and manage information through communication with different departments through various channels to help develop integrative research which could have clinical applications for better serving of the community.

c5 Write, evaluate and interpret biochemical reports.

c6 Apply evidence-based principles and the scientific knowledge to critical evaluation and decision-making in biochemical scientific programs.

c7 Interpret the results of various statistical analyses for biochemical studies and implement them into recommendations for specific intervention and preventive measures.

c8 Evaluate and develop and introduce new assays, techniques, methods and tools in the area of Clinical Biochemistry and molecular biology.

c9 Apply quality improvement concepts to address challenges of the different laboratory techniques aiming to reach highly precise applicable and easily implemented assays in the health field services.

c10 Utilize the available resources and technologies to improve the laboratory practice and management.

c11 Plan for the design, development, implementation, and evaluation of activities to help diagnose, follow up and improve individual health.

c12 Specify current risk assessment methods and approaches for assessing, preventing and controlling biochemical and laboratory hazards, fallacies and pitfalls

c13 Perform different laboratory tests (conventional and highly advanced) dealing with molecular biology and implementing the use of gene bank in the research and some basic, advanced and chromatographic assays in basic sciences to be utilized in the research work.

2.d General and transferrable skills:

By the end of this program, the graduate must be able to:

d1 Communicate effectively through all types of effective communications.

d2 Use health information technology to serve in the development of professional practice.

d3 Self-assessment and identify learning needs.

d4 Use different sources to obtain information and knowledge.

d5 Use rules and indicators for assessing the performance of others.

d6 Demonstrate teamwork, leadership and time management skills.

d7 Implement self-learning methods continuously.

3- Program Academic References Standards (Annex 1)

- National Liver Institute developed MD degree programs' academic standards (NLIARS) for Clinical Biochemistry and Molecular Diagnostics.
- In preparing these standards, the General Academic Reference Standards for post graduate programs (GARS) were adopted. These standards set out the graduate attributes and academic characteristics that are expected to be achieved by the end of the program

Program matrices (Annex 2):

Tables of comparisons between:

I. General Academic Reference Standards (ARS) versus program ARS.
II. Program ARS versus the National Institute Mission
III. Program ARS versus program ILOs.
IV. Program ILOs versus courses ILOs.
V. Teaching and learning strategies versus program ILOs

VI. Program Assessment methods versus program ILOs

These standards were approved by the Institute council in December, 2016 and last updated in November 2023.

4- Program Structure

4.a Duration of program: 2 years.

4.b Program credit hours distribution:

- **Total number of hours:** 48credit hours.
- **Didactic** 26 credit hours (54.16%), **practical** 22 credit hours(45.84%) (10h for practical of courses +12h for thesis)
- **Total** 100%.

- **First part:**
  - **Didactic** 12 credit hours (66.7%), **practical** 6 credit hours (33.3%).
  - **Total** 18 credit hours.
  - Should be divided into at least two semesters.
- **Second part:**
  - **Didactic** 14 credit hours (77.77%), **practical** 4 credit hours (22.33%).
  - **Total** 18 credit hours.
  - Should be divided into at least two semesters.
- **Thesis:12 h**
  - According the currently applied laws:

- **Compulsory courses**:32 credit hours (8 courses).
- **Optional courses**: N/A.
- **Elective courses:** 4 credit hours (choose two different courses).

	Credit Hours	% From total
Basic courses Didactic Training	**4** 2 2	**8.3%** 4.2% 4.2%
Specialized courses Didactic Training	**28** 20 8	**58.3%** 41.7% 16.6%
Elective Courses Didactic	**4** 4	**8.3%** 8.3%
Thesis	**12**	**25%**

4.c Curriculum Structure:

Candidates have to study all obligatory courses and choose at least one of the different elective courses for each part.

Courses of the program

		Curricula	Code	Didactic	Training	Total
First part	**Obligatory Curricula**	Metabolism	CLINBIO901A	4	2	6
		Blood chemistry and its errors	CLINBIO901B	4	2	6
		Scientific and clinical course in Hepatology	CLINBIO902	1	1	2
		Scientific and clinical course in Pediatric Hepatology	CLINBIO903	1	1	2
	Elective Curricula (Choose one)	Nutritional biochemistry	CLINBIO901F	2	0	2
		Bioinformatics	CLINBIO901G	2	0	2
		Chemical immunology	CLINBIO904	2	0	2
		Toxicology	CLINBIO905	2	0	2
Second Part	**Obligatory Curricula**	Molecular biology	CLINBIO901C	3	1	4
		Inborn errors of metabolism and blood chemistry	CLINBIO901D	3	1	4
		Scientific and practical Biochemistry curriculum and its applications (first section)	CLINBIO901Eta	3	1	4
		Scientific and practical Biochemistry curriculum and its applications (second section)	CLINBIO901Etb	3	1	4
	Elective Curricula (Choose one)	Nutritional biochemistry	CLINBIO901F	2	0	2
		Bioinformatics	CLINBIO901G	2	0	2
		Chemical immunology	CLINBIO904	2	0	2
		Toxicology	CLINBIO905	2	0	2
				26	10	36
Thesis						12
Total						**48**

5- Courses Contents (Annex 3)

The objectives for each course are specified in conjunction with teaching/training methods, requirements for achieving these objectives and assessment methods.

See Annex 3 for detailed specifications for each course.

6- Program Assessment weighting

		Curricula	Code	Credit Hours	Number Of papers	Written	Practical	Oral	Total
First part	**Obligatory Curricula**	**Metabolism**	**CLINBIO901A**	6	2	90	30	30	150
		Blood chemistry and its errors	**CLINBIO901B**	6	1	90	30	30	150
		Scientific and clinical course in Hepatology	**CLINBIO902**	2	1	40	10		50
		Scientific and clinical course in Pediatric Hepatology	**CLINBIO903**	2	1	40	10		50
	Elective Curricula	**Nutritional biochemistry**	**CLINBIO901F**	2	1	30		20	50
		Bioinformatics	**CLINBIO901G**	2	1	30		20	50
		Chemical immunology	**CLINBIO904**	2	1	30		20	50
		Toxicology	**CLINBIO905**	2	1	30		20	50
Second Part	**Obligatory Curricula**	**Molecular biology**	**CLINBIO901C**	4	2	70	15	15	100
		Inborn errors of metabolism and blood chemistry	**CLINBIO901D**	4	2	70	15	15	100
		Scientific and practical Biochemistry curriculum and its applications (First section)	**CLINBIO901Eta**	4	2	70	15	15	100
		Scientific and practical Biochemistry curriculum and its applications(Second section)	**CLINBIO901Etb**	4	2	70	15	15	100
Thesis				**12**					
Total				**48**					

7- Admission requirements

Admission Requirements (prerequisites):

I. General Requirements:

- Master degree in Clinical Biochemistry and Molecular Diagnostics or any equivalent degree.

II. Specific Requirements:

- Fluent in English (study language).
- Excellent computer skills.

III. Fees:

- As regulated by the postgraduate studies rules and approved by the faculty vice dean of post graduate studies and the National Liver Institute and university councils.

8- Progression and completion requirements

- Student must attend at least 75% of the credit hours of each course in order to obtain the MD degree, which includes the courses of first & second parts, thesis & activities of the log book.
- Student has to pass all obligatory courses and required number of elective courses' exams, and obtain average total CGPA score not less than grade C.
- Student has to pass English test in one of the language centers affiliated to Menoufia University or any equivalent English test before thesis discussion.
- Registration for the thesis is allowed in the first semester of the first part of the program.
- Thesis discussion is allowed after 8 months from protocol registration and after one month of passing the final exams of the second part.
- Student has to obtain publication acceptance of at least one scientific paper derived from the thesis from a journal approved by the department council.

Log book fulfillment:

- Lectures & seminars of the previously described courses must be documented in the log book & signed by the lecturer.
- Works related to thesis must be documented in the log book & signed by the supervisors.

- Any workshops, conferences & scientific meetings should be included in the log book.

Maximum allowed period for completion of the MD degree is 6 years.

9- Program evaluation

No.	Evaluator	Method	Sample
1	Quality Assurance Unit	- Reports - Field visits	2
2	External (Evaluators & Examiners)	- Reports - Field visits	2
3	Stakeholders	Reports Field visits Questionnaires	2
4	Senior students	Questionnaires	2
5	Alumni	Questionnaires	2

10- Declaration

- We certify that all of the information required to deliver this program is contained in the above specification and will be implemented.
- All course specifications for this program are in place.

Program Principle Academic Coordinator: Prof. Dr. Hala El Said

Head of the Responsible Department: Prof. Dr. Hala El Said

ANNEX 1: PROGRAM ACADEMIC REFERENCE STANDARDS (ARS)

1. Graduate attributes for medical doctorate in Clinical Biochemistry and Molecular Diagnostics

The Graduate of the program must be able to:

1.1 Show competency and proficiency of basics, methods and tools of scientific medical research and clinical audit.

1.2 Conduct strong research and translate clinical Biochemistry and molecular biology research results into effective policies and programs to the health of both individuals and population continuously. Share in updating and improving clinical practice in Clinical Biochemistry and Molecular Diagnostics.

1.3 Implement the critical appraisal of biochemical and molecular biology databases and literature.

1.4 Show in-depth awareness of current health problems of the population. Master, develop, and implement various (advanced and new) laboratory assays to screen, diagnose and follow up of different diseases and help in tailoring treatment regimens.

1.5 Identify, assess and find creative solutions for the common laboratory problems, fallacies and pitfalls in the field of Clinical Biochemistry and Molecular Diagnostics.

1.6 Show expertise and wide professional skills in Clinical Biochemistry and Molecular Diagnostics.

1.7 Improve and update novel methods of practice in Clinical Biochemistry and Molecular Diagnostics.

1.8 Utilize various technological facilities and updated assays effectively and efficiently to improve practice in Clinical Biochemistry and Molecular Diagnostics.

1.9 Show effective leadership, communications and interpersonal skills for effective teamwork with personnel from other departments in the health professions facilities.

1.10 Demonstrate good decision making skills based on effective and

efficient use of available information resources in different situations related to Clinical Biochemistry and Molecular Diagnostics.

1.11 Employ the available resources efficiently and develop and find new resources in the field of medical clinical biochemistry and molecular biology.

1.12 Show awareness to sustainable improvement of the environment and community services.

1.13 Show commitment to medical ethics as well as professionalism in the field Clinical Biochemistry and Molecular Diagnostics.

1.14 Show dedication to improve his skills and shares his experience in Clinical Biochemistry and Molecular Diagnostics with others.

2. General academic standards for medical doctorate in Clinical Biochemistry and Molecular Diagnostics

2.a Knowledge and understanding skills:

By the end of the program, the graduate must have satisfactory knowledge & understanding of:

a1 Evidence- based theories, basics and recent updates of Clinical Biochemistry and Molecular Diagnostics and related biomedical sciences and clinical practice.

a2 Basics of advanced research methodology and ethics of medical research and its different biochemical tools.

a3 Ethical and medico-legal principles of medical practice relevant to Clinical Biochemistry and Molecular Diagnostics.

a4 Quality standards and principles of Clinical Biochemistry and Molecular Diagnostics practice.

a5 Standards of sustainable environmental improvement and the impact of Clinical Biochemistry and Molecular Diagnostics practice on the environment.

2.b Intellectual skills:

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

b1 Analyze and critically appraise the information related to the **medical field** of Clinical Biochemistry and Molecular Diagnostics.

b2 Find creative solutions of the problems in the Clinical Biochemistry and Molecular Diagnostics field based available data based on the available data.

b3 Conduct scientific medical research studies of high quality to enrich the Clinical Biochemistry and Molecular Diagnostics current knowledge.

b4 Write and publish outstanding scientific papers concerned with the various diseases in both adults and pediatrics.

b5 Assess and evaluate risks related to Clinical Biochemistry and Molecular Diagnostics clinical practice.

b6 Plan to improve performance in the field of Clinical Biochemistry and Molecular Diagnostics.

b7 Apply creative and innovative thinking in Clinical Biochemistry and Molecular Diagnostics medical practice.

b8 Hold evidence- based scientific medical discussions.

b9 Take suitable decisions in various situations related to Clinical Biochemistry and Molecular Diagnostics.

2.c Professional skills:

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

c1 Master basic and advanced professional skills relevant to Clinical Biochemistry and Molecular Diagnostics in the medical practice.

c2 Write, interpret and evaluate reports for related to the Clinical Biochemistry and Molecular Diagnostics in the medical practice.

c3 Appraise and improve **various** methods and techniques used in the Clinical Biochemistry and Molecular Diagnostics field based on scientific evidence.

c4 Utilize the available technologies methods effectively and efficiently to improve his medical laboratory practice.

c5 Plan for improvement of Clinical Biochemistry and Molecular Diagnostics practice and enhance others' performance.

2.d General and transferrable skills:

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

d1 Employ different communication channels effectively.

d2 Utilize the available information technologies effectively and efficiently to improve medical laboratory procedures.d3 Show self-appraisal and self-learning skills.

d4 Exploit different information resources efficiently and effectively to acquire knowledge relevant to Clinical Biochemistry and Molecular Diagnostics in the medical field.

d5 Set the basis and performance indicators for evaluation others performance.

d6 Function in teamwork and show excellent leadership skills different laboratory contexts.

d7 Mange time effectively.

d8 Show self-learning skills and seek continuous medical laboratory education and self-improvement.

ANNEX 2: MATERICES

مصفوفة توافق المعايير القومية القياسية العامة لبرامج الدكتوراه مع المعايير الأكاديمية المعتمدة من معهد الكبد القومي- جامعة المنوفية لدرجة الدكتوراه في الكيمياء الحيوية الاكلينيكية والمشخصات الجزيئية

I. General Academic Reference Standards (ARS) versus program ARS:

I.a Program Graduate attributes versus NAQAAE graduate attributes :

Program Graduate attributes	Graduate attributes from NAQAAE for postgraduate programs
1.1 Show competency and proficiency of basics, methods and tools of scientific medical research and clinical audit.	١,١ إتقان أساسيات ومنهجيات البحث العلمي.
1.2 Conduct strong research and translate Clinical biochemistry and molecular biology research results into effective policies and programs to improve the health of both individuals and population continuously. Share updating and improving clinical practice in Clinical Biochemistry and Molecular Diagnostics.	١,٢ العمل المستمر على الإضافة للمعارف في مجال التخصص.
1.3 Implement the critical appraisal of biochemical and molecular biology databases and literature.	١,٣ تطبيق المنهج التحليلي والناقد للمعرف في مجال التخصص والمجالات ذات العلاقة.
1.4 Show in depth awareness of current health problems of the population. Master, develop, and implement various (advanced and new) laboratory assays to screen, diagnose and follow up of different diseases and help in tailoring treatment regimens.	١,٤ إظهار وعيا عميقا بالمشاكل الجارية والنظريات الحديثة في مجال التخصص.
1.5 Identify, assess and find creative solutions for the common laboratory problems, fallacies, and pitfalls in the field of Clinical Biochemistry and Molecular Diagnostics.	١,٥ تحديد المشكلات المهنية وإيجاد حلولا مبتكرة لحلها.
1.6 Show expertise and wide	١,٦ إتقان نطاقا واسعا من المهارات المهنية في

Program Graduate attributes		Graduate attributes from NAQAAE for postgraduate programs
	professional skills in Clinical Biochemistry and Molecular Diagnostics.	مجال التخصص.
1.7	Improve and update novel methods of practice in Clinical Biochemistry and Molecular Diagnostics.	١,٧ التوجه نحو تطوير طرق وأدوات وأساليب جديدة للمزاولة المهنية.
1.8	Utilize various technological facilities and updated assays effectively and efficiently to improve practice in Clinical Biochemistry and Molecular Diagnostics.	١,٨ إستخدام الوسائل التكنولوجية المناسبة بما يخدم ممارسته المهنية.
1.9	Show effective leadership, communications and interpersonal skills for effective teamwork with personnel from other departments in the health professions facilities.	١,٩ التواصل بفاعلية وقيادة فريق عمل في سياقات مهنية مختلفة.
1.10	Demonstrate good decision making skills based on effective and efficient use of available information resources in different situations related to Clinical Biochemistry and Molecular Diagnostics.	١,١٠ اتخاذ القرار في ظل المعلومات المتاحة.
1.11	Employ the available resources efficiently and develop and find new resources in the field of medical clinical biochemistry and molecular biology.	١,١١ توظيف الموارد المتاحة بكفاءة وتنميتها والعمل على إيجاد موارد جديدة.
1.12	Show awareness to sustainable improvement of the environment and community services.	١,١٢ الوعي بدوره في تنمية المجتمع والحفاظ على البيئة.
1.13	Show commitment to medical ethics as well as professionalism in the field of Clinical Biochemistry and Molecular Diagnostics.	١,١٣ التصرف بما يعكس الالتزام بالنزاهة والمصداقية و قواعد المهنة.
1.14	Show dedication to improve his skills and shares his experience in Clinical Biochemistry and Molecular Diagnostics with others.	١,١٤ الالتزام بالتنمية الذاتية المستمرة ونقل خبراته للآخرين.

I.b Program academic standards ARS versus NAQAAE ARS

Program ARS	NAQAAE ARS postgraduate programs
2.a Knowledge and understanding: a1 Evidence- based theories, basics and recent updates of Clinical Biochemistry and Molecular Diagnostics and related biomedical sciences and clinical practice.	a1-النظريات والأساسيات والحديث من المعارف في مجال التخصص والمجالات ذات العلاقة.
a2 Basics of research methodology and ethics of medical research and its different biochemical tools.	a2-أساسيات ومنهجيات وأخلاقيات البحث العلمي وأدواته المختلفة.
a3 Ethical and medico-legal principles of medical practice relevant to Clinical Biochemistry and Molecular Diagnostics.	a3-المبادئ الأخلاقية والقانونية للممارسة المهنية في مجال التخصص.
a4 Quality standards and principles in Clinical Biochemistry and Molecular Diagnostics practice.	a4-مبادئ وأساسيات الجودة في الممارسة المهنية في مجال التخصص.
a5 Standards of sustainable environmental improvement and the impact of Clinical Biochemistry and Molecular Diagnostics practice on the environment.	a5-المعارف المتعلقة بآثار ممارسته المهنية على البيئة و طرق تنمية البيئة وصيانتها.
2.b Intellectual skills: b1 Analyze and critically appraise the information related to the medical field of Clinical Biochemistry and Molecular Diagnostics**.**	b1-تحليل وتقييم المعلومات في مجال التخصص والقياس عليها والاستنباط منها.
b2 Find creative solutions of the problems in the Clinical Biochemistry and Molecular Diagnostics field based available data based on the available data.	b2-حل المشاكل المتخصصة استنادا على المعطيات المتاحة.
b3 Conduct scientific medical research studies of high quality to enrich the Clinical Biochemistry and Molecular Diagnostics current knowledge.	b3-إجراء دراسات بحثية تضيف إلى المعارف.
b4 Write and publish outstanding scientific papers concerned with the various diseases in both adults	b4-صياغة أوراق علمية.

Program ARS	NAQAAE ARS postgraduate programs
and pediatrics.	
b5 Assess and evaluate risks related to Clinical Biochemistry and Molecular Diagnostics clinical practice.	b5-تقييم المخاطر في الممارسات المهنية.
b6 Plan to improve performance in the field of Clinical Biochemistry and Molecular Diagnostics.	b6-التخطيط لتطوير الأداء في مجال التخصص.
b7 Apply creative and innovative thinking in Clinical Biochemistry and Molecular Diagnostics medical practice.	b7-الابتكار / الإبداع.
b8 Hold evidence-based scientific medical discussions.	b8-الحوار والنقاش المبني على البراهين والأدلة.
b9 Take suitable decisions in various situations related to Clinical Biochemistry and Molecular Diagnostics.	b9-اتخاذ القرارات المهنية في سياقات مهنية مختلفة.
2.c Professional skills: c1 Master basic and advanced professional skills relevant to Clinical Biochemistry and Molecular Diagnostics in the medical practice.	c1-إتقان المهارات المهنية الأساسية والحديثة في مجال التخصص.
c2 Write, interpret and evaluate reports for related to the Clinical Biochemistry and Molecular Diagnostics in the medical practice.	c2-كتابة وتقييم التقارير المهنية.
c3 Appraise and improve various methods and techniques used in the Clinical Biochemistry and Molecular Diagnostics field based on scientific evidence.	c3-تقييم وتطوير الطرق والأدات القائمة في مجال التخصص.
c4 Utilize the available technologies methods effectively and efficiently to improve his medical laboratory practice.	c4-استخدام الوسائل التكنولوجية بما يخدم الممارسة المهنية.
c5 Plan for improvement of Clinical Biochemistry and Molecular Diagnostics practice and enhance others' performance.	c5-التخطيط لتطوير الممارسة المهنية وتنمية أداء الآخرين.
2.d General & transferable skills: d1 Employ different communication channels effectively.	d1-التواصل الفعال بأنواعه المختلفة.

Program ARS	NAQAAE ARS postgraduate programs
d2 Utilize the available information technologies effectively and efficiently to improve medical laboratory procedures.	d2-استخدام تكنولوجيا المعلومات بما يخدم الممارسة المهنية.
d3 Show self-appraisal and determine self- learning skills needs.	d3-التقييم الذاتي و تحديد احتياجاته التعليمية الشخصية.
d4 Exploit different information resources efficiently and effectively to acquire knowledge relevant to Clinical Biochemistry and Molecular Diagnostics in the medical field.	d4-استخدام المصادر المختلفة للحصول على المعلومات والمعارف.
d5 Set the basis and performance indicators for evaluation others performance.	d5-وضع قواعد ومؤشرات تقييم أداء الآخرين.
d6 Function in teamwork and show excellent leadership skills different laboratory contexts.	d6-العمل في فريق وقيادة فرق في سياقات مهنية مختلفة.
d7 Mange time effectively.	d7-إدارة الوقت بكفاءة.
d8 Show self-learning skills and seek continuous medical laboratory education and self-improvement.	d8-التعلم الذاتي و المستمر.

II. Graduate attributes versus National Liver Institute mission

Graduate attributes	تقديم برامج تعليمية للدراسات العليا	تبنى أبحاث علميه فى مجال أمراض الكبد	تقديم خدمات صحية لتلبية احتياجات المجتمع
1. Show competency and proficiency of basics, methods and tools of scientific medical research and clinical audit.	✓	✓	
2. Conduct strong research and translate clinical Biochemistry and molecular biology research results into effective policies and programs to the health of both individuals and population continuously. Share in updating and improving clinical practice in Clinical Biochemistry and Molecular Diagnostics.		✓	✓
3. Implement the critical appraisal of biochemical and molecular biology databases and literature.	✓	✓	
4. Show in-depth awareness of current health problems of the population. Master, develop, and implement various (advanced and new) laboratory assays to screen, diagnose and follow up of different diseases and help in tailoring treatment regimens.		✓	✓
5. Identify, assess and find creative solutions for the common laboratory problems, fallacies and pitfalls in the field of Clinical Biochemistry and Molecular Diagnostics.	✓	✓	
6. Show expertise and wide professional skills in Clinical Biochemistry and Molecular Diagnostics.	✓		✓
7. Improve and update novel methods of practice in Clinical Biochemistry and Molecular Diagnostics.		✓	✓
8. Utilize various technological facilities and updated assays effectively and efficiently to improve practice in Clinical Biochemistry and Molecular Diagnostics.	✓		✓
9. Show effective leadership,	✓		

Graduate attributes	تقديم برامج تعليمية للدراسات العليا	تبنى أبحاث علميه فى مجال أمراض الكبد	تقديم خدمات صحية لتلبية احتياجات المجتمع
communications and interpersonal skills for effective teamwork with personnel from other departments in the health professions facilities.			
10. Demonstrate good decision making skills based on effective and efficient use of available information resources in different situations related to Clinical Biochemistry and Molecular Diagnostics.	✓		
11. Employ the available resources efficiently and develop and find new resources in the field of medical clinical biochemistry and molecular biology.	✓		✓
12. Show awareness to sustainable improvement of the environment and community services.	✓		✓
13. Show commitment to medical ethics as well as professionalism in the field Clinical Biochemistry and Molecular Diagnostics.	✓		✓
14. Show dedication to improve his skills and shares his experience in Clinical Biochemistry and Molecular Diagnostics with others.	✓		✓

III. Program ARS versus program ILOs:

Program ARS	Program ILOs
2.a Knowledge and understanding: a1 Evidence- based theories, basics and recent updates of the Clinical Biochemistry and Molecular Diagnostics and related biomedical sciences and clinical practice.	**2.a Knowledge and understanding:** a1 Identify the basics and updates of evidence based- theories, principles of Clinical Biochemistry and Molecular Diagnostics and related biomedical sciences in various diseases in comparison to the normal population.
a2 Basics of research methodology and ethics of medical research.	a2 Describe various biochemical and laboratory techniques and assays principles and understand biostatistics codes. a3 Recognize basics of research methodology studies and ethics of medical research.
a3 Ethical and medico-legal principles of medical practice relevant to Clinical Biochemistry and Molecular Diagnostics.	a4 Identify the ethical and medico-legal principle related to Clinical Biochemistry and Molecular Diagnostics practice and scientific research.
a4 Quality standards and principles of Clinical Biochemistry and Molecular Diagnostics.	a5 Recognize principles of laboratory quality assurance and continuous quality improvement of the medical practice and medical education.
a5 Principles of sustainable environmental improvement and the impact of Clinical Biochemistry and Molecular Diagnostics practice on the environment.	a6 Explain precisely the mutual links between environmental issues and the development of different diseases
2.b Intellectual skills: b1 Analyze and critically appraise the information related to the field of Clinical Biochemistry and Molecular Diagnostics.	**2.b Intellectual skills:** b1Comprehend the biochemical and molecular basis of different diseases and validate their various outcomes b2 Identify the basis of different inborn errors of metabolism in children and evaluate the the different aspects of the disease.
b2 Find creative solutions of the problems in the Clinical Biochemistry and Molecular Diagnostics field based available data.	b3 Recognize the basis of biochemical methods and assays and how they can help studying the determinants of different health problems and trying to find solutions to overcome the different problems that could be encountered in the field of molecular biology.
b3 Conduct scientific research studies of good quality to enrich the Clinical Biochemistry and Molecular Diagnostics current knowledge.	b4 Identify the causes of various diseases how they reflect by changing the metabolism of various substances. b5 Perform good structured research studies

Program ARS	Program ILOs
	deal with the determinants of different health problems that could be the basis for planning, screening, early diagnosis and follow up protocols which could serve as control measures improving health services.
b4 Write and publish scientific papers.	b6 Formulate a research question, plan a health research, and write a scientifically-based research proposal and learn how to write and publish scientific in the field of biochemistry.
b5 Assess and evaluate risks related to Clinical Biochemistry and Molecular Diagnostics practice.	b7 Specify current risk assessment methods and approaches for assessing, preventing and controlling biochemical and laboratory hazards, fallacies and pitfalls.
b6 Plan for improving in Clinical Biochemistry and Molecular Diagnostics performance.	b8 Plan for the design, development, implementation, and evaluation of activities to help improve diagnosis, follow up and improve individual health. b9 Identify the basis of healthy nutrition in different diseases and how to help the patients through nutritional therapy. Special care is given to understanding the requirement for prevention and control of malnutrition diseases in children. b10 Describe quality improvement concepts which address challenges of the different laboratory techniques aiming to reach highly precise applicable and easily implemented assays in the health field services
b7 Apply creative and innovative thinking in Clinical Biochemistry and Molecular Diagnostics practice.	b11 Express the principles of new biochemical and laboratory techniques in an attempt to improve and creatively solve different problems in the field of clinical biochemistry. b9 Identify the basis of healthy nutrition in different diseases and how to help the patients through nutritional therapy. Special care is given to understanding the requirement for prevention and control of malnutrition diseases in children. b12 Identify basis of different inborn errors of metabolism in children and the different assays used in the diagnosis and how to interpret them to reach definitive diagnosis,
b8 Hold evidence- based scientific discussions.	b13 Hold brainstorming seminars to which could develop better understanding of different biochemical aspects of diseases.
b9 Take suitable decisions in various situations related to Clinical	b14 Describe the evidence-based principles and the scientific knowledge that could be

Program ARS	Program ILOs
Biochemistry and Molecular Diagnostics.	used in critical evaluation and decision-making in biochemical scientific aspects.
2.c <u>Professional skills:</u> c1 Demonstrate basic and advanced professional skills relevant to Clinical Biochemistry and Molecular Diagnostics in the medical practice.	**2.c <u>Professional Skills:</u>** c1 Develop professional skills in the area of clinical biochemistry and molecular biology for diagnosis of various diseases. c2 Implement clinical biochemical research projects to address community health problems and needs. c3 Formulate a research question, plan a health research, and write a scientifically-based research proposal, which could be used for screening, early diagnosis and follow up protocols to serve as control measures improving health services. c4 Collect, organize and manage information through communication with different departments through various channels to help develop integrative research which could have clinical applications for better serving of the community
c2Write, interpret and evaluate reports for situations related to the Clinical Biochemistry and Molecular Diagnostics in the medical practice.	c5Write, evaluate and interpret biochemical reports. c6 Apply evidence-based principles and the scientific knowledge to critical evaluation and decision-making in biochemical scientific programs. c7 Interpret the results of various statistical analyses for biochemical studies and implement them into recommendations for specific intervention and preventive measures.
c3 Appraise and improve methods and techniques used in the Clinical Biochemistry and Molecular Diagnostics field based on scientific evidence.	c8 Evaluate, develop and introduce new assays, techniques, methods and tools in the area of Clinical Biochemistry and molecular biology. c9 Apply quality improvement concepts to address challenges of the different laboratory techniques aiming to reach highly precise applicable and easily implemented assays in the health field services.
c4 Utilize the available technologies effectively and efficiently to improve his professional practice.	c10 Utilize the available resources and technologies to improve the laboratory practice and management. c11Specify current risk assessment methods

Program ARS	Program ILOs
	and approaches for assessing, preventing and controlling biochemical and laboratory hazards, fallacies and pitfalls
c5 Plan for improvement of Clinical Biochemistry and Molecular Diagnostics practice and enhance others performance.	c12Perform different laboratory tests (conventional and highly advanced) dealing with molecular biology and implementing the use of gene bank in the research and some basic, advanced and chromatographic assays in basic sciences to be utilized in the research work. c13Plan for the design, development, implementation, and evaluation of activities to help diagnose, follow up and improve individual health.
2.d General & transferable skills: d1 Utilize different communication channels effectively.	**2.d General &transferable skills:** d1 Communicate effectively through all types of effective communications.
d2 Utilize the available information technologies effectively and efficiently to improve professional practice.	d2 Use health information technology to serve the development of professional practice.
d3 Show self-appraisal and self- learning skills.	d3 Assess himself and identify learning needs.
d4 Utilize different information resources efficiently and effectively to acquire knowledge relevant to Clinical Biochemistry and Molecular Diagnostics.	d4 Use different sources to obtain information and knowledge.
d5 Set the basis and performance evaluation parameters for others.	d5 Use rules and indicators for assessing the performance of others.
d6 Show excellent leadership and teamwork skills time effectively.	d6 Demonstrate teamwork, leadership time management skills
d7 Show self-learning skills and seek continuous medical education and self-improvement	d7 Implement self-Learning methods continuously.

IV. Program ILOs versus courses ILOs:

2.a Knowledge and understanding:

Course	Program covered ILOs					
	a1	a2	a3	a4	a5	a6
Course1 Metabolism	✓					
Course 2 Blood chemistry and its errors	✓					
course 3 Scientific and clinical course in Hepatology			✓			
Course 4 Scientific and clinical course in Pediatric Hepatology			✓			
Course 5 Nutritional biochemistry	✓				✓	
Course 6 :Bioinformatics	✓		✓			
Course 7 Chemical immunology						
Course 8 Toxicology				✓		✓
Course 9 Molecular biology	✓	✓	✓	✓		✓
Course 10 Inborn errors of metabolism and blood chemistry	✓					
Course 11 Scientific and practical Biochemistry curriculum and its applications(First section)	✓	✓		✓	✓	
Course 12 Scientific and practical Biochemistry curriculum and its applications (Second section)	✓	✓		✓	✓	

2.b Intellectual

Course	Program covered ILOs													
	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	b13	b14
Course 1 Metabolism		✓		✓								✓	✓	✓
Course 2 Blood chemistry and its errors	✓												✓	✓
Course 3 Scientific and clinical course in Hepatology													✓	✓
Course 4 Scientific and clinical course in Pediatric Hepatology													✓	✓
Course 5 Nutritional biochemistry									✓				✓	✓
Course 6 Bioinformatics			✓		✓	✓						✓	✓	✓
Course 7 Chemical immunology													✓	✓
Course 8 Toxicology													✓	✓
Course 9 Molecular biology	✓		✓		✓								✓	✓
Course 10 Inborn errors of metabolism and blood chemistry	✓	✓		✓								✓	✓	✓
Course 11 Scientific and practical Biochemistry curriculum and its applications (First section)	✓	✓		✓		✓	✓	✓		✓		✓	✓	✓
Course 12 Scientific and practical Biochemistry curriculum and its applications (Second section)	✓		✓		✓	✓	✓	✓		✓	✓	✓	✓	✓

2.c Professional and practical skills:

Course	Program covered ILOs												
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13
Course 1 Metabolism	✓				✓			✓			✓		
Course 2 Blood chemistry and its errors	✓				✓	✓	✓		✓				
Course 3 Scientific and clinical course in Hepatology			✓										
Course 4 Scientific and clinical course in Pediatric Hepatology			✓										
Course 5 Nutritional biochemistry													
Course 6 Bioinformatics	✓		✓					✓					✓
Course 7 Chemical immunology			✓										
Course 8 Toxicology			✓										
Course 9 Molecular biology	✓		✓					✓					✓
Course 10 Inborn errors of metabolism and blood chemistry	✓				✓	✓	✓	✓	✓				
Course 11 Scientific and practical Biochemistry curriculum and its applications (First section)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Course 12 Scientific and practical Biochemistry curriculum and its applications (Second section)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

2.d General and transferrable skills:

Course	Program covered ILOs						
	d1	d2	d3	d4	d5	d6	d7
Course 1 Metabolism				✓			✓
Course 2 Blood chemistry and its errors				✓			✓
Course 3 Scientific and clinical course in Hepatology	✓						
Course 4 Scientific and clinical course in Pediatric Hepatology	✓						
Course 5 Nutritional biochemistry				✓			
Course 6 Bioinformatics		✓	✓	✓			✓
Course 7 Chemical immunology	✓						
Course 8 Toxicology	✓						
Course 9 Molecular biology		✓		✓			✓
Course 10 Inborn errors of metabolism and blood chemistry				✓			✓
Course 11 Scientific and practical Biochemistry curriculum and its applications (First section)	✓	✓	✓	✓	✓	✓	✓
Course 12 Scientific and practical Biochemistry curriculum and its applications (Second section)	✓	✓	✓	✓	✓	✓	✓

V. Teaching and Learning Strategies versus program ILOs

Teaching Strategy	Teaching Method	Program ILOs Measured
1. Direct	Lectures – Practical - Clinical	a – b -c
2. Indirect	Case Studies	a – b - c-d
3. Interactive	Presentations – Discussion - Reports	a -b-c-d
4. Self-Learning	Projects – Assignments - flipped classroom	c – d
5. E- Learning	Blended - Synchronous – Asynchronous	a – b
6. Experimental Learning	Thesis	a -b-c-d

Teaching and learning facilities include:

Lecture rooms – data show – library – practical lab – laboratory equipment.

VI. Program assessment methods versus program ILOs

Assessment Method	Program ILOs Measured
1- Written examinations - Essay questions - Objective questions - Case/Problem solving - MCQ	a - b
2- Practical Examinations OSPE	a – c – d
3- Clinical Examinations	a – b -c - d
4- Oral Exams Using VIVA cards	a – b - d
5- Logbook assessment	a – b -c - d
6- Research assignment	a – b -c - d

- Case /problems – assess use of knowledge in problems solving.
- Logbook – includes all the various activities that the student perform throughout the program including project reports, seminars, practical training, workshops, etc.
- Examination MCQ – A standardized examination using multiple-choice questions (MCQ). The in-training examination and written board examinations are examples.
- Examination Oral – Uses structured realistic study designs and presenting problems in an oral examination to assess decision-making.

ANNEX 3: SPECIFICATIONS OF COURSES

A- First part (compulsory courses)

Course1: Metabolism

University: Menoufia

Faculty: National Liver Institute

Clinical Biochemistry and Molecular Diagnostics Department

Course specifications

- **Program(s) on which the course is given:** Clinical Biochemistry and Molecular Diagnostics MD programs (First part).
- **Major or minor element of programs:** N/A.
- **Department offering the program:** Clinical Biochemistry and Molecular Diagnostics Department.
- **Department offering the course:** Clinical Biochemistry and Molecular Diagnostics Department.
- **Academic year / Level:** MD. Clinical Biochemistry and Molecular Diagnostics(First part)
- **Date of specification updates approval: November, 2023**

A. Basic Information

- **Course Title:** Metabolism
- **Course code:** CLINBIO901A
- **Specialty:** Clinical biochemistry and molecular diagnostics
- **Course duration:** 15weeks of teaching with a final examination at the end of the semester
- **Credit Hours:** 6 hours/week **Lecture:** 4 hour/week
  Practical/Tutorial: 2 hours/week
- **Total teaching hours:** 120 hours(theoretical/Practical)
- **Department(s)delivering the course:** Clinical Biochemistry and Molecular Diagnostics
- **Coordinator (s):** Prof Dr: Hala EL Said.

B. Professional Information

1. Overall aims of course:

1. To help students to become familiar with the biochemical knowledge that will assist them in understanding biochemical alteration in health and disease by knowing the metabolic processes occurring in the human body that can explain the biochemical basis of disease.
2. To provide students with good knowledge about structure and functions of carbohydrate, lipids and proteins and get familiar with various control and integrating mechanisms of different metabolic processes.
3. To enable the students to understand the biochemical basis of some diseases with special emphasis on the liver diseases giving applied examples.
4. To give students experience in biochemical methodology in order to be aware with the clinical biochemistry techniques as diagnostic tools and to be able to interpret the results for appropriate diagnosis.

2. Intended learning outcomes of course (ILOs)

2.a Knowledge and understanding

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

a.1 Identify functions of carbohydrates and factors affecting blood glucose level, and their clinical importance with special stress on some related diseases .

a.2 Recognize the types, structure and functions of lipids and their clinical importance with special stress on some related diseases. ketone bodies and factors affecting their blood level.

a.3 Identify different amino acids classification, function and their clinical importance with special stress on some related diseases. Amino acids degradation and fate of ammonia.

2.b Intellectual skills

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

b.1 Interpret symptoms, signs and biochemical laboratory findings of various diseases whether related or not to the liver.

b.2 Point out the clinical significance of some enzymes in clinical applications.

2.c Professional and practical skills

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

c.1 Request different biochemical tests according to the condition of the patient.

c.2 Apply some biochemical diagnostic tests.

2.d General and transferable skills

On successful completion of the course, the candidate will be able to:

d.1 Work effectively in a group and preparation of seminars.

d.2 Demonstrates respect for the role of staff and co-staff members regardless of degree or occupation.

3. Contents:

W	Topic	No. of credit hours	Lecture	No. of Lecture hours	Tutorial/ Practical	Total teaching hours
1st	Carbohydrates biochemistry	6	a. Overview of Carbohydrates biochemistry and metabolism	4	4	8
2rd	Carbohydrates biochemistry	6	b. Metabolic disorders and their clinical implications	4	4	8
3th	Carbohydrates biochemistry	6	c. Starvation	4	4	8
4th	Carbohydrates biochemistry	6	d. Hypoglycemia	4	4	8
5th	Lipid biochemistry	6	a. Overview of Lipid biochemistry and metabolism	4	4	8
6th	Lipid biochemistry	6	b.Metabolic disorders and their clinical implications	4	4	8
7th	Lipid biochemistry	6	c. Lipid transport	4	4	8
8th	Lipid biochemistry	6	d. fatty liver and Metabolic syndrome	4	4	8
9th	Amino acids biochemistry	6	a. Overview of Amino acids biochemistry and metabolism	4	4	8
10th	Amino acids biochemistry	6	b. Overview of Amino acids biochemistry and metabolism	4	4	8
11th	Amino acids biochemistry	6	b. Metabolic disorders and their clinical implications	4	4	8
12th	Amino acids biochemistry	6	c. Urea cycle and hyperammonemia	4	4	8
13th	Amino acids biochemistry	6	e. Porphyrias	4	4	8
14th	Revision	6	CHO -lipids	4	4	8
15th	Revision	6	Amino acids biochemistry	4	4	8
	Total	**90**		**60**	**60**	**120**

4. Course Matrix Contents

Main Topics / Chapters	Course ILOs Covered by Topic (By ILOs Code)			
	K &U	I.S.	P.S.	G.S.
1. Overview of Carbohydrates biochemistry and metabolism	a.1	b.1	c.2	d.1/d.2
2. Metabolic disorders and their clinical implications	a.1	b.1 / b.2	c.1 / c.2	d.1/d.2
3. Starvation	a.1	b.1 / b.2	c.2	d.1/d.2
4. Hypoglycemia	a.1	b.1 / b.2	c.2	d.1/d.2
5. Overview of Lipid biochemistry and metabolism	a.2	b.1	c.2	d.1/d.2
6. Metabolic disorders and their clinical implications	a.2	b.1 / b.2	c.1 / c.2	d.1/d.2
7. Lipid transport	a.2	b.1 / b.2	c.1 / c.2	d.1/d.2
8. fatty liver and Metabolic syndrome	a.2	b.1 / b.2	c.1 / c.2	d.1/d.2
9. Overview of Amino acids biochemistry and metabolism	a.3	b.1	c.2	d.1/d.2
10. Metabolic disorders and their clinical implications	a.3	b.1 / b.2	c.1 / c.2	d.1/d.2
11. Urea cycle and hyperammonemia	a.3	b.1 / b.2	c.1 / c.2	d.1/ d.2
12. Porphyrias	a.3	b.1 / b.2	c.1 / c.2	d.1/ d.2

5. Teaching and Learning Methods

5.1: Lectures (definitions, examples ,video material)

5.2: Tutorials (students solving problems and engaging in discussion)

5.3: Assignments (work in groups and trying to put options for solving advanced problems)

5.4: Projects (work in groups on extensive projects involving making research using its tools)

5.5: Electronic Learning including:

- Online Lectures on zoom meeting
- Uploading lectures on Google class room

WhatsApp group to facilitate communication between teaching staff and candidates, follow up, student inquiries, set dates for online lectures.

Teaching methods versus Course ILOs

Teaching/ Learning Methods		Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
Direct	Lectures	a1-a3	b1-b2		
	Practical	a1-a3		c1-c2	d1-d2
Interactive	Presentations Discussion Reports	a1-a3	b1-b2		d1-d2
Self-Learning	Assignments flipped classroom	a1-a3	b1-b2		d1-d2
E-learning	Synchronous Asynchronous	a1-a3	b1-b2		

6. Student Assessment Methods:

Prerequisites for Exam entry

- Log book
- In – class and tutorial participation, calculations on board and theoretical concepts

- Seminars: the candidate should prepare & present at least one seminar in a topic related to the course & determined by the supervisors in front of the department staff.
- Practical quizzes (not graded formative assessment) throughout the course.

I- assessment tools:

6.1 Written final Examination (to assess knowledge & intellectual skills)

6.2 Oral final examination (to assess knowledge, intellectual skill &transferable skills).

6.3 Practical Exam for assessment of lab skills.

Assessment methods versus Course ILOs

Assessment Method	Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
1- Written Examinations: - Essay questions - Objective questions - Problem solving - MCQ	a1-a3	b1-b2		
2- Practical Examinations OSPE	a1-a3		c1-c2	d1-d2
3- Oral Exams Using VIVA cards	a1-a3	b1-b2		d1-d2
4- Logbook assessment	a1-a3	b1-b2	c1-c2	d1-d2

II- marks: 150 mark: 2written paper 2 hours 90mark+30 practical+30 oral

7. List of References

7.1 **Course Notes**: Lecture notes prepared by the staff members in the department

7.2 **Essential Books (Text Books):**

- Text book of Biochemistry with Clinical Correlations.
- Harper's Illustrated Biochemistry (32nd edition).
- Lecture Notes on Clinical Biochemistry: Whitby LG, Smith AF, Beckett GJ, Walker SW, Blackwell Scientific Publications.
- MN Chaterra (8th edition).

- Clinical Biochemistry (7th edition)
- Principles of Biochemistry (8th edition).
- Biomarkers in inborn errors of metabolism (clinical aspects and laboratory determination 1st edition).

7.3 **Recommended books:**

Lippincott's Reviews of Biochemistry (7th edition).

7.4 **Periodicals, Web Sites … etc.**

- Metabolism (Clinical and Experimental) (Elsevier)
- Cell Physiology and Biochemistry.
- Egyptian J. Biochemistry and Molecular Biology.

8. Facilities Required for Teaching and Learning

Candidates & their learning are supported in a number of ways:

- Lecture rooms: available in the NLI
- Computer Lab: available in the NLI's Library with a wide range of software.
- Induction course introducing study skills
- Candidates logbook
- Program Specification & Handbooks
- Extensive library & other learning resources
- Internet with a wide range of learning support material

Course Coordinator: Prof. Dr. Hala El-Said

Head of Department: Prof. Dr. Hala El-Said

Course 2: Blood chemistry and its errors.

University: Menoufia

Faculty: National Liver Institute

Clinical Biochemistry and Molecular Diagnostics Department

Course specifications

- **Program(s) on which the course is given:** Clinical Biochemistry and Molecular Diagnostics MD. program (First part)
- **Major or minor element of programs:** N/A.
- **Department offering the program:** Clinical Biochemistry and Molecular Diagnostics Department
- **Department offering the course:** Clinical Biochemistry and Molecular Diagnostics Department
- **Academic year / Level:** MD. Clinical Biochemistry and Molecular Diagnostics (First part)
- **Date of specification updates approval**: **November, 2023**

A- Basic Information

- **Course Title:** Blood chemistry and its errors.
- **Course code:** CLINBIO901B
- **Specialty:** Clinical Biochemistry and Molecular Diagnostics
- **Course duration: 15**weeks of teaching with a final examination at the end of the semester
- **Credit Hours:** 6 hours/week **Lectures: 4** hours/week
- **Practical:** 1.5hour/week **Tutorial:** 0.5hour/week
- **Total teaching hours: 120** hours(theoretical + practical)
- **Department(s) delivering the course:** Clinical biochemistry and molecular diagnostics
- **Coordinator (s)**: Prof Dr: Hala EL Said.
- **Requirements (pre-requisites) if any:**

B- Professional Information

1. Overall aims of course:

1. To help students to become familiar with the biochemical knowledge that will assist them in understanding biochemical alteration in health and disease

by knowing the metabolic changes in blood chemistry occurring in the human body that can explain the biochemical basis of disease.

2. To enable the students to be oriented with biochemical importance of vitamins as well as the functions of some key enzymes.
3. To enable the students to understand the biochemical basis of some diseases with special emphasis on the liver diseases giving applied examples.
4. To give students experience in biochemical methodology in order to be aware with the clinical biochemistry techniques as diagnostic tools and to be able to interpret the results for appropriate diagnosis.
5. To make students familiar with structure, functions and mode of action of hormones in health and disease.
6. To enable the students to point-out different mechanisms, which the body uses to get rid of various types of foreign chemical as drugs, food additives and pollutants.

2. Intended learning outcomes of course (ILOs)

2.a Knowledge and understanding:

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

a.1 Identify factors affecting blood glucose level, and their clinical importance with special stress on some related diseases .

a.2 Recognize the structure and functions of hormones, their mode of action and the metabolic disorders related to these hormones.

a.3 Define the functions and sources of vitamins and their deficiency manifestations as well as the effects of excessive intake.

a.4 Identify the importance of minerals to the body and factors affecting them.

a.5 Define the expressions of osmotic pressure, pH, buffers, acidosis and alkalosis.

a.6 Define nature of enzymes, isoenzymes, and their role in the diagnosis of diseases.

a.7 Enable the students to point-out different mechanisms which the body uses to get rid of various types of foreign chemical as drugs, food additives and pollutants.

a.8 Identify role and importance of tumor markers in the diagnosis of cancer, some plasma proteins, liver and kidney function tests.

a.9 Define impact of certain diseases on the process of cell apoptosis.

a.10 Recognize the structure and functions of plasma proteins.

a.11 Define nature of Bilirubin: metabolism, types, hyperbilirubinaemia

2.b. Intellectual skills:

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

b.1 Interpret symptoms, signs and biochemical laboratory findings of various diseases whether related or not to the liver.

b.2Point out the clinical significance of some enzymes in clinical applications.

2.c. Professional and practical skills:

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

c.1 Request different biochemical tests according to the condition of the patient.

c.2 Apply some biochemical diagnostic tests.

2.d. General and transferable skills:

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

d.1 Work effectively in a group and preparation of seminars.

d.2 Demonstrates respect for the role of staff and co-staff members regardless of degree or occupation.

3. Contents:

W	Topic	No. Of credit hours	Lecture	No. of Lecture hours	Tutorial/ Practical	Total teaching hours
1st	Hormones	6	a. Classification of hormones and their mode of action [Intracellular receptors (Second messengers) and Cell surface receptors].	4	4	8
2nd	Hormones	6	b. Thyroid hormones and function tests c. Adrenal hormones	4	4	8
3rd	Hormones	6	d. Endocrine function of the pancreas (Insulin and glucagon hormones)	4	4	8
4th	Hormones	6	e. Diabetes mellitus and its complications	4	4	8
5th	Vitamins	6	a. Classification- clinical Importance	4	4	8
6th	Blood chemistry	6	b. Acid base balance	4	4	8
7th	Blood chemistry	6	c. Water and electrolytes balance d. Liver function tests (Synthetic – Excretory – Metabolic – Storage)	4	4	8
8th	Blood chemistry	6	e. Plasma proteins (albumin, total proteins & coagulation factors, Immunoglobulins, acute phase proteins, protease inhibitors, haptoglobulins, macroglobulins, microglobulins)	4	4	8
9th	Blood chemistry	6	f. Bilirubin: metabolism, types, hyperbilirubinaemia (physiological, syndromes) g. Kidney function tests (excretory– reabsorptive– regulatory – endocrine)	4	4	8
10th	Blood chemistry	6	h. Classification of Enzymes, mode of action and Isoenzymes Pancreatic enzymes Cardiac biomarkers	4	4	8
11th	Blood chemistry	6	i. Tumor markers	4	4	8
12th	Blood chemistry	6	j. Metabolism of xenobiotics	4	4	8
13th	Blood chemistry	6	k. apoptosis	4	4	8
14th	Revision	6	hormones	4	4	8
15th	Revision	6	Blood chemistry	4	4	8
	Total	**90**		**60**	**60**	**120**

4. Course Matrix Contents

Main Topics / Chapters	Course ILOs Covered by Topic (By ILOS Code)			
	K &U	I.S.	P.S.	G.S.
1. Classification of hormones and their mode of action[Intracellular receptors (Second messengers) and Cell surface receptors]	a.2	b.1	c.1 / c.2	d.1/d.2
2. Thyroid hormones and function tests, adrenal hormones	a.2	b.1	c.1 /c.2	d.1/d.2
3. Endocrine function of the pancreas (Insulin and glucagon hormones)	a.2	b.1	c.1 / c.2	d.1/d.2
4. Diabetes mellitus and its complications	a.1/ a.2	b.1 / b.2	c.1 / c.2	d.1/d.2
5. Classification- clinical Importance of vitamins	a.3	b.1 / b.2	c.1 / c.2	d.1/d.2
6. Acid base balance	a.5	b.1	c.1 /c.2	.1/.2
7. Water and electrolytes balance 8. Liver function tests (Synthetic – Excretory – Metabolic – Storage)	a.4/ a.6	b.1	c.1 / c.2	d.1/d.2
9. Plasma proteins (albumin, total proteins & coagulation factors, Immunoglobulins, acute phase proteins, protease inhibitors, haptoglobulins, macroglobulins, microglobulins)	a.8/a.10	b.1 / b.2	c.2	d.1/d.2
10. Bilirubin: metabolism, types, hyperbilirubinaemia Kidney function tests (excretory – reabsorptive – regulatory – endocrine)	a.8 /a.11	b.1 / b.2	c.1 / c.2	d.1/d.2
11. Classification of Enzymes, mode of action and Isoenzymes Pancreatic enzymes Cardiac biomarkers	a.6	b.1 /b.2	c.1 /c.2	d.1/ d.2
12. Tumor markers	a.8	b.1 / b.2	c.1 / c.2	d.1/d.2
13. Metabolism of xenobiotics	a.7	b.1 / b.2	c.2	d.1/d.2
14. Apoptosis	a.9	b.1 / b.2	c.2	d.1/d.2

5. Teaching and Learning Methods

5.1Lectures (definitions, examples ,video material)

5.2 Tutorials (students solving problems and engaging in discussion)

5.3Assignments (work in groups and trying to put options for solving advanced problems)

5.4Projects (work in groups on extensive projects involving making research using its tools).

5.5 Electronic Learning including:

- Online Lectures on zoom meeting
- Uploading lectures on Google classroom
- WhatsApp group to facilitate communication between teaching staff and candidates, follow up, student inquiries, set dates for online lectures.

Teaching methods versus Course ILOs

Teaching/ Learning Methods		Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
Direct	Lectures	a1-a11	b1-b2		
	Practical			c1-c2	d1-d2
Interactive	Presentations Discussion Reports	a1-a11	b1-b2		d1-d2
Self-Learning	Assignments flipped classroom	a1-a11	b1-b2		d1-d2
E-learning	Synchronous Asynchronous	a1-a11	b1-b2		

6. Student Assessment Methods:

Prerequisites for Exam entry

- Log book
- In-class and tutorial participation, calculations on board and theoretical concepts

- Seminars: the candidate should prepare & present at least one seminar in a topic related to the course & determined by the supervisors in front of the department staff .
- Practical quizzes (not graded formative assessment) throughout the course

I- Assessment tools:

6.1 Written final Examination (to assess knowledge & intellectual skills)

6.2 Oral final examination (to assess knowledge, intellectual skill &transferable skills)

6.3 Practical Exam for assessment of lab skills.

Assessment methods versus Course ILOs

Assessment Method	Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
1- Written Examinations: - Essay questions - Objective questions - Problem solving - MCQ	a1-a11	b1-b2		
2- Practical Examinations OSPE	a1-a11		c1-c2	d1-d2
3- Oral Exams Using VIVA cards	a1-a11	b1-b2		d1-d2
4- Logbook assessment	a1-a11	b1-b2	c1-c2	d1-d2

II- **Marks:** 150 mark: 2written paper 3hours 90mark+30 practical+30 oral

7. List of References

7.1 **Course Notes**: Lecture notes prepared by the staff members in the department

7.2 **Essential Books (Text Books):**

- Text book of Biochemistry with Clinical Correlations.
- Harper's Illustrated Biochemistry (32nd edition).
- Lecture Notes on Clinical Biochemistry: Whitby LG, Smith AF, Beckett GJ, Walker SW, Blackwell Scientific Publications.
- MN Chaterra (8th edition).
- Clinical Biochemistry (7th edition)

- Principles of Biochemistry (8th edition).
- Biomarkers in inborn errors of metabolism (clinical aspects and laboratory determination 1st edition).

7.3 **Recommended Books:** Lippincott's Reviews of Biochemistry 7th edition

7.4 **Periodicals, Web Sites … etc.**

- Metabolism (Clinical and Experimental) (Elsevier)
- Cell Physiology and Biochemistry.
- Egyptian J. Biochemistry and Molecular Biology.

8. Facilities Required for Teaching and Learning

Candidates & their learning are supported in a number of ways:

- Lecture rooms: available in the NLI
- Computer Lab: available in the NLI's Library with a wide range of software.
- Induction course introducing study skills
- Candidates logbook
- Program Specification & Handbooks
- Extensive library & other learning resources
- Internet with a wide range of learning support material

Course Coordinator: Prof. Dr. Hala El-Said

Head of Department: Prof. Dr. Hala El-Said

Course 3: Scientific and clinical course in Hepatology and Gastroenterology

University: Menoufia

Faculty: National Liver Institute

Clinical Biochemistry and Molecular Diagnostics Department

Course specifications

- **Program(s) on which the course is given:** Clinical Biochemistry and Molecular Diagnostics MD. programs (First part)
- **Major or minor element of programs:**
- **Department offering the program:** Clinical Biochemistry and Molecular Diagnostics Department
- **Department offering the course:** Hepatology and Gastroenterology
- **Academic year / Level:** MD. Clinical Biochemistry and Molecular Diagnostics 2022/2023(First part)

- Date of specification updates approval: November 2023

A- Basic Information

Title: Scientific and clinical course in Hepatology and Gastroenterology

Code: CLINBIO902

Course duration: One semester (15 week) followed by one final exam

Credit Hours: 2 hours/week **Lecture:**1hour/w

Clinical & scientific activities: 1 Credit hour/week

Total teaching hours: 45 hours

B- Professional Information:

1. **Overall aim of the course:** Enable the candidates to
   - To develop a basic understanding of and familiarity with the principles and practice of Hepatology with emphasis on the basic knowledge in internal medicine.
2. **Intended learning outcomes of course (ILOs):**

On completing the course, students should be able to:

2.a Knowledge and understanding:

On successful completion of the course, the candidate will be able to:

a.1 Recognize the cardinal manifestations & presentation of dysfunction of the different systems.

a.2 Describe the causes, pathogenesis and clinical picture of the most common diseases of the cardiac, respiratory, gastrointestinal renal, hematologic and endocrine systems.

a.3 Outline the basics and the recent advances in clinical management of patients with the most common disorders of cardiovascular, respiratory, gastrointestinal, renal and hematologic disorders.

a.4 Identify the management priorities for the commonly encountered medical emergencies.

2.b Intellectual skills

On successful completion of the course, the candidate will be able to:

b1- Apply full clinical skills and different investigations in optimal manner so as to reach the diagnosis.

b2- Interpret the commonly used laboratory and radiologic investigation tools.

b3- Suggest differential diagnosis and the provisional diagnosis.

b4- Conclude the final diagnosis.

b5- Identify the indications and logistics of referring patients to higher levels of experience or specialization.

2.c Professional and practical skills:

On successful completion of the course, the candidate will be able to:

c.1 Take a thorough history of appropriate depth and detail, relative to the clinical context.

c.2 Demonstrate a complete and/or problem-focused physical examination.

c.3 Recognize different medical emergencies and institute appropriate initial management.

c.4 Safely perform routine diagnostic and therapeutic procedures.

c.5 Use appropriate sterile technique, Comply with and use universal precautions.

2.d General and transferable skills:

On successful completion of the course, the candidate will be able to:

d.1 Increase their clinical sense.

d.2 Perform continuous medical education.

d.3 Communicate with patients and their families.

d.4 Present patients' data in an organized way in clinical rounds and department meetings.

3. Course Contents

A. Academic lectures:1 credit hour/week

W	Topic	No. of credit hours	Lecture	Clinical/ Scientific activities	Total teaching hours
1st	– Myocardial Biology and Heart Failure	2	1	2	3
2nd	– Acute kidney injury (AKI) and chronic kidney disease (CKD)	2	1	2	3
3rd	– Glomerular disease and vasculitis	2	1	2	3
4th	– Disturbances of Free Water, Electrolytes, Acid-Base Balance, and Oncotic Pressure	2	1	2	3
5th	– COPD & asthma	2	1	2	3
6th	– Respiratory Tract Infections & respiratory failure	2	1	2	3
7th	– Updates in Neurological infections	2	1	2	3
8th	– Updates in Diabetes mellitus	2	1	2	3
9th	– Updates inThyroid & pituitary disease	2	1	2	3
10th	– Epstein–Barr Virus infection	2	1	2	3
11th	– Cytomegalovirus infection	2	1	2	3
12th	– Updates in Coagulation disorders	2	1	2	3
13th	– Updates in Platelets disorders	2	1	2	3
14th	– Updates in Anemia diagnosis&management	2	1	2	3
15th	**Final revision**	2	1	2	3
	Total	30	15	30	45

B. Activities: Students can attend any of the following activities to fulfill a total of 1 CH/W.

- **Clinical:** 2 hours equivalent to 1 credit hour.
  - Clinical morning round
  - Staff round
  - Outpatient clinic
  - Ultrasonography training
  - Endoscopy
  - Paracentesis
- **Scientific activities:** 1 hour equivalent to 0.25 credit hour.
  - Journal club
  - Monthly meeting
  - Thesis defense
  - Conference
  - Workshop

4. Course matrix content

	Main Topics / Chapters	Course ILOs Covered by Topic (By ILOS Code)			
		K &U	**I.S.**	**P.S.**	G.S.
1-	Myocardial Biology and Heart Failure	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4
2-	Acute kidney injury (AKI) and chronic kidney disease (CKD)	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4
3-	Glomerular disease and vasculitis	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4
4-	Disturbances of Free Water, Electrolytes, Acid-Base Balance, and Oncotic Pressure	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4
5-	COPD & asthma	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4
6-	Respiratory Tract Infections & respiratory failure	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4
7-	Updates in Neurological infections	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4
8-	Updates in Diabetes mellitus	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4
9-	Updates in Thyroid & pituitary disease	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4

	Main Topics / Chapters	Course ILOs Covered by Topic (By ILOS Code)			
10-	Epstein–Barr Virus infection	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4
11-	Cytomegalovirus Infections	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4
12-	Updates in Coagulation disorders	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4
13-	Updates in Platelets disorders	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4
14-	Updates in Anemia diagnosis&management	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4
15-	Final revision	a.1, a.2, a.3, a.4	b.1, b.2, b.3, b.4, b.5	c.1, c.2, c.3, c.4, c.5	d.1, d.2, d.3, d.4

5. Teaching and learning methods

5.1 Academic lectures.

5.2 Activities: Students can attend any of the following activities to fulfill a total of 1 Credit hour/Week.

- Clinical: 1 hour equivalent to 0.5 credit hour.
  - Clinical rounds: morning & Staff rounds in the inpatient ward.
  - Discussion of cases in the outpatient clinics.
  - Tutorial/practical sessions.
- Scientific activities: 1 hour equivalent to 0.25 credit hour.
  - Seminars & Journal club
  - Monthly department meeting
  - Thesis defense
  - Conferences
  - Workshops

Teaching methods versus Course ILOs

Teaching/ Learning Methods		Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
Direct	Lectures	a1-a4	b1-b5		
	Clinical	a1-a4		c1-c5	d1-d4
Indirect	Case Study	a1-a4	b1-b5	c1-c5	d1-d4
Interactive	Presentations Discussion Reports	a1-a4	b1-b5		d1-d4
Self-Learning	Assignments flipped classroom	a1-a4	b1-b5		d1-d4
E-learning	Synchronous Asynchronous	a1-a4	b1-b5		

6. Student assessment methods

6.1 **Attendance criteria:** The minimal acceptable attendance of lectures & activities is 75%.

6.2 **Prerequisite for Exam entry**

- Marking clinical sheets: to assess the student's ability to take proper history and conduct clinical examination.
- Discussion in clinical rounds.
- Log book

6.3 **Assessment tools:**

II- Written exam: to assess knowledge & intellectual skills.

III- Clinical exam: to assess knowledge, clinical and intellectual skills and general & transferable skills.

Assessment methods versus Course ILOs

Assessment Method	Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
1- Written Examinations: - Essay questions - Objective questions - Problem solving - MCQ	a1-a4	b1-b5		
2- Clinical Examinations	a1-a4	b1-b5	c1-c5	d1-d4
3- Oral Exams Using VIVA cards	a1-a4	b1-b5		d1-d4
4- Logbook assessment	a1-a4	b1-b5	c1-c5	d1-d4

Assessment schedule

- **Written examination:** one paper.
- **Clinical examination:** on a separate day.

Weighting of assessments

- **Written Exam:** 40 marks.
- **Clinical Examination:** 10 marks.
- **Total:** 50 marks

7. List of References:

7.1 Course notes: handouts handed to the students after each lecture.

7.2 Recommended books:

- Davidson's Principles and Practice of Internal Medicine, 24th edition, Churchill Livingstone 2022.
- Kumar and Clark's Clinical Medicine. 9th edition. Elsevier 2020.

7.3 Clinical books:

- BickleyLS, SzilagyiPG, Hoffman RM (Eds). Bates' Guide to Physical Examination and History Taking. 12th edition. Philadelphia: Wolters Kluwer 2017.
- J.Alastair Innes, Anna R.Dover, Karen Fairhurst. Macleod's Clinical Examination. 14th edition. Elsevier 2018.

- Burns E, Korn K, Whyte J (Eds). Oxford American Handbook of Clinical Examination and Practical Skills. United States Of America: Oxford University Press, Inc 2011.

7.4 Periodicals, Web sites, … etc

- http://www.pubmed.com.
- http://sciencedirect.com.

8. Facilities required for teaching and learning:

- Lecture rooms.
- Teaching hospital (outpatient clinics and inpatient wards).
- Extensive library.
- Computer Lab: available in the NLI's Library with a wide range of software, internet access and online access to medical journals.
- Conference halls equipped with data show.
- Candidates logbook.
- Program Specification & Handbooks.

Course coordinator: Prof. Dr. Hanaa Badran

Head of Department: Prof. Mohamed Akl

Course 4: Scientific and clinical course in Pediatric Hepatology

University: Menoufia

Faculty: National Liver Institute

Clinical Biochemistry and Molecular Diagnostics Department

Course specifications

- **Program(s) on which the course is given:** Clinical Biochemistry and Molecular Diagnostics MD. programs (First part)
- **Major or minor element of programs:**
- **Department offering the program:** Clinical Biochemistry and Molecular Diagnostics Department
- **Department offering the course:** Pediatric Hepatology, gastroenterology and nutrition
- **Academic year / Level:** MD Clinical Biochemistry and Molecular Diagnostics(First part)
- **Date of specification updates approval: November, 2023**

A- Basic Information

Title: Scientific and clinical course in Pediatric Hepatology

Code: CLINBIO903

Course duration: One semester (15 weeks) followed by one final exam

Credit Hours: 2 hours/week **Lecture:**1hour/w **Practical:**1 hour/w

Total teaching hours: 45 hours

B- Professional Information

1. Overall aims of course

Enable postgraduate students to

1. Understand and apply the ethics of the profession.
2. Develop the desire for self-education.
3. Demonstrate theoretical knowledge in the field of pediatrics.
4. Develop clinical skills based on a systematic approach to diagnose pediatric diseases.
5. Have appropriate background covering the common and important Pediatric emergencies and diseases.
6. Respond in a positive and creative manner to a given problem

2. Intended learning outcomes of course (ILOs)

2.a Knowledge and Understanding:

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

a.1 Recognize the biochemical basis of pediatric disorders.
a.2 Describe the pathologic basis of pediatric disorders.
a.3Define the clinical pathology investigations needed in pediatric practice.
a.4 Describe basics of pediatric endocrine disorders.
a.5 Describe the causes and pathogenesis of the most important neonatal and Pediatric problems.
a.6 Describe the causes and pathogenesis of the most important neonatal and Pediatric problems.

2.b Intellectual Skills

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

b.1Identify, analyze and specify pediatric problems
b.2Select the appropriate investigational tool.
b.3Interpret results
b.4Make conclusions
b.5Be capable of scientific discussion
b.6 Recognize pediatric emergencies
b.7 Interpret the most important symptoms and signs of disease in Pediatric patients.

2.c Professional and Practical Skills

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

c.l Construct a proper history for a patient in the pediatric age group.
c.2 Interpret patient's data in an organized and informative manner.
c.3 Choose the proper investigations for a given medical problem.
c.4 Interpret the results of the investigations
c.5 Define the diagnosis and differential diagnosis of different cases.
c.6 Identify patients in need for higher specialization
c.7 Perform the interventional skills specified in each specific course
c.8 Apply up-to-date practice and promote evidence based medicine while committed to the highest standards of care and ethical and professional behavior.

2.d General and Transferable Skills

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

d.l Communicate effectively with peers and professors.
d.2 Develop skills of group working.

d.3 Demonstrate appropriate professional attitudes and behaviors in different practice situations.

d.4 Present patient' data in an organized and informative manner.

d.5 Convey simplified, easy understandable explanation of the child condition to the parents.

3. Contents

Week	Topic	No. of credit hours	Lecture	Tutorial/clinical	Total teaching hours
1st	• Preterm and Low Birth Weight Infants, Fluid and Electrolyte Management • neonatal emergencies • Disorders of Glucose Homeostasis • Hyperbilirubinemia	1	1	2	3
2nd	• Hyperbilirubinemia • Blood Gas Interpretation • Common GIT Problems • Neonatal Shock	1	1	2	3
3rd	• Congenital heart diseases (Cyanotic and acyanotic) • Rheumatic fever	1	1	2	3
4th	• Infective endocarditis • Heart failure	1	1	2	3
5th	• Hematuria in children • Proteinuria in children	2	1	2	3
6th	• Acute kidney injury • Urinary tract infections	1	1	2	3
7th	• Disorders of the Hypothalamus and Pituitary Gland • Disorders of the Thyroid Gland	1	1	2	3
8th	• Disorders of the Adrenal Glands	2	1	2	3
9th	• Diabetes Mellitus In Children	2	1	2	3
10th	• Leukemia	1	1	2	3
11th	• Tumor markers	1	1	2	3

Week	Topic	No. of credit hours	Lecture	Tutorial/clinical	Total teaching hours
12st	• Immunodeficiency.	1	1	2	3
13nd	• Immune mediated disorders	1	1	2	3
14rd	• Diabetic ketoacidosis • Electrolytes disturbance	1	1	2	3
15rd	• Revision	1	1	2	3
	Total	15	15	30	45

4. Course matrix content:

Main Topics / Chapters	Course ILOs Covered by Topic (By ILOs Code)			
	K &U	I.S.	P.S.	G.S.
• Preterm and Low Birth Weight Infants, Fluid and Electrolyte Management • Neonatal emergencies • Disorders of Glucose Homeostasis	a.1, a.2, a.3 ,a.4, a.5, a.6	b.1, b.2, b.3, b.4,b.6	c.1, c.2, c.3, c.4, c.5, c.6	d.1, d.2, d.3, d.4
• Blood Gas Interpretation • Common GIT Problems • Neonatal Shock • Inborn Errors of Metabolism	a.1, a.2, a.3 , a.5, a.6	b.1, b.2, b.3, b.4,b.6	c.1, c.2, c.3, c.4, c.5, c.6	d.1, d.2, d.3, d.4
• Congenital heart diseases (Cyanotic and acyanotic) • Rheumatic fever	a.1, a.2, a.3	b.1, b.2, b.3, b.4,b.6	c.1, c.2, c.3, c.4, c.5, c.6	d.1, d.2, d.3, d.4
• Infective endocarditis • Heart failure	a.1, a.2, a.3	b.1, b.2, b.3, b.4,b.6	c.1, c.2, c.3, c.4, c.5, c.6	d.1, d.2, d.3, d.4
• Hematuria in children • Proteinuria in children	a.1, a.2, a.3	b.1, b.2, b.3,	c.1, c.2, c.3, c.4,	d.1, d.2, d.3

Main Topics / Chapters	Course ILOs Covered by Topic (By ILOs Code)			
	K &U	I.S.	P.S.	G.S.
		b.4,b6	c.5, c.6	
• **Acute kidney injury** • **Urinary tract infections** • **Voiding dysfunction in children**	a.1, a.2, a.3	b.1, b.2, b.3, b.4,b6,b.7	c.1, c.2, c.3, c.4, c.5, c.6	d.1, d.2, d.3
• **Disorders of the Hypothalamus and Pituitary Gland** • **Disorders of the Thyroid Gland** • **Disorders of the Parathyroid Glands**	a.1, a.2, a.3 ,a.4	b.1, b.2, b.3, b.4,b.6,b.7	c.1, c.2, c.3, c.4, c.5, c.6	d.1, d.2, d.3, d.4**,d.5**
• **Disorders of the Adrenal Glands** • **Diabetes Mellitus In Children**	a.1, a.2, a.3 ,a.4	b.1, b.2, b.3, b.4,b.6,b.7	a.1, a.2, a.3 ,a.4	d.1, d.2, d.3, d.4**,d.5**
• **Leukemia**	a.1, a.2, a.3	b.1, b.2, b.3, b.4,b.6,b.7	c.1, c.2, c.3, c.4, c.5, c.6	d.1, d.2, d.3
• **Tumor markers**	a.1, a.2, a.3	b.1, b.2, b.3, b.4,b.6	c.1, c.2, c.3, c.4, c.5, c.6	d.1, d.2, d.3
• **Immunodeficiency.**	a.1, a.2, a.3	b.1, b.2, b.3, b.4,b.6,b.7	c.1, c.2, c.3, c.4, c.5, c.6	d.1, d.2, d.3, d.4**,d.5**
• **Immune mediated disorders**	a.1, a.2, a.3	b.1, b.2, b.3, b.4,b.6,b.7	c.1, c.2, c.3, c.4, c.5, c.6,c.7	d.1, d.2, d.3, d.4
• **Diabetic ketoacidosis** • **Electrolytes disturbance**	a.1, a.2, a.3	b.1, b.2, b.3, b.4,b.5,b.7	c.1, c.2, c.3, c.4, c.5, c.6, c.8	d.1, d.2, d.3, d.4,d.5

5. Teaching and Learning Methods

5.1- Formal Lectures

5.2- Clinical conference (case discussion)

5.3- Clinical sessions: (Clinical demonstrations, practice of skills, and discussions) Pediatric inpatient ward teaching, Outpatient clinic teaching, Emergency department teaching and NICU teaching.

5.4- Electronic Learning including:

- Online Lectures on zoom meeting
- Uploading lectures on Google classroom
- WhatsApp group to facilitate communication between teaching staff and candidates , follow up, student inquiries, set dates for online lectures.

Teaching methods versus Course ILOs

Teaching/ Learning Methods		Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
Direct	Lectures	a1-a6	b1-b7		
	Clinical	a1-a6	b1-b7	c1-c8	d1-d5
Indirect	Case Study	a1-a6	b1-b7	c1-c8	d1-d5
Interactive	Presentations Discussion Reports	a1-a6	b1-b7		d1-d5
Self-Learning	Assignments flipped classroom	a1-a6	b1-b7		d1-d5
E-learning	Synchronous Asynchronous	a1-a6	b1-b7		

6. Student Assessment Methods

Prerequisites for Exam entry

- Log book
- In – class and tutorial participation, calculations on board and theoretical concepts

- Seminars: the candidate should prepare & present at least one seminar in a topic related to the course & determined by the supervisors in front of the department staff.
- Practical quizzes (not graded formative assessment) throughout the course.

Final examination

6.1 Written examination to assess knowledge and understanding

6.2 Practical examination to assess clinical, practical, intellectual and general skills in the form of long and short clinical cases

Assessment Schedule

- Written Assessment (written exam for 2 hours)
- Practical Assessment in the form of clinical case report on a separate day.

Assessment methods versus Course ILOs

Assessment Method	Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
1- Written Examinations: - Essay questions - Objective questions - Problem solving - MCQ	a1-a6	b1-b7		
2- Clinical Examinations	a1-a6	b1-b7	c1-c8	d1-d5
3- Oral Exams Using VIVA cards	a1-a6	b1-b7		d1-d5
4- Logbook assessment	a1-a6	b1-b7	c1-c8	d1-d5

Weighting of Assessments

- Final-term Examination 40 marks
- Practical Examination 10 marks
- Total 50 marks

7. List of References

7.1 Course Notes

7.2 Department lectures (Pediatrics, By Staff Members of Pediatric Hepatology, Gastroenterology and Nutrition Department Department).

7.3 Essential Books (Text Books)

- Nelson's "Essentials of Pediatrics" (available in NLI library and from bookshops). ISBN: 1-4160-0159-x

- Recommended books

- Current Pediatric Diagnosis & Treatment (By William W. Hay; Jr; Jessie R. Groothius, Anthony R. Hayward, & Myron J. Levin). ISBN: 0-8385-1455-3.

7.4 Periodicals and websites

7.4 Egyptian Knowledge Bank (https://www.ekb.eg) Researcher Portal

8. Facilities Required for Teaching and Learning

- **Lecture hall**: At building of national liver institute, 7th floor, data show is available.
- **Small group classes:**

a- Neonatal Intensive Care Unit (pediatric Hepatology, gastroenterology, and Nutrition department, NLI, Menoufia University)

b- Outpatient clinic and inpatient ward teaching (pediatric Hepatology, gastroenterology, and Nutrition department, NLI, Menoufia University)

- **Library:** 8th floor of National Liver Institute.
- **Internet room:** with available access to medical databases.
- **Clinical facilities:**
  - General & specialized outpatient clinics (Pediatric Hepatology, Gastroenterology, and Nutrition Department, NLI, Menoufia University).
  - General & specialized inpatients units (Pediatric Hepatology, Gastroenterology, and Nutrition Department, NLI, Menoufia University).
  - Emergency unit. (Pediatric Hepatology, Gastroenterology, and Nutrition Department, NLI, Menoufia University).
  - Neonatal intensive care unit (Pediatric Hepatology, Gastroenterology, and Nutrition Department, NLI, Menoufia University)

External International Academic Reference

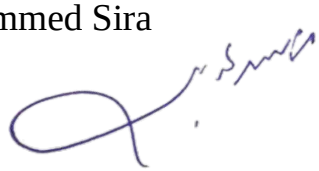
Diploma in child health

Patil Medical College, Navi Mumbai, India

Website:http://www.dypatil.in/picrepimage/Diploma%20in%20child%20health%20care.pdf

Course coordinator: Prof. Dr. Mostafa Mohammed Sira

Head of Department: Prof. Nermine Adawy



Elective Courses

Course 5: Nutritional Biochemistry

Course specifications

- **Program(s) on which the course is given:** Clinical Biochemistry and Molecular Diagnostics MD. programs (Elective)
- **Major or minor element of programs:**
- **Department offering the program:** Clinical Biochemistry and Molecular Diagnostics Department
- **Department offering the course:** Clinical Biochemistry and Molecular Diagnostics Department
- **Academic year / Level:** MD. Clinical Biochemistry and Molecular Diagnostics
- **Date of specification updates approval: November, 2023**

A- **Basic Information**

- **Course Title:** Nutritional Biochemistry**.**
- **Course code:**CLINBIO901F
- **Specialty: Clinical biochemistry and molecular diagnostics**
- **Number of credit hours:** 2 hours/ week **-lectures:**2 hours/ week
- **Total teachinghours:**30 hours
- **Department(s) delivering the course: Clinical biochemistry and molecular diagnostics**
- **Requirements (pre-requisites) if any:**

B- **Professional Information**

1. Overall aims of course:

1. To help students to become familiar with the biochemical knowledge that will assist them in understanding the functions, relationships, and deficiency syndromes of the essential vitamins and minerals, and the relation between nutrition and immunity.
2. To enable the students to describe absorption and metabolism of major nutrients in health and disease;
3. To enable the students to understand interactions among micro- and macronutrients, their role in maintaining optimal body functions and

factors that interfere with these interactions, and how to integrate this knowledge into medical practice.

4. To give students experience in assessing nutritional status by simple anthropometric, dietary, clinical, and laboratory means. 5. To make students familiar with the types and functions of lipids, carbohydrates and proteins with special stress on some related diseases and Recommended daily dose (RDI).
5. To enable the students to determine energy and nutrient requirements for individuals (energy balance).
6. To enable the students to discuss the epidemiology, prevention, diagnosis, and treatment of the major nutritional diseases in the world.

2. Intended learning outcomes of course (ILOs)

2.a Knowledge and understanding:

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

a.1 Describe absorption and metabolism of major nutrients in health and disease.

a.2 Recognize the functions, relationships, and deficiency syndromes of the essential vitamins and minerals, and the relation between nutrition and immunity.

a.3 Identify interactions among micro- and macronutrients, their role in maintaining optimal body functions and factors that interfere with these interactions, and how to integrate this knowledge into medical practice stress on some related diseases, amino acids degradation, fate of ammonia.

a.4 Assess nutritional status by simple anthropometric, dietary, clinical, and laboratory means.

a.5 Discuss the epidemiology, prevention, diagnosis, and treatment of the major nutritional diseases in the world.

a.6 Determine energy and nutrient requirements for individuals(energy balance).

a.7 Give general dietary guidelines and be able to find appropriate nutritional resources for referral.

a.8Define the importance of nutrition in the maintenance of health and the prevention of disease, identifying nutrition risk and managing hospitalized patients, especially those with chronic conditions.

a.9Evaluate nutritional status and appropriately prescribe enteral and parenteral nutritional therapy for various diseases.

2.b Intellectual skills:

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

b.1 Interpret symptoms, signs and biochemical laboratory findings of various diseases whether related or not to the liver.

b.2Point out the nutritional status by simple anthropometric, dietary, clinical, and laboratory means.

2.c Professional and practical skills:

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

c.1 Request different biochemical tests according to the condition of the patient.

c.2Evaluate nutritional status and appropriately prescribe enteral and parenteral nutritional therapy for various diseases.

2.d General and transferable skills

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

d.1 Work effectively in a group and preparation of seminars.

d.2 Demonstrates respect for the role of staff and co-staff members regardless of degree or occupation.

3. Contents:

W	Topic	No. Of credit hours	Lecture	No. of Lecture hours	Tutorial/ Practical	Total teaching hours
1st	Over view of Basics of nutritional science	2	a. Nutrition Definition b. Goals of nutritional science c. Nutrients overview	2		2
2nd	Over view of Basics of nutritional science	2	**a.** Macronutrients and micronutrients **b.** Essential and non-essential nutrients **c.** Phytochemicals and zoonutrients **d.** d. Recommended daily dose (RDI)	2		2
3rd	Carbohydrates	2	a. Basic forms b. Health benefits with fiber and RDI	2		2
4th	Lipids	2	**a.** Basic forms and functions **b.** Dietary cholesterol, functions	2		2
5th	Proteins	2	a. Types, quality b. RDI c. Functions	2		2
6th	Water Probiotic and prebiotic Food	2	**a.** Functions, b. RDI c. Definition, Types d. d. Medical importance	2		2
7th	Vitamins	2	**a.** Types (water soluble) **b.** RDI **c.** Sources, Functions	2		2
8th	Vitamins	2	- Types (fat soluble) - RDI - Sources, Functions	2		2
9th	Minerals	2	- Types - RDI - Sources, Functions	2		2
10th	Nutritional Status	2	a. Food pyramid b. Food energy c. Nutritional adequacy d. Types of malnutrition e. Anthropometric measures	2		2
11th	Food	2	a. Fortification b. Supplements c. Processing	2		2
12th	Nutrition and Disease	2	a. With Cancer b. Cardiovascular Disease c. Bone disease d. Pulmonary disease e. Burns and surgery	2		2
13th	Nutrition and Disease	2	a. Liver disease b. GIT disorders c. Renal disease d. Diabetes	2		2
14th	Nutrition and Disease	2	e. Parenteral	2		2

W	Topic	No. Of credit hours	Lecture	No. of Lecture hours	Tutorial/ Practical	Total teaching hours
			f. Menopause g. Aging h. Pregnancy			
15th	Revision	2	Nutrition and Disease	2		2
	Total	**30**		**30**		**30**

4. Course Matrix Contents

Main Topics / Chapters	Course ILOs Covered by Topic (By ILOS Code)			
	K &U	I.S.	P.S.	G.S.
1- Nutrition: Definition and goals of nutritional science Nutrients overview.	a.1/ a.2	b.1	c.2	d.1/d.2
2- Macronutrients and micronutrients. Essential and non-essential nutrients. Phytochemicals and zoo nutrients. Recommended daily dose (RDI)	a.3/a.5/a.6	b.1 / .2	c.1 / c.2	d.1/d.2
3- Basic forms of carbohydrates and Health benefits with fiber and RDI	a.1/ a.2/ a.6	b.1 / b.2	c.1 / c.2	d.1/d.2
4- Basic forms and functions of lipids and Dietary cholesterol, functions.	a.1/ a.2	b.1 / b.2	c.1 / c.2	d.1/d.2
5- Types, quality, Functions and RDI of proteins	a.1/ a.2/ a.6	b.1 / b.2	c.1 / c.2	d.1/d.2
6- Types, Functions, medical importance and RDI of Water , Probiotic and prebiotic Food	a.1/ a.2/ a.6 / a.8	b.1 / b.2	c.1 / c.2	d.1/d.2
7- Vitamins a. Types (water soluble) b. RDI c. Sources, Functions	a.2/ a.6	b.1 / b.2	c.1 / c.2	d.1/d.2
8- Vitamins a. Types (fat soluble) b. RDI c. Sources, Functions	a.2/ a.6	b.1 / b.2	c.1 / c.2	d.1/d.2
9- Minerals a. Types b. RDI c. Sources, Functions		b.1 / b.2	c.1 / c.2	d.1/d.2
10- Nutritional Status a. Food pyramid b. Food energy c. Nutritional adequacy d. Types of malnutrition e. Anthropometric measures	a.4/	b.1 / b.2	c.1 / c.2	d.1/d.2

Main Topics / Chapters	Course ILOs Covered by Topic (By ILOS Code)			
	K &U	I.S.	P.S.	G.S.
11- Food a. Fortification b. Supplements c. Processing	a.6/ a.7/	b.1 / b.2	c.1 / c.2	d.1/d.2
12- Nutrition and disease a. With Cancer b. Cardiovascular Disease c. Bone disease d. Pulmonary disease e. Burns and surgery	a.4/ a.8/ a.9	b.1 / b.2	c.1 / c.2	d.1/d.2
13- Nutrition and disease a. Liver disease b. GIT disorders c. Renal disease d. Diabetes e. Parenteral f. Menopause g. Aging h. Pregnancy	a.4/ a.8/ a.9	b.1 / b.2	c.1 / c.2	d.1/d.2

5. Teaching and Learning Methods

5.1 Lectures (definitions, examples ,video material)

5.2: Electronic Learning including:

- Online Lectures on zoom meeting
- Uploading lectures on Google class Room
- WhatsApp group to facilitate communication between teaching staff and candidates , follow up, student inquiries, set dates for online lectures.

Teaching methods versus Course ILOs

Teaching/ Learning Methods		Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
Direct	Lectures	a1-a9	b1-b2		
Interactive	Presentations Discussion Reports	a1-a9	b1-b2	c1-c2	d1-d2
Self-Learning	Assignments flipped classroom	a1-a9	b1-b2		d1-d2
E-learning	Synchronous Asynchronous	a1-a9	b1-b2		

6. Student Assessment Methods:

Prerequisites for Exam entry

- Log book
- In – class and tutorial participation, calculations on board and theoretical concepts
- Seminars: the candidate should prepare & present at least one seminar in a topic related to the course & determined by the supervisors in front of the department staff.
- Practical quizzes (not graded formative assessment) throughout the course.

I- assessment tools:

6.1 Written final Examination (to assess knowledge & intellectual skills)

6.2 Oral final examination (to assess knowledge, intellectual skill &transferable skills)

Assessment methods versus Course ILOs

Assessment Method	Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
1- Written Examinations: - Essay questions - Objective questions - Problem solving - MCQ	a1-a9	b1-b2		
2- Oral Exams Using VIVA cards	a1-a9	b1-b2		d1-d2
3- Logbook assessment	a1-a9	b1-b2	c1-c2	d1-d2

II- **marks**: 50 mark: 1written paper 30 mark+ 20 oral

7. List of References

7.1 Course Notes: Lecture notes prepared by the staff members in the department

7.2 Essential Books (Text Books): Nutritional biochemistry 2nd edition.

7.3 Recommended Books

7.4 Periodicals, Web Sites … etc.

- Metabolism (Clinical and Experimental) (Elsevier)
- Cell Physiology and Biochemistry.
- Egyptian J. Biochemistry and Molecular Biology.

8. Facilities Required for Teaching and Learning

Candidates & their learning are supported in a number of ways:

- Lecture rooms: available in the NLI
- Computer Lab: available in the NLI's Library with a wide range of software.
- Induction course introducing study skills
- Candidates logbook
- Program Specification & Handbooks
- Extensive library & other learning resources
- Internet with a wide range of learning support material

Course Coordinator: Prof. Dr. Ashraf El-Fert

Head of Department: Prof. Dr. Hala El-Said

Course 6: Bioinformatics.

Course specifications

- **Program(s) on which the course is given:** Clinical Biochemistry and Molecular Diagnostics
- MD. programs (Elective)
- **Major or minor element of programs:**
- **Department offering the program:** Clinical Biochemistry and Molecular Diagnostics Department
- **Department offering the course:** Clinical Biochemistry and Molecular Diagnostics Department
- **Academic year / Level:** MD. Clinical Biochemistry and Molecular Diagnostics(Elective)
- **Date of specification updates approval: November, 2023**

A- Basic Information

- Course Title: Bioinformatics.

- Course code: CLINBIO901G

- Specialty: Clinical biochemistry and molecular diagnostics

-Course duration: 13weeks of teaching with a final examination at the end of the semester

- Credit Hours: 2 hours/week **Lectures:** 2 hours/week

- Total teaching hours: 30 hours

- Department(s) delivering the course: Clinical Biochemistry and Molecular Diagnostics

- Coordinator (s): Prof Dr: Ashraf El-Fert.

- Requirements (pre-requisites) if any: MD. In Clinical biochemistry and molecular diagnostics.

B- Professional Information

1. Overall aims of course

1. To provide students with up-to-date information in molecular biology and bioinformatics as they relate to human disease.
2. To ensure that graduates from this course are competent end-users of the technology.

3. To emphasize and demonstrate the integration of bioinformatics and molecular medicine throughout the course.
4. To teach the students a variety of presentation skills to ensure they are effective communicators of science.

2. Intended learning outcomes of course (ILOs)

2.a Knowledge and understanding:

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

a.1 Evaluate and discuss the role of molecular biology in the investigation of human diseases and their therapy.

a.2Identify the practice of biomedical science by applying key skills of critical analysis, evaluation and communication.

a.3Outline competence, confidence and an enquiring, investigative approach.

a.4 Integrate information from diverse sources relevant to molecular biology.

a.5 Articulate contemporary ethical dilemmas associated with the study of human pathology.

2.b Intellectual skills

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

b.1 Discuss the application of molecular biology to the design of novel therapeutics.

b.2 Identify the clinical significance of molecular biology techniques in clinical applications.

b.3 Describe the application of molecular biology techniques in basic and clinical sciences.

b.4 Recognize the tools used in data mining, DNA and protein sequence analysis.

b.5 Evaluate the role of bioinformatics in the understanding of systems biology.

b.6 Execute and report on a research project in the area of bioinformatics.

2.c Professional and practical skills:

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

c.1 Request different biochemical tests according to the condition of the patient.

c.2 Apply some molecular diagnostic tests.

2.d General and transferable skills

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

d.1 Work effectively in a group and preparation of seminars.

d.2 Demonstrates respect for the role of staff and co-staff members regardless of degree or occupation.

3. Contents

Week	Topic	No. Of credit hours	Lecture	No. of Lecture hours	Total teaching hours
1st	Bioinformatics	2	1. Introduction to DNA, RNA, and protein	2	2
2nd	Bioinformatics	2	2. Sequences in database. 3. Access to sequence Data and	2	2
3rd	Bioinformatics	2	4. Literature Information. 5. Pair wise Sequence Alignment.	2	2
4th	Bioinformatics	2	6. Basic Local Alignment Search Tool (BLAST).	2	2
5th	Bioinformatics	2	7. Advanced Database Searching. Multiple Sequence alignment	2	2
6th	Bioinformatics	2	8. Molecular Phylogeny and evolution	2	2
7th	Bioinformatics	2	9. Genome wide analysis of RNA and protein Gene expression: Microarray Data Analysis & Protein sequencing analyses.	2	2
8th	Bioinformatics	2	10. National Center for Biotechnology Information NCBI PubMed/Entrez/BLAST/OMIM/Books/Taxonomy/Structure/The European Bioinformatics Institute (EBI).	2	2
9th	Bioinformatics	2	11. The Map Viewer at NCBI Nucleotide and Protein sequences Amount of Sequence Data	2	2

Week	Topic	No. Of credit hours	Lecture	No. of Lecture hours	Total teaching hours
10th	Bioinformatics	2	12. Organisms in GenBank	2	2
11th	Bioinformatics	2	13. Types of Data in GenBank	2	2
12th	Bioinformatics	2	14. Genomic DNA Databases	2	2
13th	Bioinformatics	2	15. cDNA Databases 16. Expressed Genes, Expressed Sequence Tags (ESTs) and UniGene	2	2
14th	Bioinformatics	2	17. PCR and Primers	2	2
15th	Revision	2	Bioinformatics	2	2
	Total	**30**		**30**	**30**

4. Course Matrix Contents

Main Topics / Chapters	Course ILOs Covered by Topic (By ILOs Code)			
	K &U	I.S.	P.S.	G.S.
1. Introduction to DNA, RNA, and protein	a.1	b.1/ b.2 / b.3	c.2	d.1/d.2
2. Sequences in database.	a.2/ a.3	b.4	c.2	d.1/d.2
3. Literature Information, Pair wise Sequence Alignment.	a.2/a.3/ a.4	b.2 / b.3/ b.4	c.1 / c.2	d.1/d.2
4. Basic Local Alignment Search Tool (BLAST).	a.2/a.3	b.4	c.2	d.1/d.2
5. Advanced Database Searching. Multiple Sequence alignment.	a.2/a.3/ a.4/ a.5	b.4	c.2	d.1/d.2
6. Molecular Phylogeny and evolution.	a.1/a.4/ a.5	b.2 / b.3/b.4 /b.5	c.1 / c.2	d.1/d.2
7. Genome wide analysis of RNA and protein Gene expression: Microarray Data Analysis & Protein sequencing analyses	a.1/a.2/a.3/ a.4/ a.5	b.1 / b.2 / b.3/b.4 /b.5 /b.6	c.1 / c.2	d.1/d.2
8. National Center for Biotechnology Information NCBI PubMed/Entrez/BLAST/OMIM/Books/Taxonomy/Structure/The European Bioinformatics Institute (EBI)	a.2/a.3/ a.4/	b.3/b.4 /b.6	c.1 / c.2	d.1/d.2
9. The Map Viewer at NCBI Nucleotide and Protein sequences Amount of Sequence Data	a.2/a.3/ a.4	b.4 /b.5 /b.6	c.2	d.1/d.2

Main Topics / Chapters	Course ILOs Covered by Topic (By ILOs Code)			
	K &U	I.S.	P.S.	G.S.
10. Organisms in GenBank, Types of Data in GenBank.	a.2/ a.3/ a.4	b.5 /b.6	c.2	d.1/d.2
11. Genomic DNA Databases, cDNA Databases	a.2/ a.3/ a.4	b.5 /b.6	c.2	d.1/ d.2
12. Expressed Genes, Expressed Sequence Tags (ESTs) and UniGene	a.2/ a.3/ a.4	b.5 /b.6	c.1 / c.2	d.1/ d.2
13. PCR and Primers	a.2/ a.3/ a.4/ a.5	b.1 / b.2 / b.3/ b.5 / b.6	c.1 / c.2	

5. Teaching and Learning Methods

5.1 Lectures (definitions, examples ,video material)

5.2: Electronic Learning including:

- Online Lectures on zoom meeting
- Uploading lectures on Google class Room
- WhatsApp group to facilitate communication between teaching staff and candidates , follow up, student inquiries, set dates for online lectures.

Teaching methods versus Course ILOs

Teaching/ Learning Methods		Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
Direct	Lectures	a1-a5	b1-b6		
Interactive	Presentations Discussion Reports	a1-a5	b1-b6	c1-c2	d1-d2
Self-Learning	Assignments flipped classroom	a1-a5	b1-b6		d1-d2
E-learning	Synchronous Asynchronous	a1-a5	b1-b6		

6. Student Assessment Methods

Prerequisites for Exam entry

- Log book
- In – class and tutorial participation, calculations on board and theoretical concepts
- Seminars: the candidate should prepare & present at least one seminar in a topic related to the course & determined by the supervisors in front of the department staff.
- Practical quizzes (not graded formative assessment) throughout the course.

I- Assessment tools:

a. Written final Examination (to assess knowledge & intellectual skills)
b. Oral final examination (to assess knowledge, intellectual skill &transferable skills)

Assessment methods versus Course ILOs

Assessment Method	Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
1- Written Examinations: - Essay questions - Objective questions - Problem solving - MCQ	a1-a5	b1-b6		
2- Oral Exams Using VIVA cards	a1-a5	b1-b6		d1-d2
3- Logbook assessment	a1-a5	b1-b6	c1-c2	d1-d2

II- **Marks**: 50 mark: 1written paper 2hour 30mark+20 oral

7. List of References

7.1 Course Notes: Lecture notes prepared by the staff members in the department

7.2 Essential books (textbooks):

- Understanding Bioinformatics.
- Bioinformatics and Functional Genomics, second Edition.

- Essential Bioinformatics (Jin Xiong) 1st edition.

7.3 Recommended books:

- Exploring Bioinformatics

7.4 Periodicals, Web sites, … etc**:**

- Egyptian J. Biochemistry and Molecular Biology
- Gene.

8. Facilities Required for Teaching and Learning

Candidates & their learning are supported in a number of ways:

- Lecture rooms: available in the NLI
- Computer Lab: available in the NLI's Library with a wide range of software.
- Induction course introducing study skills
- Candidates logbook
- Program Specification & Handbooks
- Extensive library & other learning resources
- Internet with a wide range of learning support material

Course Coordinator: Prof. Ashraf El-Fert

Head of Department: Prof. Dr. Hala El-Said

Course 7: Chemical Immunology

University: Menoufia

Faculty: National Liver Institute

Course specification

- **Program(s) on which the course is given:** MD Degree in Clinical Biochemistry and Molecular Diagnostics.
- **Major or minor element of programs:** N/A.
- **Department offering the program:** Clinical Biochemistry and Molecular Diagnostics Department
- **Department offering the course:** Clinical Microbiology and Immunology
- **Academic year / Level:** Elective
- **Date of specification updates approval**: **September 2022**

A- Basic Information

Title: Immunology.

Code:CLINBIO904

Credit Hours: 2 hours/week. **Lecture:** 1hour/week.

Practical:1hour/week

Total teaching hours:45hours.

B- Professional Information:

1. Overall aims of the course

- Provide graduates with fundamentals of immunology, including pathogenicity processes at the cellular and molecular level.

2. Intended learning Outcomes (ILOs)

2.a Knowledge and understanding skills:

By the end of this course, the student must have sufficient knowledge & understanding of the scientific basis of immunology, development of an immune response.

a.1 Describe the role of the immune system and interferon in viral infections and the uses of antiviral drugs and vaccines.

a.2 Recognize the various chemical and cellular factors of immunology.

a.3 Define the steps involved in the innate immune testing and immune therapy, immune response, inflammation and complement activation.

a.4 Classify antigens and antibodies involved in the development of immune response and identify their roles.

a.5 Describe the various interactions involved in the development of an immune response.

a.6 Describe the types of hypersensitivity and autoimmunity disorders.

a.7 Identify the immunology of bacterial, viral and fungal diseases.

a.8Define the principles of different immunological assays and techniques and their use for diagnostic purposes.

a.9 Identify the basic concepts of clinical immunology.

a.10 Describe the various types of immune therapies such as (but not restricted to) immunization, desensitization, immune suppression, and immune modulation.

2.b Intellectual skills:

By the end of this course, the student must be able to:

b.1 Interpret important mechanisms of microbial pathogenesis, basic concepts of molecular immunology, immunity to infection and outcomes of infections.

2.c Professional and practical skills:

By the end of this course, the student must be able to:

c.1 Use immunological and molecular methods that help in the detection and identification of microorganisms and their virulence factors.

c.2 Interpret commonly used immunological techniques such as ELISA and immune diffusion.

c.3 Employ some basic molecular methods such as nucleic acid extraction, PCR amplification and transformation.

c.4 Identify some equipment used in molecular and serological diagnosis (ELISA processor, immune fluorescent microscope and thermal cycler).

c.5 Apply laboratory methods to detect the cellular immunity status.

2.d General and transferrable skills:

By the end of this course, the student must be able to:

d.1 Communicate effectively through oral presentations, computer processing and presentations, and written reports.

d.2 Interpret and evaluate information from a variety of sources.

d.3 Transfer techniques and solutions from one discipline to another.

d.4 Manage resources and time.

d.5 Work independently and effectively with critical inquiry for the purpose of continuing professional development.

d.6 Identify different scientific methodologies and have critical reading abilities

3. Contents

W	Topic	No. of credit hours	Lecture	Tutorial/ Practical	Total teaching hours
1st	- Structure and development of immune system and innate immunity	2	1	2	3
2nd	- Cells of the immune response	2	1	2	3
3rd	- The immune cell receptor	2	1	2	3
4th	- Immunoglobulin structure, function and genetics	2	1	2	3
5th	- Humoral immunity	2	1	2	3
6th	- Cell-mediated immunity	2	1	2	3
7th	- Cytokines	2	1	2	3
8th	- Complement system	2	1	2	3
9th	- Transplantation immunology	2	1	2	3
10th	- Cancer immunology	2	1	2	3
11th	- Hypersensitivity reactions	2	1	2	3
12th	- Autoimmunity	2	1	2	3
13th	- Autoimmunity	2	1	2	3
14th	- Protective immunity and vaccination	2	1	2	3
15th	- Protective immunity and vaccination	2	1	2	3
	Total	30	15	30	45

4. Course Matrix Contents

	Main Topics / Chapters	Duration (Weeks)	Course ILOs Covered by Topic (By ILOs Code)			
			K &U	I.S.	P.S.	G.S.
1-	- Structure and development of immune system and innate immunity	1	a.1	b.1		d.1/ d2
2-	- Cells of the immune response	1	a.3/a.2	b.1		d.1/d. 2
3-	- The immune cell receptor	1	a.3/a.2	b.1		d.1/d. 2
4-	- Immunoglobulin structure, function and genetics	1	a.4	b.1		d.1/d. 2
5-	- Humoral immunity	1	a.6/a7			d3/d4
6-	- Cell-mediated immunity	1	a.6	b.1		d3/d4
7-	- Cytokines	1	a.6/a7			d3/d4
8-	- Complement system	1	a.6	b.1		d3/d4
9-	- Transplantation immunology	1	a.6	b.1	c.1/c2/c3	
10-	- Cancer immunology	1	a.6	b.1	c.1/c2/c3	d.1
11-	- Hypersensitivity reactions	1	a.5/a.6	b.1	c.2	d.2
12-	- Autoimmunity	1	a.6/a8	b.1	c.4	
13-	- Protective immunity and vaccination	1	a.9/a.10	b.1	c.5	d.5/d6

5. Teaching and Learning Methods

5.1 Lectures.

5.2 Seminars.

5.3 Conferences.

5.4 Tutorial /practical sessions.

5.5 Workshops.

5.6 Electronic Learning including:

- Online Lectures on zoom meeting
- Uploading lectures on Google class Room
- WhatsApp group to facilitate communication between teaching staff and candidates , follow up, student inquiries, set dates for online lectures.

Teaching methods versus Course ILOs

Teaching/ Learning Methods		Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
Direct	Lectures	a1-a10	b1		
Interactive	Presentations Discussion Reports	a1-a10	b1	c1-c5	d1-d6
Self-Learning	Assignments flipped classroom	a1-a10	b1		d1-d6
E-learning	Synchronous Asynchronous	a1-a10	b1		

6. Student Assessment Methods

Prerequisites for Exam entry

- Log book
- In – class and tutorial participation, calculations on board and theoretical concepts
- Seminars: the candidate should prepare & present at least one seminar in a topic related to the course & determined by the supervisors in front of the department staff.
- Practical quizzes (not graded formative assessment) throughout the course.

6.1 Written final Examination (to assess knowledge & intellectual skills)

6.2 Oral final examination (to assess knowledge, intellectual skills &transferable skills).

Assessment methods versus Course ILOs

Assessment Method	Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
1- Written Examinations: - Essay questions - Objective questions - Problem solving - MCQ	a1-a10	b1		
2- Oral Exams Using VIVA cards	a1-10	b1		d1-d6
3- Logbook assessment	a1-a10	b1	c1-c5	d1-d6

Weighting of Assessments

- Final-term Examination 30 marks
- Oral final Examination 20 marks
- Total 50 marks

7. List of References

7.1 Course Notes: Books authorized by department.

7.2 Essential books (text books):

- Review of Medical Microbiology (Jawetz, Melnick & Adelberg) 27thEdition**.**

7.3 Recommended books:

- (Diagnostic Microbiology (Bailey & Scott's)14th Edition
- Cellular and Molecular Immunology By Abul K. Abbas, Andrew H. H. Lichtman, Shiv Pillai 8th Edition
- Medical Microbiology & Immunology, by Levinson and Jawetz (Appleton and Lange).
- Lippincott's Illustrated Reviews: Microbiology Third Edition.

8. Facilities Required for Teaching and Learning

Candidates & their learning are supported in a number of ways:

- Lecture rooms: available in the NLI
- Computer Lab: available in the NLI's Library with a wide range of software.
- Induction course introducing study skills

- Candidates logbook
- Program Specification & Handbooks
- Extensive library & other learning resources
- Internet with a wide range of learning support material

Course Coordinator: Prof .Dr Enas Ghoneim

Head of Department: Prof .Dr . Enas Ghoneim

Course 8: Toxicology

Menoufia University

National liver institute

Clinical Biochemistry and Molecular Diagnostics Department

Course specifications

Program(s) on which the course is given: Clinical Biochemistry and Molecular Diagnostics MD. Programs (Elective)

Major or minor element of programs:

Department offering the program: Clinical Biochemistry and Molecular Diagnostics Department

Department offering the course: Forensic Medicine and Toxicology Department.

Academic year / Level: MD. Clinical Biochemistry and Molecular Diagnostics (Elective)

Date of specification updates approval: November, 2023

A- Basic Information

Title: Toxicology

Code: CLINBIO905

Credit Hours: 2 hours/week **Lecture:** 1 hours/week

Tutorial/Practical:1 hours/week

Total teaching hours: 45 hours/week

B- Professional Information:

1. **Overall aims of the course**
2. To Demonstrate general knowledge of the harmful actions of the different types of chemical substances on the human body and how it can be used in the medico legal field.
3. To demonstrate knowledge of medical ethics.
4. To demonstrate knowledge of types, actions, clinical features, circumstances, diagnosis, detection, and management of poisoning which operate on the human body.

2. Intended learning outcomes of course (ILOs)

2.a Knowledge and understanding:

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

a.1 Describe principles of toxicology of different types of poisonous substances and drugs which operate on human body including classification, mechanism of action, clinical features of toxicity, circumstances, diagnosis and clinical management.

a.2 Recognize the clinical features, diagnosis and general management of dependence producing substances and drugs

2.b Intellectual skills:

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

b.1 Interpret the features of different types of poisonous plant for proper diagnosis and management

b.2 Diagnose different cases of poisonings and intoxications.

b.3 Interpret features of a case study of poisoning to solve the problem

b.4 Establish strategy for management of the intoxicated patients.

2.c Professional and practical skills:

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

c.1 Write standard medical report about a case of poisoning through interpretation of history, clinical examination and laboratory test findings of poisoned patients in admission units of different hospitals.

c.2 Perform some chemical tests on labs and to identify some poisons.

c.3 Perform some screening tests on labs to identify some drugs of abuse (such as cannabis, marijuana, opium, barbiturate, amphetamine etc.) by Triage kits, and immunoassay test on blood and urine samples.

c.4 Identify on the labs seeds, capsules and roots of poisonous plants

2.d General and transferrable skills:

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

d.1 Manipulate computer programs, do web search, to write an essay about community or worldwide problems or a subject in clinical toxicology, with trial of solving.

d.2 Communicate with each other and interact effectively and ethically with patients presenting with symptoms and signs of poisoning in admission units of hospitals then write a report about the case or discuss with staff members.

d.3 Work together to perform some laboratory tests about detection of some poisons and perform some screening tests on labs to identify some drugs of abuse in blood and urine

3. Contents:

Week	Topic	No. of credit hours	Lecture	Tutorial/ Practical	Total teaching hours
1st	- Clinical Toxicology	2	1	2	3
2nd	- General toxicology	2	1	2	3
3rd	- Corrosive poisons	2	1	2	3
4th	- Heavy Metals poisons	2	1	2	3
5th	- Plant alkaloids poisons	2	1	2	3
6th	- CNS depressants	2	1	2	3
7th	- Gaseous poisons	2	1	2	3
8th	- Volatile poison	2	1	2	3
9th	- Pesticides poisoning	2	1	2	3
10th	- Drug dependence	2	1	2	3
11th	- Drug dependence	2	1	2	3
12th	- Animal poisons	2	1	2	3
13th	- Food poisoning	2	1	2	3
14th	- Antihistaminic poisoning	2	1	2	3
15th	- Revision	2	1	2	3
	Total	30	15	30	45

4. Course Matrix Contents

	Main Topics / Chapters	Course ILOs Covered by Topic (By ILOS Code)			
		K &U	I.S.	P.S.	G.S.
1-	Clinical Toxicology	a.1	b.2/ b.3/ b.4	c.1/ c.2	d.1/ d.2/ d.3
2-	General toxicology	a.1	b.2/ b.3/ b.4	c.1/ c.2	d.1/ d.2/ d.3
3-	Corrosive poisons	a.1	b.2/ b.3/ b.4	c.1/ c.2	d.1/ d.2/ d.3
4-	Heavy Metals poisons	a.1	b.2/ b.3/ b.4	c.1/ c.2	d.1/ d.2/ d.3
5-	Plant alkaloids poisons	a.1	b.1/ b.3/ b.4	c.1/ c.2/ c.4	d.1/ d.2/ d.3
6-	CNS depressants	a.1	b.2/ b.3/ b.4	c.1/ c.2	d.1/ d.2/ d.3
7-	Gaseous poisons	a.1	b.2/ b.3/ b.4	c.1/ c.2	d.1/ d.2/ d.3
8-	Volatile poison	a.1	b.2/ b.3/ b.4	c.1/ c.2	d.1/ d.2/ d.3
9-	Pesticides poisoning	a.1	b.2/ b.3/ b.4	c.1/ c.2	d.1/ d.2/ d.3
10-	Drug dependence	a.2	b.2/ b.3/ b.4	c.1/ c.2/ c.3	d.1/ d.2/ d.3
11-	Animal poisons	a.1	b.2/ b.3/ b.4	c.1/ c.2	d.1/ d.2/ d.3
12-	Food poisoning	a.1	b.2/ b.3/ b.4	c.1/ c.2	d.1/ d.2/ d.3
13-	Antihistaminic poisoning	a.1	b.2/ b.3/ b.4	c.1/ c.2	d.1/ d.2/ d.3

5. Teaching and Learning Methods

5.1 Lectures.

5.2 Seminars.

5.3 Conferences.

5.4 Tutorial /practical sessions.

5.5 Workshops.

5.6: Electronic Learning including:

- Online Lectures on zoom meeting
- Uploading lectures on Google class Room
- WhatsApp group to facilitate communication between teaching staff and candidates , follow up, student inquiries, set dates for online lectures.

Teaching methods versus Course ILOs

Teaching/ Learning Methods		Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
Direct	Lectures	a1-a2	b1-b4		
Interactive	Presentations Discussion Reports	a1-a2	b1-b4	c1-c4	d1-d3
Self-Learning	Assignments flipped classroom	a1-a2	b1-b4		d1-d3
E-learning	Synchronous Asynchronous	a1-a2	b1-b4		

6. Student Assessment Methods

Prerequisites for Exam entry

- Log book
- In – class and tutorial participation, calculations on board and theoretical concepts
- Seminars: the candidate should prepare & present at least one seminar in a topic related to the course & determined by the supervisors in front of the department staff.
- Practical quizzes (not graded formative assessment) throughout the course.

Written final Examination (to assess knowledge & intellectual skills)

Oral final examination (to assess knowledge, intellectual skills &transferable skills).

Assessment methods versus Course ILOs

Assessment Method	Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
1- Written Examinations: - Essay questions - Objective questions - Problem solving - MCQ	a1-a2	b1-b4		
2- Oral Exams Using VIVA cards	a1-a2	b1-b4		d1-d3
3- Logbook assessment	a1-a2	b1-b4	c1-c4	d1-d3

Weighting of Assessments

- Final-term Examination 30 marks
- Oral final Examination 20 marks
- Total 50 marks

7. List of References

7.1 Course Notes: Books authorized by department.

7.2 Essential books (text books):

- Principles of Toxicology: Karen E Stine

7.3 Recommended books:

7.4 Medical toxicology: Richard C Dart

7.5 Emergency Toxicology: Peter Viccellio.

7.6 Periodicals, Web sites,etc:

- http://www.medscape.com.
- http://www.pubmed.com.
- http://sciencedirect.com.

8. Facilities Required for Teaching and Learning

Candidates & their learning are supported in a number of ways:

- Lecture rooms: available in the NLI
- Computer Lab: available in the NLI's Library with a wide range of software.
- Induction course introducing study skills
- Candidates logbook
- Program Specification & Handbooks
- Extensive library & other learning resources
- Internet with a wide range of learning support material

Course Coordinator: Prof .Dr Azza Wageeh Zanaty

Head of Department: Prof .Dr Prof. Azza Wageeh Zanaty

Second part (Compulsory Courses)

Course 9: Molecular Biology.

Course specifications

- **Program(s) on which the course is given:** Clinical Biochemistry and Molecular Diagnostics MD. programs (second part)
- **Major or minor element of programs:**
- **Department offering the program :**Clinical Biochemistry and Molecular Diagnostics Department
- **Department offering the course:** Clinical Biochemistry and Molecular Diagnostics Department
- **Academic year / Level:** MD. Clinical Biochemistry and Molecular Diagnostics (second part)

Date of specification updates approval: September 2022

A- Basic Information

- **Course Title:** Molecular biology.
- **Course code:** CLINBIO901C
- **Specialty:** Clinical Biochemistry and Molecular Diagnostics
- **Credit Hours:** 4 hours/week **Lecture: 3** hours/week
- **Practical:** 0.5hour/week **Tutorial:** 0.5hour/week
- **Total teaching hours: (75hrs) 45**theoretical hours
- 30 practical and tutorial hours
- **Department(s) delivering the course:** Clinical biochemistry and molecular diagnostics
- **Coordinator (s)**: Prof Dr: Ashraf El- Fert
- **Requirements (pre-requisites) if any:** MSc.. In Clinical Biochemistry and Molecular diagnostics.

B- Professional Information

1. Overall aims of course

1- To enable the students to be oriented with concepts of molecular biology and how this field gave us a new perspective and new technology used in the diagnosis, treatment and new drugs design.

2- To enable the students to understand the biochemical basis of some diseases with special emphasis on the liver diseases giving applied examples.
3- To give students experience in biochemical methodology in order to be aware with the clinical biochemistry techniques as diagnostic tools and to be able to interpret the results for appropriate diagnosis.

2. Intended learning outcomes of course (ILOs)

2.a Knowledge and understanding:

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

a.1 Describe DNA structure, organization, replication, mutation and repair .
a.2 Identify RNA structure, types, transcription and protein biosynthesis.
a.3 Point-out recombinant DNA techniques used in diagnosis and therapy.
a.4 Recognize the role of Proto-oncogenes and oncogenes and tumor suppressor genes in carcinogenesis.

2.b Intellectual skills:

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

b.1 Interpret symptoms, signs and molecular laboratory findings of various diseases whether related or not to the liver.
b.2 Point-out the application of molecular biology in basic and clinical sciences.

2.c Professional and practical skills:

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

c.1 Request different molecular tests according to the condition of the patient.
c.2 Recognize the principle of some molecular biology techniques like, quantitative and qualitative PCR, western blot and sequencing.

2.d General and transferable skills

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

d.1 Work effectively in a group and preparation of seminars.
d.2 Demonstrates respect for the role of staff and co-staff members regardless of degree or occupation.

3. Contents

W	Topic	No. Of credit hours	Lecture	No. of Lecture hours	Tutorial/ Practical	Total teaching hours
1st	Nucleic acids biochemistry	4	a. overview of Nucleic acids biochemistry. Informational macromolecules, purine catabolism, hyperurecemia, gout	3	2	5
2th	Nucleic acids biochemistry	4	b. DNA (structure, organization, replication, types of damage)	3	2	5
3th	Nucleic acids biochemistry	4	c. Genetic code, different types of mutations and their clinical effect	3	2	5
4th	Nucleic acids biochemistry	4	d. Genetic code, different types of mutations and their clinical effect	3	2	5
5th	Nucleic acids biochemistry	4	e. Different types of RNA,, RNA processing	3	2	5
6th	Nucleic acids biochemistry	4	f. Different types of RNA,, RNA processing	3	2	5
7th	Nucleic acids biochemistry	4	g. Regulation of gene expression	3	2	5
8th	Nucleic acids biochemistry	4	h. Regulation of gene expression	3	2	5
9th	Nucleic acids biochemistry	4	i. Biochemical basis of Cancer	3	2	5
10th	Nucleic acids biochemistry	4	j. Biochemical basis of Cancer	3	2	5
11th	Nucleic acids biochemistry	4	k. Biochemical basis of Cancer	3	2	5
12th	Nucleic acids biochemistry	4	l. Applied DNA technology, (Qualitative and quantitative PCR, Sequencing and cloning	3	2	5
13th	Nucleic acids biochemistry	4	m. Applied DNA technology, (Qualitative and quantitative PCR, Sequencing and cloning	3	2	5
14th	Revision	4	Nucleic acids biochemistry	3	2	5
15th	Revision	4	Nucleic acids biochemistry	3	2	5
	Total	**60**		**45**	**30**	**75**

4. Course Matrix Contents

Main Topics / Chapters	Course ILOs Covered by Topic (By ILOS Code)			
	K &U	I.S.	P.S.	G.S.
1. Overview of Nucleic acids biochemistry. Informational macromolecules, purine catabolism, hyperurecemia, gout	a.1/ a.2	b.1 / b.2	c.1	d.1/d.2
2. DNA (structure, organization, replication, types of damage)	a.1	b.1	c.1	d.1/d.2
3. Genetic code, different types of mutations and their clinical effect.	a.1	b.1 / b.2	c.1	d.1/d.2
4. Different types of RNA,, RNA processing	a.2	b.2	c.1	d.1/d.2
5. Regulation of gene expression.	a.1	b.2	c.1	d.1/d.2
6. Biochemical basis of Cancer.	a.4	b.1 / b.2	c.1 / c.2	d.1/d.2
7. Applied DNA technology, (Qualitative and quantitative PCR, Sequencing and cloning	a.3	b.1 / b.2	c.1 / c.2	d.1/d.2

5. Teaching and Learning Methods

5.1 Lectures (definitions, examples ,video material)

5.2 Tutorials (students solving problems and engaging in discussion)

5.3 Assignments (work in groups and trying to put options for solving advanced problems)

5.4 Projects (work in groups on extensive projects involving making research using its tools)

5.5: Electronic Learning including:

- Online Lectures on zoom meeting
- Uploading lectures on Google class Room
- WhatsApp group to facilitate communication between teaching staff and candidates , follow up, student inquiries, set dates for online lectures.

Teaching methods versus Course ILOs

Teaching/ Learning Methods		Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
Direct	Lectures	a1-a4	b1-b2		
	Practical	a1-a4		c1-c2	d1-d2
Interactive	Presentations Discussion Reports	a1-a4	b1-b2		d1-d2
Self-Learning	Assignments flipped classroom	a1-a4	b1-b2		d1-d2
E-learning	Synchronous Asynchronous	a1-a4	b1-b2		

6. Student Assessment Methods

Prerequisites for Exam entry

- Log book
- In – class and tutorial participation, calculations on board and theoretical concepts
- Seminars: the candidate should prepare & present at least one seminar in a topic related to the course & determined by the supervisors in front of the department staff.
- Practical quizzes (not graded formative assessment) throughout the course.

I- assessment tools:

6.1 Written final Examination (to assess knowledge & intellectual skills)

6.2 Oral final examination (to assess knowledge, intellectual skill & transferable skills)

6.3 Practical Examination to assess the lab skills

Assessment methods versus Course ILOs

Assessment Method	Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
1- Written Examinations: - Essay questions - Objective questions - Problem solving - MCQ	a1-a4	b1-b2		
2- Practical Examinations OSPE	a1-a4		c1-c2	d1-d2
3- Oral Exams Using VIVA cards	a1-a4	b1-b2		d1-d2
4- Logbook assessment	a1-a4	b1-b2	c1-c2	d1-d2

II- **marks**: 100 mark: 2written paper 70mark+15 practical+15 oral

7. List of References

7.1 Course Notes: Lecture notes prepared by the staff members in the department

7.2 Essential Books (Text Books):

- Text book of Biochemistry with Clinical Correlations.
- Harper's Illustrated Biochemistry (32nd edition).
- Lecture Notes on Clinical Biochemistry: Whitby LG, Smith AF, Beckett GJ, Walker SW, Blackwell Scientific Publications.
- MN Chaterra (8th edition).
- 5.Clinical Biochemistry (7th edition)
- 6.Principles of Biochemistry (8th edition).

7.3 Recommended Books

Lippincott's Reviews of Biochemistry (7th edition)

7.4 Periodicals, Web sites, … etc

- Gene.
- American Journal of Pathology Cellular and Molecular Biology of Diseases
- Egyptian J. Biochemistry and Molecular Biology.

8. Facilities Required for Teaching and Learning

Candidates & their learning are supported in a number of ways:

- Lecture rooms: available in the NLI
- Computer Lab: available in the NLI's Library with a wide range of software.
- Induction course introducing study skills
- Candidates logbook
- Program Specification & Handbooks
- Extensive library & other learning resources
- Internet with a wide range of learning support material

Course Coordinator: Prof. Dr. Ashraf El-Fert

Head of Department: Prof. Dr. Hala El-Said

Course 10: Inborn errors of metabolism and blood chemistry

Course specifications

- **Program(s) on which the course is given:** Clinical Biochemistry and Molecular Diagnostics MD. programs (second part)
- **Major or minor element of programs:**
- **Department offering the program:** Clinical Biochemistry and Molecular Diagnostics **Department offering the course:** Clinical Biochemistry and Molecular Diagnostics Department
- **Academic year / Level:** MD. Clinical Biochemistry and Molecular Diagnostics (second part)
- **Date of specification updates approval: November, 2023**

A- Basic Information

- **Course Title:** Inborn errors of metabolism and blood chemistry.
- **Course code:** CLINBIO901D
- **Specialty:** Clinical biochemistry and molecular diagnostics
- **Credit Hours:** 4 hours **Lecture: 3** hours/week
- **Practical:** 0.5hour/week **Tutorial:** 0.5hour/week
- **Total teaching hours: (75 hrs); 45**theoretical hours
- 30 practical/Tutorial hours Clinical Biochemistry and Molecular Diagnostics
- **Department(s) delivering the course:** Clinical biochemistry and molecular diagnostics
- **Coordinator (s)**: Prof Dr: Hala EL Said.
- **Requirements (pre-requisites) if any:**

B- Professional Information

1. Overall aims of course

1. To help students to become familiar with the biochemical knowledge that will assist them in understanding biochemical alteration in health and disease by knowing the metabolic processes occurring in the human body that can explain the biochemical basis of disease.
2. To enable the students to be oriented with biochemical importance of vitamins as well as the functions of some key enzymes.

3. To enable the students to understand the biochemical basis of some diseases with special emphasis on the liver diseases giving applied examples.
4. To give students experience in biochemical methodology in order to be aware with the clinical biochemistry techniques as diagnostic tools and to be able to interpret the results for appropriate diagnosis.
5. To make students familiar with structure, functions and mode of action of hormones in health and disease.
6. To enable the students to point-out different mechanisms, which the body uses to get rid of various types of foreign chemical as drugs, food additives and pollutants.

2. Intended learning outcomes of course (ILOs)

2.a Knowledge and understanding:

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

a.1Define functions of carbohydrates and factors affecting blood glucose level, and their clinical importance with special stress on some related diseases .

a.2Identify the types, structure and functions of lipids and their clinical importance with special stress on some related diseases. Ketone bodies and factors affecting their blood level.

a.3Describe different amino acids classification, function and their clinical importance with special stress on some related diseases, amino acids degradation, fate of ammonia.

a.4Identify the structure and functions of hormones, their mode of action and the metabolic disorders related to these hormones.

a.5Recognizethe functions and sources of vitamins and their deficiency manifestations as well as the effects of excessive intake.

a.6 Identify the importance of minerals to the body and factors affecting them.

a.7Define the expressions of osmotic pressure, pH, buffers, acidosis and alkalosis.

a.8 Define nature of enzymes, isoenzymes, and their role in the diagnosis of diseases.

a.9Point-out different mechanisms which the body uses to get rid of various types of foreign chemical as drugs, food additives and pollutants..

a.10 Identify role and importance of tumor markers in the diagnosis of cancer, some plasma proteins, liver and kidney function tests..

a.11- Impact of certain diseases on the process of cell apoptosis.

a.12 Identify bilirubin: metabolism, types, hyperbilirubinaemia.

2.b Intellectual skills:

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

b.1 Interpret symptoms, signs and biochemical laboratory findings of various diseases whether related or not to the liver.

b.2Point out the clinical significance of some enzymes in clinical applications.

2.c Professional and practical skills:

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

c.1 Request different biochemical tests according to the condition of the patient.

c.2 Define the principle of some biochemical diagnostic tests.

2.d General and transferable skills

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

d.1 Work effectively in a group and preparation of seminars.

d.2 demonstrates respect for the role of staff and co-staff members regardless of degree or occupation.

3. Contents

W	Topic	No. Of credit hours	Lecture	No. of Lecture hours	Tutorial/ Practical	Total teaching hours
1st	Applied Carbohydrates biochemistry	4	Metabolic disorders and their clinical implications (inborn errors of metabolism).	3	2	5
2nd	Applied Lipid biochemistry	4	a. Metabolic disorders and their clinical implications (inborn errors of metabolism). b. fatty liver and Metabolic syndrome	3	2	5
3rd	Applied Amino acids biochemistry	4	Metabolic disorders and their clinical implications (inborn errors of metabolism).	3	2	5
4th	Hormones	4	- Clinical applications - Hypothalamic hormones - Pituitary Hormones - Thyroid hormones and function tests	3	2	5
5th	Hormones	4	- Clinical applications - Pancreatic hormones - Adrenal cortex and medulla	3	2	5
6th	Vitamins	4	clinical Importance	3	2	5
7th	Blood Biochemistry	4	- Diagnosis of Acid base balance impairments	3	2	5
8th	Blood Biochemistry	4	- Diagnosis of Water and electrolytes balance impairment	3	2	5
9th	Kidney and liver Function tests	4	- Kidney function tests (excretory – reabsorptive – regulatory – endocrine - Liver Function tests	3	2	5
10th	Minerals	4	- Importance and clinical applications of Macro and micro minerals	3	2	5
11th	Blood Biochemistry	4	- hemoglobinopathies	3	2	5
12th	Enzymes	4	- Clinical applications of enzymes and isoenzymes	3	2	5
13th	Biologic Markers	4	- Importance of Different biologic markers and their applications	3	2	5
14th	Biologic Markers	4	- Importance of Different biologic markers and their applications	3	2	5
15th	Revision	4	Kidney and liver Function tests- Blood Biochemistry	3	2	5
	Total	**60**		**45**	**30**	**75**

4. Course Matrix Contents

Main Topics / Chapters	Course ILOs Covered by Topic (By ILOs Code)			
	K &U	I.S.	P.S.	G.S.
1- Metabolic disorders and their clinical implications(inborn errors of metabolism) of Carbohydrates biochemistry.	a.1	b.1 / b.2	c.1 / c.2	d.1/d.2
2- Metabolic disorders and their clinical implications(inborn errors of metabolism)oflipid biochemistry, fatty liver and Metabolic syndrome	a.2	b.1 / b.2	c.1 / c.2	d.1/d.2
3- Metabolic disorders and their clinical implications(inborn errors of metabolism)ofAmino acids biochemistry	a.3	b.1 / b.2	c.1 / c.2	d.1/d.2
4. Clinical applications a. Hypothalamic hormones b. Pituitary Hormones - Thyroid hormones and function tests	a.4	b.1	c.1 / P.2	d.1/d.2
5. Clinical applications c. Pancreatic hormones d. Adrenal cortex and medulla	a.4	b.1	c.1 / c.2	d.1/d.2
6. Clinical Importance of vitamins	a.5	b.1	c.1	d.1/d.2
7.Diagnosis of Acid base balance impairments	a.7	b.1	c.2	d.1/d.2
8. Diagnosis of Water and electrolytes balance, impairments	a.6/ a.10	b.1 / b.2	c.1 / c.2	d.1/d.2
9. Kidney function tests (excretory – reabsorptive – regulatory – endocrine Liver Function tests	a.10/ a.12	b.1	c.1/c.2	d.1/d.2
10. Importance and clinical applications of Macro and micro minerals	a.6/	b.1 / b.2	c.1 / c.2	d.1/d.2
11. Classification of Enzymes, mode of action and Isoenzymes Pancreatic enzymes Cardiac biomarkers	a.8	b.1 / b.2	c.1 / c.2	d.1/ d.2
12. Biologic markers , hemoglobinopathies	a.9/ a.10/ a.11	b.1 / b.2	c.1 / c.2	d.1/ d.2

5. Teaching and Learning Methods

5.1 Lectures (definitions, examples ,video material)

5.2 Tutorials (students solving problems and engaging in discussion)

5.3 Assignments (work in groups and trying to put options for solving advanced problems)

5.4 Projects (work in groups on extensive projects involving making research using its tools).

5.5 Electronic Learning including:

- Online Lectures on zoom meeting
- Uploading lectures on Google class Room
- WhatsApp group to facilitate communication between teaching staff and candidates , follow up, student inquiries, set dates for online lectures.

Teaching methods versus Course ILOs

Teaching/ Learning Methods		Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
Direct	Lectures	a1-a12	b1-b2		
	Practical	a1-a12		c1-c2	d1-d2
Interactive	Presentations Discussion Reports	a1-a12	b1-b2		d1-d2
Self-Learning	Assignments flipped classroom	a1-a12	b1-b2		d1-d2
E-learning	Synchronous Asynchronous	a1-a12	b1-b2		

6. Student Assessment Methods

Prerequisites for Exam entry

- Log book
- In – class and tutorial participation, calculations on board and theoretical concepts
- Seminars: the candidate should prepare & present at least one seminar in a topic related to the course & determined by the supervisors in front of the department staff.
- Practical quizzes (not graded formative assessment) throughout the course.

I-assessment tools:

6.1 Written final Examination (to assess knowledge & intellectual skills)

6.2 Oral final examination (to assess knowledge, intellectual skill &transferable skills)

6.3 Log book

6.4 In – class and tutorial participation, calculations on board and theoretical concepts

6.5 Seminars: the candidate should prepare & present at least one seminar in a topic related to the course & determined by the supervisors in front of the department staff (without marks).

Assessment methods versus Course ILOs

Assessment Method	Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
1- Written Examinations: - Essay questions - Objective questions - Problem solving - MCQ	a1-a12	b1-b2		
2- Practical Examinations OSPE	a1-a12		c1-c2	d1-d2
3- Oral Exams Using VIVA cards	a1-12	b1-b2		d1-d2
4- Logbook assessment	a1-a12	b1-b2	c1-c2	d1-d2

II– marks: 100 marks: 2written papers70mark+15 practical+15 oral

7. List of References

7.1 Course Notes: Lecture notes prepared by the staff members in the department

7.2 Essential Books (Text Books):

-Text book of Biochemistry with Clinical Correlations.

- Harper's Illustrated Biochemistry (32nd edition).

-Lecture Notes on Clinical Biochemistry: Whitby LG, Smith AF, Beckett GJ, Walker SW, Blackwell Scientific Publications.

- MN Chaterra (8th edition).

- Clinical Biochemistry (7th edition)

- Principles of Biochemistry (8th edition).

- Biomarkers in inborn errors of metabolism (clinical aspects and laboratory determination 1st edition).

7.3 Recommended Books

Lippincott's Reviews of Biochemistry (7th edition)

7.4 Periodicals, Web sites, …etc

-Metabolism (Clinical and Experimental) (Elsevier)

-Cell Physiology and Biochemistry.

- Egyptian J. Biochemistry and Molecular Biology.

8. Facilities Required for Teaching and Learning

Candidates & their learning are supported in a number of ways:

- Lecture rooms: available in the NLI
- Computer Lab: available in the NLI's Library with a wide range of software.
- Induction course introducing study skills
- Candidates logbook
- Program Specification & Handbooks
- Extensive library & other learning resources
- Internet with a wide range of learning support material

Course Coordinator: Prof. Dr. Hala El-Said

Head of Department: Prof. Dr. Hala El-Said

Course 11: Scientific and practical Biochemistry curriculum and its applications (First section)

Course specifications

- **Program(s) on which the course is given:** Clinical Biochemistry and Molecular Diagnostics MD. programs (second part)
- **Major or minor element of programs:**
- **Department offering the program :**Clinical Biochemistry and Molecular Diagnostics Department
- **Department offering the course:** Clinical Biochemistry and Molecular Diagnostics Department

  Academic year / Level: MD. Clinical Biochemistry and Molecular Diagnostics (second part)
- **Date of specification updates approval: November, 2023**

A- Basic Information

- Course Title: Scientific and practical Biochemistry curriculum and its applications (first section).

- Course code: CLINBIO901ETa

- Specialty: Clinical Biochemistry and Molecular Diagnostics

-Credit Hours: 4 hours **Lecture: 3**hours/week

-Practical: 1 hours/week

- Total teaching hours: (75hrs) 45theoretical hours30practical hours

- Department(s) delivering the course: Clinical Biochemistry and Molecular Diagnostics

- Coordinator (s): Prof Dr: Ashraf Ab El-Raouf.

- Requirements (pre-requisites) if any:

B- Professional Information

1. Overall aims of course

1. To help students to become familiar with the biochemical knowledge that will assist them in understanding biochemical alteration in health and disease by knowing the metabolic processes occurring in the human body that can explain the biochemical basis of disease.
2. To enable the students to be oriented with biochemical importance of vitamins as well as the functions of some key enzymes.

4. To enable the students to understand the biochemical basis of some diseases with special emphasis on the liver diseases giving applied examples.
5. To give students experience in biochemical methodology in order to be aware with the clinical biochemistry techniques as diagnostic tools and to be able to interpret the results for appropriate diagnosis.
6. To enable the students to point-out different mechanisms which the body uses to get rid of various types of foreign chemical as drugs, food additives and pollutants.

2. Intended learning outcomes of course (ILOs)

2.a Knowledge and understanding:

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

a.1 Identify factors affecting blood glucose level, and their clinical importance with special stress on some related diseases.

a.2 Define the diseases of carbohydrate, lipids and amino acids metabolism. with special stress on the biochemical bases of these diseases.

a.3 Recognize the functions and sources of vitamins and their deficiency manifestations as well as the effects of excessive intake.

a.4 Point-out different mechanisms which the body uses to get rid of various types of foreign chemical as drugs, food additives and pollutants.

a.5 Outline role and importance of tumor markers in the diagnosis of cancer, some plasma proteins, liver and kidney and other organs function tests.

a.6 Recognize hemoglobin metabolism and tissue specific metabolism..

a.7 Identify extracellular matrix and plasma proteins, glycoproteins.

a.8 Identify water metabolism, electrolyte balance, minerals and acid base balance.

2.b Intellectual skills

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

b.1 Interpret symptoms, signs and biochemical laboratory findings of various diseases whether related or not to the liver.

b.2 Point out the clinical significance of some enzymes in clinical applications.

2.c Professional and practical skills

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

c.1 Request different biochemical tests according to the condition of the patient.

c.2 Apply some biochemical diagnostic tests.

2.d General and transferable skills

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

d.1 Work effectively in a group and preparation of seminars.

d.2 Demonstrates respect for the role of staff and co-staff members regardless of degree or occupation.

3. Contents

W	Topic	No. Of credit hours	Lecture	No. of Lecture hours	Tutorial/ Practical	Total teaching hours
1st	Carbohydrates	4	a. The sugar code b. Glycoconjugats: glycoproteins, proteoglycans and glycosphingo lipids	3	2	5
2nd	Lipid	4	a. Lipids as signals, cofactors and pigments- b. Obesity and regulation of body mass c. Obesity and metabolic syndrome Fatty liver	3	2	5
3rd	Proteins	4	a. Metabolic fate of amino group b. Nitrogen excretion and urea cycle c. Amino acid degradation	3	2	5
4th	Proteins	4	d. Proteins of biomedical importance e. Importance of Non protein nitrogenous compound f. Methods of protein analysis	3	2	5
5th	Haemoglobin	4	a. Haemoglobin synthesis, types clinical correlation to diseases and catabolism (Jaundice)	3	2	5
6th	Metabolism	4	a. Intermediary metabolism	3	2	5
7th	Metabolism	4	b. Tissue specific metabolism : Liver, adipose tissue, muscles an brain	3	2	5
8th	Blood chemistry	4	a. Water, electrolytes, pH balance, vitamins impairments in chronic and acute diseases	3	2	5
9th	Blood chemistry	4	b. different Organs function tests c. Hepatorenal disorders	3	2	5
10th	Special topics	4	a. xenobiotics b. How structure dictates function	3	2	5

W	Topic	No. Of credit hours	Lecture	No. of Lecture hours	Tutorial/ Practical	Total teaching hours
11th	Special topics	4	c. apoptosis	3	2	5
12th	Special topics	4	d. glycoproteins	3	2	5
13th	Special topics	4	e. extracellular matrix	3	2	5
14th	Special topics	4	f. plasma proteins	3	2	5
15th	Special topics	4	g. Muscle	3	2	5
	Total	**60**		**45**	**30**	**75**

4. Course Matrix Contents

Main Topics / Chapters	Course ILOs Covered by Topic (By ILOs Code)			
	K &U	I.S.	P.S.	G.S.
1-Carbohydrates: a. The sugar code b.Glycoconjugats: glycoproteins, proteoglycans and glycosphingolipids	a.1/ a.2	b.1	c.1 / c.2	d.1/d.2
2- Lipid: a. Lipids as signals, cofactors and pigments- a. Obesity and regulation of body mass C. Obesity and metabolic syndrome Fatty liver	a.2	b.1	c.1 / c.2	d.1/d.2
3- Proteins: a. Metabolic fate of amino group b. Nitrogen excretion and urea cycle c. Amino acid degradation d. proteins of biomedical importance e. Methods of protein analysis	a.2	b.1 / b.2	c.1 / c.2	d.1/d.2
4-Haemoglobin synthesis ,types clinical correlation to diseases and catabolism (Jaundice)	a.6	b.1 / b.2	c.1 / c.2	d.1/d.2
5- Intermediary metabolism	a.2	b.1	c.1 / c.2	d.1/d.2
6- Tissue specific metabolism : Liver ,adipose tissue, muscles an brain	a.6	b.1	c.1	d.1/d.2
7- Water, electrolytes, pH balance, vitamins impairments in chronic and acute diseases	a.8	b.1	c.2	d.1/d.2
8-How structure dictates function	a.3	b.1	c.1 / c.2	d.1/d.2
9-Different Organs function tests	a.5	b.1 / b.2	c.1 / c.2	d.1/d.2
10- Xenobiotics	a.4	b.1 / b.2	c.2	d.1/d.2
11- apoptosis	a.6	b.1	c.2	d.1/ d.2
12- glycoproteins	a.7	b.1 / b.2	c.2	d.1/ d.2
13- extracellular matrix - plasma proteins - Muscle	a.7 a.5	b.1 / b.2	c.1 / c.2	d.1/d.2

5. Teaching and Learning Methods

5.1 Lectures (definitions, examples ,video material)

5.2 Tutorials (students solving problems and engaging in discussion)

5.3 Assignments (work in groups and trying to put options for solving advanced problems)

5.4 Projects (work in groups on extensive projects involving making research using its tools)

5.5 Electronic Learning including:

- Online Lectures on zoom meeting
- Uploading lectures on Google class Room
- WhatsApp group to facilitate communication between teaching staff and candidates , follow up, student inquiries, set dates for online lectures.

Teaching methods versus Course ILOs

Teaching/ Learning Methods		Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
Direct	Lectures	a1-a8	b1-b2		
	Practical	a1-a8		c1-c2	d1-d2
Interactive	Presentations Discussion Reports	a1-a8	b1-b2		d1-d2
Self-Learning	Assignments flipped classroom	a1-a8	b1-b2		d1-d2
E-learning	Synchronous Asynchronous	a1-a8	b1-b2		

6. Student Assessment Methods

Prerequisites for Exam entry

- Log book
- In – class and tutorial participation, calculations on board and theoretical concepts

- Seminars: the candidate should prepare & present at least one seminar in a topic related to the course & determined by the supervisors in front of the department staff.
- Practical quizzes (not graded formative assessment) throughout the course.

I-assessment tools

6.1 Written final Examination (to assess knowledge & intellectual skills)

6.2 Oral final examination (to assess knowledge, intellectual skill &transferable skills)

6.3 Practical examination to assess the lab skills

Assessment methods versus Course ILOs

Assessment Method	Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
1- Written Examinations: - Essay questions - Objective questions - Problem solving - MCQ	a1-a8	b1-b2		
2- Practical Examinations OSPE	a1-a8		c1-c2	d1-d2
3- Oral Exams Using VIVA cards	a1-8	b1-b2		d1-d2
4- Logbook assessment	a1-a8	b1-b2	c1-c2	d1-d2

II– marks: 100 marks: 2 written papers 70mark+15 practical+15 oral

7. List of References

7.1Course Notes: Lecture notes prepared by the staff members in the department

7.2 Essential books (textbooks)

- Text book of Biochemistry with Clinical Correlations.
- Harper's Illustrated Biochemistry (32nd edition).
-Lecture Notes on Clinical Biochemistry: Whitby LG, Smith AF, Beckett GJ, Walker SW, Blackwell Scientific Publications.

- MN Chaterra (8th edition).
- Clinical Biochemistry (7th edition)
- .Principles of Biochemistry (8th edition).
- Biomarkers in inborn errors of metabolism (clinical aspects and laboratory determination 1st edition).

7.3 Recommended books

Lippincott's Reviews of Biochemistry 7th edition

7.4 Periodicals, Web sites, …etc

- Metabolism (Clinical and Experimental) (Elsevier)
- Cell Physiology and Biochemistry.
- Egyptian J. Biochemistry and Molecular Biology.

8. Facilities Required for Teaching and Learning

Candidates & their learning are supported in a number of ways:

- Lecture rooms: available in the NLI
- Computer Lab: available in the NLI's Library with a wide range of software.
- Induction course introducing study skills
- Candidates logbook
- Program Specification & Handbooks
- Extensive library & other learning resources
- Internet with a wide range of learning support material

Course Coordinator: Prof. Dr. Ashraf Abd El Raouf

Head of Department: Prof. Dr. Hala El-Said

Course12: Scientific and practical Biochemistry curriculum and its applications (Second section)

Course specifications

- **Program(s) on which the course is given:** Clinical Biochemistry and Molecular Diagnostics MD. programs (second part)
- **Major or minor element of programs:**
- **Department offering the program :**Clinical Biochemistry and Molecular Diagnostics Department
- **Department offering the course:** Clinical Biochemistry and Molecular diagnostic Department
- **Academic year / Level:** MD. Clinical Biochemistry and Molecular Diagnostics (second part)
- **Date of specification updates approval: November, 2023**

A-Basic Information

- Course Title: Scientific and practical Biochemistry curriculum and its applications (second section)

- Course code: CLINBIO901ETb

- Specialty: Clinical biochemistry and molecular diagnostics

Credit Hours: 4 hours **Lecture:** 3hours/week

Practical: 1hours/week

Total teaching hours: (75) 45 theoretical hours 30practical hours

- Department(s) delivering the course: Clinical biochemistry and molecular diagnostics

- Coordinator (s): Prof Dr: Hala EL Said.

- Requirements (pre-requisites) if any:

B- Professional Information

1. Overall aims of course

1. To help students to become familiar with the biochemical knowledge that will assist them in understanding biochemical alteration in health and disease by knowing the metabolic processes occurring in the human body that can explain the biochemical basis of disease.
2. To enable the students to be oriented with biochemical importance of vitamins as well as the functions of some key enzymes.

4. To enable the students to be oriented with concepts of molecular biology and how this field gave us a new perspective and new technology used in the diagnosis, treatment and new drugs design.
5. To enable the students to understand the biochemical basis of some diseases with special emphasis on the liver diseases giving applied examples.
6. To give students experience in biochemical methodology in order to be aware with the clinical biochemistry techniques as diagnostic tools and to be able to interpret the results for appropriate diagnosis.
7. To make students familiar with structure, functions and mode of action of hormones in health and disease.

2. Intended learning outcomes of course (ILOs)

2.a Knowledge and understanding:

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

a.1Describe the structure and functions of hormones, their mode of action and the metabolic disorders related to these hormones.

a.2 Describe DNA structure, organization, replication, mutation and repair as well as RNA structure, types, transcription and protein biosynthesis and recombinant DNA techniques used in diagnosis and therapy. Understand the role of Proto-oncogenes and oncogenes and tumor suppressor genes in carcinogenesis.

a.3 Identify the Human genome project Gene mapping

a.4 Define nature of enzymes, isoenzymes, and their role in the diagnosis of diseases.

a.5Define nature of some Special Topics: (intra-extra-inter) cellular signaling, cell membrane and transport, Aging, cancer, gene therapy and stem cell.

a.6Identify Practical curriculum: How to read: chromatogram, Electrophoresis, Quality control and How to run a lab

a.7 Define Practical curriculum: Principles and biomedical application of; Colorimetric assays, Autoanalyzer, Chromatography (GC MS and HPLC-MS) and ICP.

a.8 Recognize Practical curriculum: Principles and biomedical application of; Molecular (DNA and RNA extraction- Conventional PCR -Real time PCR-

Sequencer), Electrophoresis types and applications (HB electrophoresis), RFLP and ELISA.

2.b Intellectual skills

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

b.1 Interpret symptoms, signs and biochemical laboratory findings of various diseases whether related or not to the liver.

b.2 Point out the clinical significance of some enzymes in clinical applications.

b.3 Point-out the application of molecular biology, chromatography and electrophoresis in basic and clinical sciences

2.c Professional and practical skills

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

c.1 Request different biochemical tests according to the condition of the patient.

c.2Apply some molecular biology techniques like, quantitative and qualitative PCR, western blot and sequencing.

c.3Recognize the principle of some biochemical diagnostic tests.

2.d General and transferable skills

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

d.1 Work effectively in a group and preparation of seminars.

d.2 Demonstrates respect for the role of staff and co-staff members regardless of degree or occupation.

3. Contents

W	Topic	No. Of credit hours	Lecture	No. Of Lecture hours	Tutorial/ Practical	Total teaching hours
1st	Nucleic acids biochemistry	4	- Evolution from gene to genome - DNA organization and replication	3	2	5
2nd	Nucleic acids biochemistry	4	- Advanced course of Mutation and repair - Advanced course in RNA synthesis and processing	3	2	5
3rd	Nucleic acids biochemistry	4	- Advanced course of Protein synthesis - Advanced course in Oncogenes tumor suppressor genes and programed cell death	3	2	5
4th	Nucleic acids biochemistry	4	- g. Human genome project - Gene mapping	3	2	5
5th	Enzymology	4	-. Enzymes of bypass reactions and catabolic pathways - Allosteric and covalent enzyme regulation - Regulation of different metabolic pathways - regulatory enzymes	3	2	5
6th	Hormones	4	Hormonal regulation of fuel metabolism) endocrine signaling	3	2	5
7th	Special Topics	4	(intra-extra-inter) cellular signaling	3	2	5
8th	Special Topics	4	cell membrane and transport and organelles	3	2	5
9th	Special Topics	4	- Aging - Cancer	3	2	5
10th	Special Topics	4	- Gene therapy - Stem cell	3	2	5
11th	Practical curriculum	4	- How to read: chromatogram (different peaks) - Interpretation of amino acids-carnitine and acyl carnitine results - Electrophoresis (molecular – protein- haemoglobin) - How to run a lab - Quality control	3	2	5
12th	Practical curriculum	4	- Principles and biomedical application of: -Colorimetric assays -Autoanalyzer -Chromatography -GC MS -HPLC-MS -ICP	3	2	5
13th	Practical curriculum	4	- Principles and biomedical application of Molecular: - DNA and RNA extraction - Conventional PCR	3	2	5

W	Topic	No. Of credit hours	Lecture	No. Of Lecture hours	Tutorial/ Practical	Total teaching hours
			- RFLP			
14th	Practical curriculum	4	- Real time PCR and droplet PCR - Sequencer - Microarray - Electrophoresis types and applications (HB electrophoresis).RFLP - ELISA	3	2	5
15th	Revision	4	Practical curriculum	3	2	5
	Total	60		45	30	75

4. Course Matrix Contents

Main Topics / Chapters	Course ILOs Covered by Topic (By ILOs Code)			
	K &U	I.S.	P.S.	G.S.
1-Nucleic acids biochemistry: Evolution from gene to genome, DNA organization, replication and Mutation and repair	a.2	b.1 / b.3	c.2	d.1/d.2
2- Nucleic acids biochemistry: RNA synthesis and processing, Advanced course in Protein synthesis and genetic code, Advanced course Oncogenes tumor suppressor genes and Gene expression	a.2	b.1 / b.3	c.2	d.1/d.2
3. Human genome project Gene mapping	a.3	b.1 / b.3	c.2	d.1/d.2
4- Enzymes: Regulation of different metabolic pathways Key regulatory enzymes and Enzymes of bypass reactions and catabolic pathways Allosteric and covalent enzyme regulation	a.4	b.1 / b.2	c.1 / c.3	d.1/d.2
5-endocrine signaling Hormonal regulation of fuel metabolism)	a.1	b.1	c.1 / c.3	d.1/d.2
6- Special Topics: (intra-extra-inter) cellular signaling, cell membrane and transport, Aging, cancer, gene therapy and stem cell.	a.5	b.1	c.1 / c.2	d.1/d.2
7- Practical curriculum: How to read: chromatogram, Electrophoresis, Quality control and How to run a lab	a.6	b.3	c.1 / c.3	d.1/d.2

Main Topics / Chapters	Course ILOs Covered by Topic (By ILOs Code)			
	K &U	I.S.	P.S.	G.S.
8- Practical curriculum: Principles and biomedical application of: a. Colorimetric assays b. Autoanalyzer c. Chromatography GC MS HPLC-MS d. ICP	a.7	b.3	c.1 / c.3	d.1/d.2
9- Practical curriculum: Principles and biomedical application of: e. Molecular -DNA and RNA extraction -Conventional PCR -Real time PCR -Sequencer Microarray f. Electrophoresis types and applications (HB electrophoresis). g. RFLP h. ELISA	a.8	b.3	c.1 / c.2 / c.3	d.1/d.2

5. Teaching and Learning Methods

5.1 Lectures (definitions, examples ,video material)

5.2 Tutorials (students solving problems and engaging in discussion)

5.3 Assignments (work in groups and trying to put options for solving advanced problems)

5.4 Projects (work in groups on extensive projects involving making research using its tools)

5.5 Electronic Learning including:

- Online Lectures on zoom meeting
- Uploading lectures on Google class Room
- WhatsApp group to facilitate communication between teaching staff and candidates , follow up, student inquiries, set dates for online lectures.

Teaching methods versus Course ILOs

Teaching/ Learning Methods		Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
Direct	Lectures	a1-a8	b1-b3		
	Practical	a1-a8		c1-c3	d1-d2
Interactive	Presentations Discussion Reports	a1-a8	b1-b3		d1-d2
Self-Learning	Assignments flipped classroom	a1-a8	b1-b3		d1-d2
E-learning	Synchronous Asynchronous	a1-a8	b1-b3		

6. Student Assessment Methods

Prerequisites for Exam entry

- Log book
- In – class and tutorial participation, calculations on board and theoretical concepts
- Seminars: the candidate should prepare & present at least one seminar in a topic related to the course & determined by the supervisors in front of the department staff.
- Practical quizzes (not graded formative assessment) throughout the course.

I-assessment tools

6.1 Written final Examination (to assess knowledge & intellectual skills)

6.2 Oral final examination (to assess knowledge, intellectual skill &transferable skills)

6.3 Log book

6.4 In – class and tutorial participation) calculations on board and theoretical concepts

6.5Seminars: the candidate should prepare & present at least one seminar in a topic related to the course & determined by the supervisors in front of the department staff (without marks).

Assessment methods versus Course ILOs

Assessment Method	Knowledge/ Understanding	Intellectual Skills	Professional/ Practical skills	General Skills
1- Written Examinations: - Essay questions - Objective questions - Problem solving - MCQ	a1-a8	b1-b3		
2- Practical Examinations OSPE	a1-a8		c1-c3	d1-d2
3- Oral Exams Using VIVA cards	a1-a8	b1-b3		d1-d2
4- Logbook assessment	a1-a8	b1-b3	c1-c3	d1-d2

II– marks: 100 mark: 2written paper 70mark+15 practical+15 oral

7. List of References

7.1 Course Notes: Lecture notes prepared by the staff members in the department

7.2 Essential Books (Text Books):

- Text book of Biochemistry with Clinical Correlations.
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-Lecture Notes on Clinical Biochemistry: Whitby LG, Smith AF, Beckett GJ, Walker SW, Blackwell Scientific Publications.
- MN Chaterra (8th edition).
- Clinical Biochemistry (7th edition)
- Principles of Biochemistry (8th edition).
- Biomarkers in inborn errors of metabolism (clinical aspects and laboratory determination 1st edition).

7.3 Recommended books

Lippincott's Reviews of Biochemistry (7th edition)

7.4 Periodicals, Web sites …. etc

-Gene.

-Cell Physiology and Biochemistry.

- Egyptian J. Biochemistry and Molecular Biology.

8. Facilities Required for Teaching and Learning

Candidates & their learning are supported in a number of ways:

- Lecture rooms: available in the NLI
- Computer Lab: available in the NLI's Library with a wide range of software.
- Induction course introducing study skills
- Candidates logbook
- Program Specification & Handbooks
- Extensive library & other learning resources
- Internet with a wide range of learning support material

Course Coordinator: Prof. Dr. Hala El-Said

Head of Department: Prof. Dr. Hala El-Said