

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university:	University of Benghazi
Program name	Molecular diagnostics
The course name:	Clinical Biochemistry
Course code:	MLSC-201
Academic year / level:	2023-2024. Second year

1- Basic information:

The course name:	Clinical Biochemistry
Course coordinator	
Program (s) on which the course is given:	Molecular diagnostics
Teaching hours	4 hours/week
Language	English
Academic year / level:	2023-2024. Second year
Course approval date	

1.1 hours per week

Lecture: (2 hours/ week)

Practical: (2 hours/ week)

Total: (hours 96)

Training: (-)

2- Aims of Course:

- The course aims to provide students with a comprehensive understanding of the biochemical principles underlying human disease and to develop their knowledge and skills in clinical laboratory science, including the ability to interpret laboratory data.
- This course covers a wide range of topics including basic analytical techniques, metabolism and disease, endocrine and reproductive systems, renal and liver function, and therapeutic drug monitoring.
- It also provides fundamental knowledge of the structure and function of biomolecules and their role in human physiology, health, and disease.
- Through a combination of lectures, practical classes, and case-based learning, students will acquire a solid foundation in the principles and practices of clinical chemistry, which are essential for a career in clinical laboratory science, medicine, or related fields.

3- Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

After completing this course, students should be able to demonstrate:

- Understand the biochemical basis of human disease.
- State the principles of clinical laboratory science.
- Underline the important biochemical analyses used in clinical biochemistry.

b- Intellectual Skills:

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

- Critically evaluate and interpret biochemical data.
- Apply knowledge from different areas of biochemistry and biomedical sciences.

c- Professional and Practical Skills:

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

- Perform laboratory tests in clinical biochemistry.

2. The ability to use standard operating procedures and quality control measures in the clinical laboratory.
3. Demonstrate knowledge of the metabolic pathways and biochemical processes involved in the diagnosis and management of diseases.
4. Understand the roles of various organs and organ systems in the regulation of biochemical homeostasis.
5. The ability to interpret laboratory data in the context of patient care.

d- General Skills:

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

1. Improve teamwork skills
2. Enhance communicate scientific ideas effectively in written and oral formats.
3. Develop problem-solving skills.
4. Develop effective time management and organizational skills.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction to Clinical Biochemistry				
Biomolecules and their Properties				
Metabolism				
Enzymes and Their Kinetics				
Carbohydrate Metabolism and Diabetes				
Lipid Metabolism and Cardiovascular Disease				
Protein Metabolism and Renal Function				
Endocrine and Reproductive Systems				
Hormones and Signaling				
Biochemical Techniques				
Diagnostic Techniques in Clinical Biochemistry				
Acid-Base Balance and Electrolytes				
Hematology and Coagulation Disorders				
Clinical Enzymology and Analytical Techniques				
Trace Elements and Minerals				
Iron Metabolism				
Inborn Errors of Metabolism				
Total.				

:Learning Methods .5

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

Assessment Type	Date	%
First assessment	16 th week of first term.	30
Lab. Exam	Before the final examination	20
Final examination (Written,)	At the end of term	50
Total		100

7. List of References:

Title	Publisher	copy	authors	Available place
Clinical Guide to Laboratory Tests.	Philadelphia, PA: W.B. Saunders Company.	4th ed.	Tietz NW, Pruden EL, Siggaard-Andersen O.	
Clinical Chemistry: Principles and Practice.	London, UK: CRC Press.	2nd ed.	Marshall WJ, Bangert SK.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراسي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2

																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university: University of Benghazi
Programme name: Molecular diagnostics
The course name: Clinical Biochemistry
Course code: MLSC-201
Academic year / level: 2023-2024. Second year

1. Basic information:

the course name:	Clinical Biochemistry
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	5 hours/week
Language	English
Academic year / level:	2023-2024. Second year
Course approval date	

1.1 hours per week

Lecture: (3 hours/week)

Practical: (2 hours/week)

Total: (hours 160)

Training: (-)

2. Aims of Course:

- To provide to provide students with a comprehensive understanding of the biochemical principles underlying human disease.
- To develop their knowledge and skills in clinical laboratory science, including the ability to interpret laboratory data.
- To covers a wide range of topics including basic analytical techniques, metabolism and disease, endocrine and reproductive systems, renal and liver function, and therapeutic drug monitoring.
- To provides fundamental knowledge of the structure and function of biomolecules and their role in human physiology, health, and disease. Through a combination of lectures, practical classes, and case-based learning, students will acquire a solid foundation in the principles and practices of clinical chemistry, which are essential for a career in clinical laboratory science, medicine, or related fields.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

1. Understand biochemical basis of human disease
- 2 Outline of the principles of clinical laboratory science
3. Describe most important biochemical analyses used in clinical biochemistry

b- Intellectual Skills:

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

1. Evaluate and interpret biochemical data.
2. Illustrate knowledge from different areas of biochemistry and biomedical sciences

c- Professional and Practical Skills:

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

- c1. Operate laboratory tests in clinical biochemistry

- c2. Use standard operating procedures and quality control measures in the clinical laboratory.
- c3. Distinguish the metabolic pathways and biochemical processes involved in the diagnosis and management of diseases
- c4. Indicate the roles of various organs and organ systems in the regulation of biochemical homeostasis
- 5. Interpret laboratory data in the context of patient care

d- General Skills:

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

- d1. Develop team-work skills.
- d2. Develop communication skills.
- d3. Develop analytical and problem-solving skills in a range of settings.
- d4. Develop time-management.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction to Clinical Biochemistry				
Biomolecules and their Properties				
Metabolism				
Enzymes and Their Kinetics				
Carbohydrate Metabolism and Diabetes				
Lipid Metabolism and Cardiovascular Disease				
Protein Metabolism and Renal Function				
Liver Function and Hepatobiliary Diseases				
Endocrine and Reproductive Systems				
Hormones and Signaling				
Biochemical Techniques				
Diagnostic Techniques in Clinical Biochemistry				
Acid-Base Balance and Electrolytes				
Hematology and Coagulation Disorders				
Clinical Enzymology and Analytical Techniques				
Trace Elements and Minerals				
Iron Metabolism				
Inborn Errors of Metabolism				
Introduction to Clinical Biochemistry				
Biomolecules and their Properties				
Metabolism				
Total				

5. Learning Methods:

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place
Clinical Guide to Laboratory Tests. Philadelphia, PA: W.B.	Saunders Company	4th ed.	Tietz NW, Pruden EL, Siggaard-Andersen O.	
Clinical Chemistry: Principles and Practice	London, UK: CRC Press;	. 2nd ed.	Marshall WJ, Bangert SK.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراس ي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1

																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university:	University of Benghazi
Program name	Molecular diagnostics
The course name:	Integrative Physiology
Course code:	BMSC-201
Academic year / level:	2023-2024. Second year

1- Basic information:

the course name:	Integrative Physiology
Course coordinator	
Program (s) on which the course is given:	Molecular diagnostics
Teaching hours	4 hours/week
Language	English
Academic year / level:	2023-2024. Second year
Course approval date	

1.1 hours per week

Lecture: (2 hours/ week)

Practical: (2 hours/ week)

Total: (hours 96)

Training: (-)

2- Aims of Course:

- a. The overall aim of this course is to provide students with a comprehensive understanding of the fundamental principles of physiology and the role of different physiological systems in maintaining health and responding to environmental challenges.
- b. By the end of the course, students should have the ability to critically analyze the function of different physiological systems and their interactions, and apply this knowledge to the study of human health and disease.

3- Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

After completing this course, students should be able to demonstrate:

1. Demonstrate an understanding of the fundamental principles of physiology and homeostasis.
2. Underline the organization and function of different physiological systems in the body.
3. Outline the mechanisms that control cellular communication and signaling pathways.
4. Understand the role of different physiological systems in maintaining homeostasis and responding to environmental challenges.
5. Describe the function of the reproductive system and its hormonal regulation.
6. Demonstrate the ability to design and conduct laboratory experiments in physiology.

b- Intellectual Skills:

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

1. Analysis and evaluation of physiological concepts and mechanisms.
2. Synthesis of complex physiological systems and their interactions.
3. Application of physiological principles to human health and disease.

- Evaluate of experimental design and interpretation of results

c- Professional and Practical Skills:

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

- Interpret experimental data and draw appropriate conclusions.

d- General Skills:

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

- Improve teamwork skills
- Enhance communicate scientific ideas effectively in written and oral formats.
- Develop effective time management and organizational skills.
- Improve Critical thinking and problem-solving

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction to Physiology and Homeostasis				
Cellular Communication and Signaling Pathways				
Membrane Transport and Energy Metabolism				
Nervous System and Sensory Physiology				
Cardiovascular System and Blood Pressure Regulation				
Respiratory System and Gas Exchange				
Renal System and Water Balance				
Digestive System and Nutrient Absorption				
Endocrine System and Hormonal Regulation				
Environmental Physiology and Adaptations to Stressors				
Genetic Basis of Physiology				
Exercise Physiology and Metabolic Adaptations				
Aging and Physiological Changes				
Reproductive System and Hormonal Regulation				
Immunology and Inflammation				
Pharmacology and Drug Effects on Physiology				
Body Composition and Energy Balance				
Circadian Rhythms and Biological Clocks				
Neural Control of Cardiovascular and				

Topic	Hours	Lectures	Lab.	Practical/ small groups
Respiratory Systems				
Environmental Factors and Physiology				
Hormonal Control of Digestive System				
Mechanisms of Pain and Pain Management				
Brain and Behavior				
Autonomic Nervous System and Stress Response				
Reproductive Health and Fertility				
Physiology of Sleep and Sleep Disorders				
Total.				

5. Learning Methods:

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

Assessment Type	Date	%
First assessment	16 th week of first term.	30
Lab. Exam	Before the final examination	20
Final examination (Written,)	At the end of term	50
Total		100

7. List of References:

Title	Publisher	Copy	authors	Available place
Human Physiology: An Integrated Approach.	Pearson Education Limited	7th ed.	Silverthorn, Dee Unglaub.	
Textbook of Medical Physiology.	Elsevier	14th ed.	Hall, John E. Guyton and Hall	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراس ي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42

																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university: University of Benghazi
Programme name: Molecular diagnostics
The course name: Biological Basis of Disease
Course code: MOLD-201
Academic year / level: 2023-2024. Second year

1. Basic information:

the course name:	Biological Basis of Disease
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	5 hours/week
Language	English
Academic year / level:	2023-2024. Second year
Course approval date	

1.1 hours per week

Lecture: (3 hours/week)

Practical: (2 hours/week)

Total: (hours 160)

Training: (-)

2. Aims of Course:

- a. To provide students with a comprehensive understanding of the biological mechanisms underlying disease development, progression, and treatment.
- b. developing a strong foundation in the fundamental principles of pathology, immunology, microbiology, pharmacology, and genetics.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

- a1. An in-depth understanding of the biological basis of disease.
- a2. The fundamental principles of pathology, including the concept of disease, etiology, pathogenesis, and morphological changes associated with diseases.
- a3. The cellular responses to injury and the molecular mechanisms that underlie these responses.
- a4. The role of inflammation and immunity in the pathogenesis of diseases.
- a5. The principles of neoplasia, including the molecular mechanisms that underlie the development and progression of cancer.
- a6. The principles of systemic pathology, including the major diseases affecting each organ system.

b- Intellectual Skills:

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

- b1. Analyze and interpret pathological data from clinical and laboratory investigations.
- b2. Apply knowledge of pathological principles to diagnose and manage diseases.
- b3. Critically evaluate scientific literature and research related to pathology.
- b4. Design and execute experiments related to pathology.

c- Professional and Practical Skills:

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

- c1. Work effectively communicate pathological concepts to healthcare professionals and patients.
- c2. Work collaboratively with healthcare professionals in the diagnosis and management of diseases.
- c3. Use laboratory investigations to diagnose and manage diseases.
- c4. Critically evaluate laboratory investigations and their role in the diagnosis and management of diseases.

d- General Skills:

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

- d1. Develop effective communication skills with diverse audience.
- d2. Enhance the ability to work independently and as part of a team to achieve common goals.
- d3. Improve problem-solving skills to address complex issues.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Fundamentals of Pathology:				
Cellular and Molecular Basis of Disease:				
:Immunology and Disease				
Microbiology and Disease:				
Genetics and Genomics in Disease:				
Cardiovascular Diseases:				
Respiratory Diseases:				
Gastrointestinal Diseases:				
Renal and Urinary Tract Diseases:				
Endocrine and Metabolic Diseases				
Neurological Diseases:				
Musculoskeletal Diseases:				
Oncology:				
Infectious Diseases:				
Hematological Diseases:				
:Laboratory Safety				
Biomarkers and Diagnostics:				
Biological Basis of Disease:				
Immune System Disorders:				
Genetic Disorders:				
Neurological Disorders:				
Dermatological Disorders:				
Introduction to Pathology:				
Cellular Responses to Injury:				
Acute Inflammation:				
Chronic Inflammation:				
Tissue Repair				

Topic	Hours	Lectures	Lab.	Practical/ small groups
and Regeneration:				
Hemodynamic Disorders:				
Genetic and Developmental Disorders:				
Environmental Pathology:				
Immunopathology:				
Neoplasia:				
Infectious Diseases:				
Nutritional and Metabolic Diseases:				
Endocrine Pathology:				
Cardiovascular Pathology:				
Respiratory Pathology:				
Gastrointestinal Pathology:				
Total				

5. Learning Methods:

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place
Robbins basic pathology.	Elsevier Health Sciences.		Kumar, V., Abbas, A. K., Aster, J. C., & Robbins, S. L.	
Robbins Pathologic Basis of Disease.	Philadelphia, PA: Saunders.		Cotran, R.S., Kumar, V., Collins, T.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراس ي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university:	University of Benghazi
Programme name:	Molecular diagnostics
The course name:	Lab Management and Medical Informatics
Course code:	LMBT-202
Academic year / level:	2023-2024. Second year

1. Basic information:

the course name:	Lab Management and Medical Informatics
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	2 hours/week
Language	English
Academic year / level:	2023-2024. Second year
Course approval date	

1.1 hours per week

Lecture: (2 hours/week)

Practical: (hours/week)

Total: (hours 64)

Training: (-)

2. Aims of Course:

- a. To equip students with the necessary skills and knowledge to effectively manage and maintain medical laboratories, as well as to apply medical informatics to enhance patient care.
- b. To gain a comprehensive understanding of laboratory management, regulatory compliance, data management, and medical informatics. Ultimately, the course aims to prepare students to manage modern medical laboratories and apply medical informatics to improve patient care.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

1. Understand the fundamental principles of laboratory operations and management.
2. Understand the regulatory requirements governing laboratory operations and compliance.
3. List the principles of quality assurance and quality control in laboratory operations.
4. Describe the importance of data management and medical informatics in modern healthcare.

b- Intellectual Skills:

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

1. Analyze and evaluate laboratory operations to identify areas for improvement.
2. Evaluate and apply laboratory regulations and compliance requirements to ensure laboratory operations meet the necessary standards.
3. Develop and implement quality control measures to ensure accurate and reliable laboratory results.
4. Analyze and interpret medical data to provide valuable insights for patient care.

c- Professional and Practical Skills:

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

1. Practice laboratory policies and procedures to ensure effective and efficient laboratory operations.
2. Prepare data and medical informatics strategies to improve patient care.
3. Manipulate laboratory findings and medical information to healthcare professionals and patients.
4. Modify strategies to ensure laboratory safety and compliance.

d- General Skills:

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

1. Develop problem-solving skills and critical thinking skills.
2. Develop communication skills for effective communication with healthcare professionals and patients.
3. Develop skills for managing and leading laboratory staff.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction to Laboratory Operations and Management				
Laboratory Regulations and Compliance				
Introduction to Laboratory Operations and Management				
Laboratory Regulations and Compliance				
Medical Informatics				
Laboratory Equipment Management and Maintenance				
Laboratory Safety and Compliance				
Laboratory Accreditation and Certification				
Laboratory Budgeting and Finance				
Laboratory Auditing and Inspection				
Laboratory Project Management				
Laboratory Ethics and Professionalism				
Data Analysis and Reporting				
Medical Informatics Applications in Healthcare				
Leadership and Team Management in the Laboratory				
Laboratory Waste Management				
Laboratory Personnel Management				
Laboratory Inventory Control				
Laboratory Informatics and Analytics				
Laboratory Automation and Robotics				
Total				

:Learning Methods .5

- a. Lectures
- b. Tutorial

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	40
2.	Final examination (Written,)	At the end of term	60
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place
Laboratory management principles and processes. Washington: American Society for Clinical Pathology Press	Valenstein PN.	3rd ed.		
Laboratory waste management: a guidebook. London:	Royal Society of Chemistry		O'Connor J.	
Use of electronic health records in U.S. hospitals.	N Engl J Med.		Jha AK, DesRoches CM, Campbell EG, Donelan K, Rao SR, Ferris TG, et al.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراسي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university:	University of Benghazi
Program name	Molecular diagnostics
The course name:	Cell and Molecular Biology
Course code:	MOLD-203
Academic year / level:	2023-2024. Second year

1. Basic information:

The course name:	Cell and Molecular Biology
Course coordinator	
Program (s) on which the course is given:	Molecular diagnostics
Teaching hours	3 hours/week
Language	English
Academic year / level:	2023-2024. Second year
Course approval date	

1.1 hours per week

Lecture: (1 hours/week)

Practical: (2 hours/week)

Total: (hours 96)

Training: (-)

2. Aims of Course:

- a. The course aims to provide students with a fundamental understanding of the molecular and cellular processes that underpin human health and disease.
- b. The course covers a range of topics, from the basic structure and function of cells to advanced concepts such as gene expression and signaling pathways. It also includes practical sessions designed to provide students with hands-on experience in laboratory techniques commonly used in molecular and cellular biology.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

After completing this course, students should be able to demonstrate:

1. Understand the basic structure and function of cells and the molecular components that underpin cellular processes.
2. Outline the molecular genetics, including DNA replication, transcription, translation, and gene regulation.
3. Describe the importance of protein structure and function in cellular processes, including enzymatic catalysis and molecular signaling.
4. Identify the major signaling pathways involved in cellular communication and their role in normal and disease states.

b- Intellectual Skills:

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

1. Critically evaluate scientific literature and experimental data.
2. Design and execute experimental protocols in molecular and cellular biology.
3. Analyze and interpret data obtained from experiments.
4. Apply the ability to hypotheses and design experiments to test them.

c- Professional and Practical Skills:

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

1. Use laboratory equipment and perform basic techniques in molecular and cellular biology.
2. Work effectively as part of a team in a laboratory setting.
3. Interpret data obtained from experiments and present findings in written and oral formats.
4. Conduct research in a responsible and ethical manner.

d- General Skills:

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

1. Develop effective communication skills.
2. Improve time-management and organizational skills.
3. Develop problem-solving and analytical skills.
4. Enhance teamwork skills in a laboratory setting

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction to Cell and Molecular Biology.				
Cell Structure and Function.				
.Biomolecules				
Enzymes and Metabolism.				
DNA Replication and Repair.				
Transcription and RNA Processing.				
Translation and Protein Folding.				
Genetic Variation and Mutation.				
Recombinant DNA Technology.				
Genetic Engineering.				
Genomics and Proteomics.				
Gene Expression and Regulation.				
Cellular signaling and its regulation.				
Signal Transduction Pathways.				
Genomics and Proteomics.				
.Gene Expression and Regulation				
Cellular Signaling and its Regulation.				
Signal Transduction Pathways.				
Intracellular Vesicular Transport.				
Cell Cycle and Division.				
Apoptosis and Cell Death.				
Cancer Biology.				
Stem Cells and Regeneration.				
Total				

:Learning Methods .5

a. Lectures

b. Tutorial

c. Lab.

6. Assessment methods:

Assessment Type	Date	%
First assessment	16 th week of first term.	30
Lab. Exam	Before the final examination	20
Final examination (Written,)	At the end of term	50
Total		100

7. List of References:

Title	Publisher	copy	authors	Available place
Molecular biology of the cell	Garland Science.	6th ed	Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., & Walter, P.	
Molecular cell biology	W. H. Freeman and Company.	8th ed.	Lodish, H., Berk, A., Zipursky, S. L., Matsudaira, P., Baltimore, D., & Darnell, J.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills			a. Knowledge and Understanding	الاسبوع الدراس
d. General&	c. Professional & practical	b. Intellectual skills		

transferable skills					skills															☞
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university: University of Benghazi
Programme name: Molecular diagnostics
The course name: Molecular Biology Techniques
Course code: MOLD-204
Academic year / level: 2023-2024. Second year

1. Basic information:

the course name:	Molecular Biology Techniques
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	3 hours/week
Language	English
Academic year / level:	2023-2024. Second year
Course approval date	

1.1 hours per week

Lecture: (1 hours/week)

Practical: (2 hours/week)

Total: (hours 96)

Training: (-)

2. Aims of Course:

- To provide students with theoretical and practical knowledge of molecular biology techniques used in research and clinical settings.
- To covers essential molecular biology techniques, including DNA extraction, PCR, cloning, gene expression analysis, and DNA sequencing.
- To develop students' practical skills in molecular biology and prepare them for research and clinical careers.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

- Understand the fundamental concepts and principles of molecular biology.
- Understand the theoretical basis of essential molecular biology techniques.
- Understand the role of molecular biology techniques in research and clinical settings.

b- Intellectual Skills:

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

- Analyze scientific literature related to molecular biology techniques.
- Design experiments and optimize protocols for molecular biology techniques.
- Interpret data generated from molecular biology experiments.

c- Professional and Practical Skills:

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

- Demonstrate practical skills in molecular biology techniques.
- Perform experiments and record data accurately and precisely.
- Work collaboratively in a laboratory setting.

d- General Skills:

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

- d1. Improve communicate scientific ideas and results effectively.
- d2. Enhance problem-solving skills .
- d3. Develop time-management skills.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction to molecular biology techniques				
DNA Extraction				
Polymerase Chain Reaction (PCR)				
Gel Electrophoresis				
Cloning				
Gene Expression Analysis				
Western Blotting				
Enzyme-Linked Immunosorbent Assay (ELISA)				
DNA Sequencing				
Restriction Enzyme Digestion				
Site-Directed Mutagenesis				
RNA Extraction and Analysis				
Real-Time PCR				
Microarray Analysis				
Epigenetic Modifications:				
:Recombinant Protein Production				
Genome Editing				
RNA Interference (RNAi):				
Stem Cell Culture and Differentiation:				
Total				

5. Learning Methods:

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place
Molecular Biology Techniques: A Classroom Laboratory Manual,		4th Edition	Susan Carson, Heather Miller, and D. Scott Witherow	
Molecular Biology: Principles and Practice		3rd Edition	Michael M. Cox, Jennifer Doudna, and Michael O'Donnell	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراسي ي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university: University of Benghazi
Program name Molecular diagnostics
The course name: Principles of Human Genetics
Course code: MOLD-205
Academic year / level: 2023-2024. Second year

1- Basic information:

the course name:	Principles of Human Genetics
Course coordinator	
Program (s) on which the course is given:	Molecular diagnostics
Teaching hours	4 hours/week
Language	English
Academic year / level:	2023-2024. Second year
Course approval date	

1.1 hours per week

Lecture: (2 hours/week)

Practical: (2 hours/week)

Total: (hours 96)

Training: (-)

2- Aims of Course:

- a. The Principles of Human Genetics undergraduate course in Biomedical Sciences aims to provide students with a comprehensive understanding of the fundamental principles of human genetics and their applications in various fields of medicine and healthcare.
- b. The course will cover the basic concepts of genetics, including inheritance patterns, molecular genetics, gene expression, and genomics, and how these principles apply to human health and disease.
- c. The course will also cover ethical, legal, and social issues related to human genetics and genomics.

3- Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

After completing this course, students should be able to demonstrate:

- 1- Demonstrate a solid understanding of the fundamental principles of human genetics
- 2- Discusses genetic data using molecular genetic techniques
- 3- Underline principles to the diagnosis and treatment of human diseases
- 4- Understand the ethical, legal, and social issues related to human genetics and genomics

b- Intellectual Skills:

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

- 1- Analyze genetic data using molecular genetic techniques.
- 2- Apply genetic principles to the diagnosis and treatment of human diseases.
- 3- Critically evaluating research studies in human genetics.
- 4- Synthesizing and interpreting complex genetic information.
- 5- Apply hypotheses and designing experiments in genetics research.

c- Professional and Practical Skills:

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

1. Genetic counseling and communication skills.
2. Designing and implementing genetic tests.
3. Interpreting and reporting genetic test results.
4. Performing molecular genetic techniques.
5. Analyzing and interpreting genetic data using bioinformatics tools.

d- General Skills:

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

- 1- Enhance communication skills.
- 2- Develop teamwork skills.
- 3- Improve time management and organization skills.
- 4- Develop critical thinking, problem-solving, and analytical skills
- 5- Develop professional and practical skills necessary for a career in the biomedical sciences

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction to Human Genetics.				
History of Human Genetics.				
.Structure and Function of DNA				
Chromosome Structure and Function.				
Mendelian Genetics.				
Pedigree Analysis.				
Single Gene Disorders.				
Chromosomal Disorders.				
Carrier Testing.				
Molecular Genetics.				
Gene Expression.				
Gene Regulation.				
Epigenetics.				
Genomics.				
Human Genome Project.				
.Genetic Discrimination				
Personalized Medicine.				
Precision Medicine.				
Pharmacogenetics.				
Genetic Diversity.				
Gene-Environment Interactions.				
Total				

:Learning Methods .5

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

Assessment Type	Date	%
First assessment	16 th week of first term.	30
Lab. Exam	Before the final examination	20
Final examination (Written,)	At the end of term	50
Total		100

7. List of References:

Title	Publisher	copy	authors	Available place
Essentials of Genetics.	Pearson Education, Inc.		Klug, W. S., Cummings, M. R., Spencer, C. A., Palladino, M. A.	
Genes IX.	Jones & Bartlett Learning		Lewin, B.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراسي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32

																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university:	University of Benghazi
Program name	Molecular diagnostics
The course name:	Medical Immunology
Course code:	MLSC-205
Academic year / level:	2023-2024. Second year

1- Basic information:

the course name:	Medical Immunology
Course coordinator	
Program (s) on which the course is given:	Molecular diagnostics
Teaching hours	4 hours/week
Language	English
Academic year / level:	2023-2024. Second year
Course approval date	

1.1 hours per week

Lecture: (2 hours/ week)

Practical: (2 hours/ week)

Total: (hours 96)

Training: (-)

1- Aims of Course:

- The course aims to provide students with a comprehensive understanding of the immune system, its mechanisms, functions, and clinical applications.
- The course intends to equip students with knowledge and skills to enable them to pursue careers in biomedical sciences, immunology research, and clinical practice.
- The course aims to develop students' ability to think critically and analytically, communicate effectively, and work collaboratively in a team.

2- Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

After completing this course, students should be able to demonstrate:

- Describe the components, organization, and functions of the immune system.
- Understand the molecular basis of immune recognition and response.
- Discuss the role of immune system in health and disease.
- Describe the genetic, ontogenic, and clinical implications of immune system function.

b- Intellectual Skills:

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

- Analyze and interpret immunological data and literature.
- Evaluate the contribution of immune system in disease pathogenesis.
- Design and execute immunological experiments.

c- Professional and Practical Skills:

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

- Illustrate immunological concepts and findings.
- Practice laboratory skills and techniques in immunological research.
- Explain ethical and professional behavior in biomedical sciences.

d- General Skills:

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

1. Develop effective written and oral communication skills.
2. Enhance time-management and organization skills.
3. Develop computer literacy and data analysis skills.
4. Develop leadership and team management skills.
5. Develop critical thinking and problem-solving skills.

4- Course Contents:

Topic	Hours	Lectures	Lab	Practical/ small groups
Introduction				
Leucocytes and Lymphoid Tissues: The Framework of the Immune System				
Major Histocompatibility Complex				
The Adaptive Immune Response: Antigens, Lymphocytes and Accessory Cells				
Immunoglobulins: Structure and Diversity				
Immunoglobulins: Metabolism and Biological Properties				
Genetics of Immunoglobulins: Ontogenic, Biological and Clinical Implications				
Antigen-Antibody Reactions				
The Complement System in Health and Disease				
Monocyte and Lymphocyte Membrane Markers: Ontogeny and Clinical Significance				
Cell-Mediated Immunity				
Adaptive Humoral Immunity and Immunoprophylaxis				
Phagocytic Cells and their Functions				
Anti-Infectious Innate and Adaptive Immune Responses				
Diagnostic Applications of Immunology				
Tolerance and Autoimmunity				
Organ-Specific Autoimmune Diseases				
Systemic Lupus Erythematosus				
Rheumatoid Arthritis				
Overview of Hypersensitivity				
IgE-mediated (Immediate) Hypersensitivity				
Immunohematology				
The Pathogenic Role of Antigen-Antibody				

Topic	Hours	Lectures	Lab	Practical/ small groups
Complexes				
Immune System Modulators				
Transplantation Immunology				
Tumor Immunology				
Lymphocyte and Plasma Cell malignancies				
Diagnosis of Immune Deficiency Diseases				
Primary Immunodeficiency Diseases				
AIDS and Other Acquired Immunodeficiencies				
Total.				

5. Learning Methods:

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

Assessment Type	Date	%
First assessment	16 th week of first term.	30
Lab. Exam	Before the final examination	20
Final examination (Written,)	At the end of term	50
Total		100

7. List of References:

Title	Publisher	copy	authors	Available place
Medical Immunology.	CRC Press.	7th Ed.	Virella, G	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراس ي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42

																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university: University of Benghazi
Programme name: Molecular diagnostics
The course name: Bioinformatics and Genomics
Course code: MOLD-301
Academic year / level: 2023-2024. Third year

1. Basic information:

the course name:	Bioinformatics and Genomics
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	5 hours/week
Language	English
Academic year / level:	2023-2024. Third year
Course approval date	

1.1 hours per week

Lecture: (3 hours/week)

Practical: (2 hours/week)

Total: (hours 160)

Training: (-)

2. Aims of Course:

- To provide students with a deep understanding of the principles and practices of bioinformatics, genomics, and computational biology.
- To provide students with a solid foundation in the underlying concepts of molecular biology, genetics, and computer science, enabling them to apply this knowledge in the analysis of complex biological data.
- To gain practical experience in the use of software tools and databases, and develop professional and transferable skills in data analysis, interpretation, and communication.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

- Understand deeply the molecular basis of life and the relationship between genomics, proteomics, and transcriptomics.
- Outline the basic principles and methods of sequence alignment, gene prediction, and sequence analysis.
- Describe usage of computational techniques to analyze and interpret large datasets.
- Identify and use databases, software tools, and other resources for the analysis of biological data.

b- Intellectual Skills:

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

- Develop critical thinking skills for the analysis of complex biological data.
- Apply computational and statistical methods to interpret biological data.
- Analyze complex genetic and genomic data and draw meaningful conclusions.
- Develop the ability to identify and address biological questions using bioinformatics and genomics approaches.

c- Professional and Practical Skills:

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

1. Interpret bioinformatics tools and databases.
2. Analysis and interpretation of biological data.
3. Summarize scientific findings.
4. Operate team-based research and collaboration.

d- General Skills:

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

1. Develop skills in problem-solving, critical thinking, and data analysis.
2. Improve scientific writing and communication skills.
3. Enhance time management.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
1: Introduction to Bioinformatics and Genomics.				
2: Molecular Biology and Genetics				
Sequence Alignment .3				
4: Sequence Analysis				
5: Gene Prediction				
6: Genome Assembly				
7: Comparative Genomics				
8: Transcriptomics				
9: Proteomics				
10: Metabolomics				
11: Structural Bioinformatics				
12: Systems Biology				
13: Genomic Variation				
14: Epigenomics				
15: Functional Genomics				
Next-Generation Sequencing :16				
17: High-Performance Computing				
18: Machine Learning				
19: Network Analysis				
20: Pathway Analysis				
21: Data Visualization				
22: Bioinformatics Databases.				
23: Personalized Genomics				
24: Current Topics in Bioinformatics and Genomics.				
Total				

:Learning Methods .5

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place
Bioinformatics and functional genomics	John Wiley & Sons	3 rd .ed.	Pevsner, J	
Introduction to bioinformatics	Oxford University Press	4th ed	Lesk, A. M.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراس ي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.	d.2	d.	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a. 3	a.2	a.1	

		3		1															
																			1
																			2
																			3
																			4
																			5
																			6
																			7
																			8
																			9
																			10
																			11
																			12
																			13
																			14
																			51
																			16
																			17
																			18
																			19
																			20
																			21
																			22
																			32
																			42
																			52
																			26
																			27
																			28
																			29
																			30
																			31
																			32
																			33
																			34
																			35
																			36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university: University of Benghazi
Programme name: Molecular diagnostics
The course name: Research Methodology and Data Analysis
Course code: BMSC-301
Academic year / level: 2023-2024. Third year

1. Basic information:

the course name:	Research Methodology and Data Analysis
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	5 hours/week
Language	English
Academic year / level:	2023-2024. Third year
Course approval date	

1.1 hours per week

Lecture: (3 hours/week)

Practical: (2 hours/week)

Total: (hours 160)

Training: (-)

2. Aims of Course:

- a. To provide students with an extensive comprehension of research methodologies and data analysis techniques applicable to various disciplines.
- b. to equip students with the skills required to develop research proposals, conduct research, gather data, perform data analysis, and interpret results.
- c. To 'emphasizes improving students' critical thinking and problem-solving abilities.
- d. To impart knowledge about research methodologies and data analysis techniques applicable to medical research, thereby enabling students to develop research proposals, conduct research, collect data, analyze data, and interpret results in the medical field.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

1. Understand the basic principles of research methodology in biomedical fields, including study design, sampling, data collection, and analysis
2. Outline of the concepts and theories related to research methodology and data analysis in biomedical sciences
3. Demonstrate intellectual skills in analyzing and evaluating research literature, formulating research questions and hypotheses, and selecting appropriate research methodologies
4. Develop professional and practical skills in designing and conducting research projects, collecting and analyzing data, and presenting research findings
5. Understand the principles of scientific writing and research communication in biomedical fields

b- Intellectual Skills:

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

- b1. Develop critical thinking and problem-solving skills through analyzing and interpreting research data

- b2. Develop the ability to formulate research questions, hypotheses, and objectives
- b3. Develop the ability to design and implement research studies in biomedical fields
- b4. Develop the ability to evaluate the strengths and limitations of different research methodologies in biomedical fields

c- Professional and Practical Skills:

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

- c1. Develop the skills to effectively communicate research findings to a range of audiences
- c2. Develop the skills to write scientific research proposals and manuscripts in biomedical fields
- c3. Develop the skills to analyze and interpret research data using statistical software and other tools
- c4. Develop the skills to manage and organize research data in biomedical fields

d- General Skills:

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

- d1. Develop general transferable skills in critical thinking, problem-solving, communication, and teamwork
- d2. Improve teamwork and collaboration skills through group projects and presentations
- d3. Enhance time management and organizational skills through planning and executing research projects
- d4. Develop problem-solving and analytical skills that can be applied to a range of fields

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
1. Introduction to Research				
2. Research Methodology: An Introduction				
3. Reviewing the Literature				
4. Writing Protocol				
5. Formulating a Research Problem and Research Question				
6. Ethics in Research				
7. Introduction to Epidemiology				
8. Measurement Tools in Epidemiology				
9. Descriptive Studies				
10. Case-Control Studies				
11. Cohort Studies				
12. Questionnaire				

Topic	Hours	Lectures	Lab.	Practical/ small groups
Design				
13. Medical Reading and Writing				
14. Structure of a Medical Research Paper				
15. Screening				
16. Association and Causation				
17. Basic Concepts and Definitions in Statistics				
18. Selecting a Method of Data Collection				
19. Descriptive Statistics				
20. Inferential Statistics and Significant Test				
21. The Use of Excel and SPSS				
22. Research Proposal Projects				
Total				

:Learning Methods .5

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

	Publisher	copy	authors	Available place
--	-----------	------	---------	-----------------

Title				
Introduction to research methods: A practical guide for anyone undertaking a research project.	How To Books Ltd.		Dawson, C.	
Research methods in applied settings: An integrated approach to design and analysis.	Routledge.		Gliner, J. A., Morgan, G. A., & Leech, N. L.	
Research Methodology: A Step-by-Step Guide for Beginners.	Sage Publications		Kumar, R.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراسي ي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university:	University of Benghazi
Programme name:	Molecular diagnostics
The course name:	Clinical Molecular Diagnostic Techniques
Course code:	MOLD-303
Academic year / level:	2023-2024. Third year

1. Basic information:

the course name:	Clinical Molecular Diagnostic Techniques
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	3 hours/week
Language	English
Academic year / level:	2023-2024. Third year
Course approval date	

1.1 hours per week

Lecture: (1 hours/week)

Practical: (2 hours/week)

Total: (hours 96)

Training: (-)

2. Aims of Course:

- a. To provide students with a comprehensive understanding of the principles and applications of molecular diagnostics in the diagnosis and management of diseases.
- b. To provide students with hands-on experience in laboratory techniques for the detection of genetic mutations, infectious agents, and other disease markers. By the end of the course,
- c. to demonstrate a detailed knowledge of the principles and applications of molecular diagnostics, as well as an ability to apply this knowledge in laboratory settings

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

1. Outline the principles and applications of molecular diagnostics.
2. Understand the molecular basis of genetic mutations, infectious agents, and other disease markers.
3. Describe and interpret molecular diagnostic data to inform the diagnosis and management of disease.

b- Intellectual Skills:

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

1. Evaluate the scientific literature on molecular diagnostics and its applications.
2. Apply theoretical knowledge to practical problem-solving scenarios.
3. Formulate and test hypotheses based on molecular diagnostic data.
4. Analyze and interpret complex molecular diagnostic datasets.

c- Professional and Practical Skills:

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

1. Practice molecular diagnostic techniques in a laboratory setting, including nucleic acid extraction, PCR, sequencing, and other techniques.
2. Interpret molecular diagnostic data to inform clinical decision making.
3. Rewrite scientific concepts and research findings effectively in written and oral formats.

4. Practice effectively in a laboratory environment, including following safety protocols and good laboratory practices.

d- General Skills:

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

1. Develop effective time-management and organizational skills.
2. Improve effective problem-solving and critical thinking skills.
3. Develop team-working and collaboration skills.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction to Molecular Diagnostics.				
Nucleic Acid Extraction.				
.PCR and qPCR				
Sequencing.				
Microarrays.				
Next-Generation Sequencing.				
Digital PCR .				
CRISPR/Cas9.				
Biomarkers.				
Gene Expression Profiling.				
Epigenetics.				
Infectious Disease Diagnostics.				
Cancer Diagnostics.				
Cardiovascular Disease Diagnostics.				
Neurological Disease Diagnostics.				
.Respiratory Disease Diagnostics				
Renal Disease Diagnostics.				
Digestive Disease Diagnostics.				
Reproductive Health Diagnostics.				
Inherited Genetic Disorder Diagnostics.				
Emerging Technologies in Molecular Diagnostics.				
Total				

:Learning Methods .5

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place
Molecular Diagnostics: Fundamentals, Methods, and Clinical Applications.	F.A. Davis Company.		Buckingham, L., & Flaws, M. L.	
Clinical Molecular Diagnostics: The Essentials.	Academic Press		Coleman, W. B., & Tsongalis, G. J.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراس ي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university:	University of Benghazi
Programme name:	Molecular diagnostics
The course name:	Medical Genetics
Course code:	MOLD-304
Academic year / level:	2023-2024. Third year

1. Basic information:

the course name:	Medical Genetics
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	4 hours/week
Language	English
Academic year / level:	2023-2024. Third year
Course approval date	

1.1 hours per week

Lecture: (2 hours/week)

Practical: (2 hours/week)

Total: (hours 128)

Training: (-)

2. Aims of Course:

- a. To provide students with an in-depth understanding of the principles and applications of genetics in medicine, with a focus on molecular, cytogenetic, immunogenetic, population, and mathematical genetics.
- b. to provide students with an understanding of the history and impact of genetics in medicine, DNA technology and its applications, methods of chromosome analysis, immune genetics, and genetic disorders.
- c. to provide students with knowledge about the ethical, legal, and social issues in genetics, genetic counseling, and genetic testing, as well as the application of genetics in society.
- d.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

1. Recognize the history and impact of genetics in medicine.
2. Define DNA as the basis of inheritance and the structure and function of genes.
3. Outline of the types of genetic disorders, chromosome abnormalities, and patterns of inheritance.
4. Describe DNA technology and its applications, including techniques of DNA analysis, DNA sequencing, and the application of DNA sequence polymorphisms.
5. Understand immune genetics, including innate and specific acquired immunity, blood groups, HLA, and immunology of transplantation.
6. Underline population and mathematical genetics, including the Hardy-Weinberg principle, factors that alter gene frequency, consanguinity, segregation analysis, genetic linkage, and risk calculation.
7. Understand genetic disorders, including hemoglobinopathies, disorders of coagulation and bleeding, and biochemical genetics.

b- Intellectual Skills:

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

1. Evaluate critically scientific literature related to genetics in medicine.

2. Analyze data obtained from DNA sequencing and DNA analysis techniques.
3. Perform segregation analysis and calculate risks of inheritance.

c- Professional and Practical Skills:

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

1. Practice genetic counseling and genetic testing, including preimplantation genetic diagnosis, prenatal diagnosis and screening, carrier testing, fetal DNA analysis, and preconception counseling.
2. Operate newborn screening and pharmacogenetic testing.
3. Demonstrate the ethical, legal, and social issues in genetics and apply this knowledge in clinical practice.
4. Discuss the importance of genetics in medicine with healthcare professionals, patients, and the general public.

d- General Skills:

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

1. Develop a teamwork skills with other healthcare professionals.
3. Enhance the ability to adapt to new technologies and techniques in the field of genetics.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
A. Principles of Human Genetics (review)				
Basic Cell Biology: Structure and Function of genes				
Chromosomes and Cell Division				
Patterns of Inheritance				
B. Molecular Genetics				
Mapping and Identifying Genes for Monogenic Disorders				
C. Cytogenetics				
D. Immunogenetics				
E. Population And Mathematical Genetics				
Genetics In Medicine				
2 Disorders of coagulation and bleeding				
3 Biochemical Genetics				
G. Genetics In Society				
Diagnosis and Screening, Carrier testing, Fetal DNA analysis, Preconception counseling				
Total				

5. Learning Methods:

- a. Lectures
- b. Tutorial

c. Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place
Emery's Elements of Medical Genetics	Elsevier	16th edition.	Peter Turnpenny, Sian Ellard, and Ruth Lovering	
Medical Genetics at a Glance	Wiley-Blackwell	4th edition.	Dorian J. Pritchard and Bruce R. Korf.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراس ي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university:	University of Benghazi
Programme name:	Molecular diagnostics
The course name:	Histotechnology
Course code:	CYTO-305
Academic year / level:	2023-2024. Third year

1. Basic information:

the course name:	Histotechnology
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	4 hours/week
Language	English
Academic year / level:	2023-2024. Third year
Course approval date	

1.1 hours per week

Lecture: (2 hours/week)

Practical: (2 hours/week)

Total: (hours 128)

Training: (-)

2. Aims of Course:

- a. To introduce students to the fundamental principles and techniques used in the preparation, processing, and staining of biological tissues.
- b. to provide students with a strong foundation in the theoretical and practical aspects of histotechnology.
- c. to develop their professional and transferable skills.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

1. Outline the principles of microtechnique and the role of histology in biomedical sciences
2. Describe different types of fixatives and their effects on tissue structure and antigenicity
3. Underline various methods used for decalcification and other treatments for hard tissues.
4. Understand steps involved in tissue processing and mounting
5. Define types of dyes used in histotechnology and their staining mechanisms
6. Identify staining techniques used for tissues, blood, and other cell suspensions
7. Describe methods used for connective tissues, nucleic acids, organic functional groups, carbohydrates, lipids, pigments, and inorganic ions
8. Outline principles of enzyme histochemistry and the different classes of enzymes
9. Identify the methods used for soluble organic compounds and metal reduction and precipitation
10. State the principles of immunohistochemistry and the different types of antibodies

b- Intellectual Skills:

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

1. Analyze and interpret histological images and data

2. Apply critical thinking to solve problems in histotechnology
3. Evaluate the quality of tissue samples and staining protocols

c- Professional and Practical Skills:

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

1. Perform tissue processing, embedding, and sectioning
2. Prepare and use staining solutions for histological samples
3. Perform enzyme histochemistry and immunohistochemistry techniques

d- General Skills:

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

1. Improve teamwork skills
2. Enhance communicate scientific ideas effectively in written and oral formats.
3. Develop effective time management and organizational skills.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction to micro-technique				
Fixation				
Decalcification and other treatments for hard tissues				
Processing and mounting				
Dyes				
Staining with dyes in one or two colours				
Staining blood and other cell suspensions				
Methods for connective tissue				
Methods for nucleic acids				
Organic functional groups and protein histochemistry				
Carbohydrate histochemistry				
Lipids				
Methods for pigments and inorganic ions				
Enzyme histochemistry: general considerations				
Hydrolytic enzymes				
Oxidoreductases				
Methods for soluble organic compounds of low molecular weight				
Metal reduction and precipitation methods				
Immunohistochemistry				
Special techniques				
Total				

:Learning Methods .5

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place
Theory and Practice of Histological Techniques	Churchill Livingstone, Elsevier	6th edition	Bancroft, J.D. and Gamble, M.	
Histological and Histochemical Methods: Theory and Practice.	Scion Publishing Ltd,	5th edition.	Kiernan, J.A.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراس ي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35

																				36
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university: University of Benghazi
Programme name: Molecular diagnostics
The course name: Molecular Basis of Disease
Course code: MOLD-305
Academic year / level: 2023-2024. Third year

1. Basic information:

the course name:	Molecular Basis of Disease
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	5 hours/week
Language	English
Academic year / level:	2023-2024. Third year
Course approval date	

1.1 hours per week

Lecture: (3 hours/week)

Practical: (2 hours/week)

Total: (hours 160)

Training: (-)

2. Aims of Course:

- a. To provide students with an in-depth understanding of the molecular mechanisms that underlie human disease.
- b. to introduce students to a wide range of molecular and cellular processes that contribute to the development and progression of disease.
- c. students should be able to analyze and interpret the molecular mechanisms underlying a wide range of diseases.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

1. Understand the molecular basis of human disease.
2. Outline the key molecular and cellular processes that contribute to the development and progression of disease.
3. Describe the genetic and environmental factors that contribute to disease susceptibility.
4. Underline the molecular mechanisms underlying the pathogenesis of a range of human diseases.

b- Intellectual Skills:

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

1. Evaluate critically the scientific literature on the molecular basis of disease.
2. Relate theoretical knowledge to practical problem-solving scenarios.
3. Formulate and test hypotheses based on molecular data.
4. Analyze and interpret complex datasets from a range of molecular techniques.

c- Professional and Practical Skills:

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

1. Interpret scientific concepts and research findings effectively in written and oral formats.
2. Practice in a laboratory environment, including handling of biological materials and molecular techniques.

3. Demonstrate the usage of common laboratory techniques in molecular biology and disease research.

d- General Skills:

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

1. Improve independent learning skills.
2. Develop effective time-management and organizational skills.
3. Develop effective problem-solving and critical thinking abilities.
4. Enhance written and oral communication skills.
5. Develop team-working and collaboration skills.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
1: Introduction to Bioinformatics and Genomics.				
Introduction to Molecular Basis of Disease.				
.DNA Replication, Repair and Mutations				
Cell Cycle and Cancer.				
Apoptosis and Cell Death.				
Protein Folding and Misfolding.				
Prion Diseases.				
Protein Trafficking and Secretion.				
Metabolism and Disease.				
Diabetes				
Immune Response and Inflammation.				
Systemic Inflammation and Cancer				
Infectious Diseases.				
.Neurodegenerative				
Cardiovascular Diseases.				
Respiratory Diseases.				
Digestive Diseases .				
Endocrine Diseases.				
Renal Diseases.				
Musculoskeletal Diseases.				
Reproductive Health and Disease.				
Genetic Diseases.				
Total				

:Learning Methods .5

- a. Lectures

- b. Tutorial
- c. Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place
Molecular biology of the cell	Garland Science.	6th ed.	Alberts, B., Johnson, A., Lewis, J., Morgan, D., Raff, M., Roberts, K., & Walter, P.	
Robbins and Cotran pathologic basis of disease	Elsevier.	10th ed	Kumar, V., Abbas, A. K., & Aster, J. C.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills			a. Knowledge and Understanding	الاسبوع الدراسي
d. General & transferable skills	c. Professional & practical skills	b. Intellectual skills		

d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university:	University of Benghazi
Programme name:	Molecular diagnostics
The course name:	Molecular Immunology
Course code:	MOLD-307
Academic year / level:	2023-2024. Third year

1. Basic information:

the course name:	Molecular Immunology
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	5 hours/week
Language	English
Academic year / level:	2023-2024. Third year
Course approval date	

1.1 hours per week

Lecture: (3 hours/week)

Practical: (2 hours/week)

Total: (hours 160)

Training: (-)

2. Aims of Course:

- a. To provide students with an in-depth understanding of the molecular and cellular basis of the immune system.
- b. To cover a wide range of topics related to immunology, including immune cell development, antigen recognition, signaling pathways, and immune responses to pathogens and tumors.
- c. students with hands-on experience in a variety of immunology techniques.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

1. Identify the molecular and cellular basis of the immune system.
2. Understand the mechanisms of immune cell development, antigen recognition, and signaling pathways.
3. Outline the immune responses to pathogens and tumors.
4. Define the principles of immunotherapy and vaccine development.

b- Intellectual Skills:

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

1. Evaluate critically scientific literature in the field of immunology.
2. Analyze and interpret experimental data in the context of immunology.
3. Formulate hypotheses and design experiments to test them.
4. Illustrate professional and practical Skills:
5. Demonstrate proficiency in laboratory techniques used in the field of immunology.
6. Construct scientific ideas and data effectively in both oral and written formats.

c- Professional and Practical Skills:

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

- c1. Practice a range of immunology techniques.
- c2. Operate effectively in a laboratory environment.

c3. Review laboratory reports and scientific papers.

d- General Skills:

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

1. Develop critical thinking and problem-solving skills.
2. Develop time-management and organization skills.
3. Improve written and oral communication skills.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
1. Properties and Overview of Immune Responses				
2. Cells and Tissues of the Immune System				
3. Leukocyte Circulation and Migration Into Tissues				
4. Innate Immunity				
5. Antibodies and Antigens				
6. Antigen Presentation to T Lymphocytes and the Function of Major Histocompatibility				
7. Immune Receptors and Signal Transduction				
8. Lymphocyte Development and Antigen Receptor Gene Rearrangement				
9. Activation of T Lymphocytes				
10. Differentiation and Functions of CD4+ Effector T Cells				
11. Differentiation and Functions of CD8+ Effector T Cells				
12. B Cell Activation and Antibody Production				
13. Effector Mechanisms of Humoral Immunity				
Specialized Immunity at Epithelial .14 Barriers and in Immune Privileged Tissues				
15. Immunologic Tolerance and Autoimmunity				
16. Immunity to Microbes				
17. Transplantation Immunology				
18. Tumor Immunology				
19. Hypersensitivity Disorders				
20. Allergy				
21. Primary and Acquired Immunodeficiencies				

:Learning Methods .5

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place
Immunobiology: the immune system in health and disease.	Garland Science		Janeway, C. A., Travers, P., Walport, M., & Shlomchik, M. J.	
Janeway's immunobiology.	Garland Science.		Murphy, K., & Weaver, C.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراسة ي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university:	University of Benghazi
Programme name:	Molecular diagnostics
The course name:	Specimen Procurement and Documentation
Course code:	MLSC-307
Academic year / level:	2023-2024. Third year

1. Basic information:

the course name:	Specimen Procurement and Documentation
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	3 hours/week
Language	English
Academic year / level:	2023-2024. Third year
Course approval date	

1.1 hours per week

Lecture: (1 hours/week)

Practical: (2 hours/week)

Total: (hours 96)

Training: (-)

2. Aims of Course:

- a. To provide students with the knowledge and practical skills necessary for the collection, handling, and documentation of specimens in a clinical laboratory setting.
- b. To cover a range of topics related to the proper handling and processing of biological specimens, including blood, urine, stool, and tissue samples.
- c. To prepare students for careers in clinical laboratory science by providing them with a strong foundation in the theory and practice of specimen procurement and documentation.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

1. Understand the principles and methods used in the collection, handling, and documentation of biological specimens
2. List the different types of specimens and their unique handling requirements
3. Describe the role of the clinical laboratory in the healthcare system
4. Outline of the ethical and legal considerations surrounding the handling of biological specimens

b- Intellectual Skills:

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

1. Analyze and interpret laboratory data
2. Apply critical thinking to specimen collection and handling
3. Evaluate quality assurance and control techniques in the laboratory

c- Professional and Practical Skills:

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

1. Apply safe and accurate measures to collect, handle, and document biological specimens
2. Use and maintain laboratory equipment related to specimen procurement and documentation
3. Operate effectively with healthcare professionals and laboratory staff

4. Demonstrate proper techniques for specimen procurement and documentation
5. Practice occupational health and safety measures in the laboratory
6. Apply quality assurance and control techniques in the laboratory

d- General Skills:

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

1. Develop effective communication skills in a laboratory setting
2. Enhance teamwork skills
3. Develop time management and organizational skills

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
1. Introduction to Specimen Procurement and Documentation				
2. Types of Specimens				
3. Patient Identification and Specimen Labeling				
4. Specimen Collection and Handling				
5. Specimen Transport and Storage				
6. Quality Assurance and Control				
7. Occupational Health and Safety				
8. Legal and Ethical Issues				
9. Point of Care Testing				
10. Clinical Laboratory Workflow				
• Laboratory Information Systems				
• Hematology				
Venipuncture:				
Capillary Blood Collection:				
• Microbiology				
• Clinical Chemistry				
Urinalysis				
Immunology and				

Topic	Hours	Lectures	Lab.	Practical/ small groups
Serology				
• Cytology and Histology				
Specimen Rejection and Unsatisfactory Samples				
Specimen Referral and External Testing				
Newborn Screening				
Specimen Collection in Special Populations				
Molecular Diagnostics				
Hematopoietic Stem Cell Collection and Processing				
Blood Transfusion				
Collection of Specimens for Drug Monitoring and Toxicology				
Specimen Collection and Transport in Public Health				
Quality Improvement in Specimen Procurement and Documentation				
Emerging Technologies in Specimen Procurement and Documentation				
Total				

5. Learning Methods:

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

Title	Publisher	Copy	authors	Available place
Microbiology: a human perspective.	McGraw-Hill Education.		Nester, E. W., Anderson, D. G., Roberts, C. E., & Nester, M. T.	
Clinical chemistry: theory, analysis, correlation.	Elsevier.		Kaplan, L. A., & Pesce, A. J.	
Clinical Chemistry: Principles, Techniques, Correlations.	Lippincott Williams & Wilkins		Bishop M, Fody E, Schoeff L.	
Clinical and Laboratory Standards Institute (CLSI). Collection, Transport, and Processing of Blood Specimens for Testing Plasma-Based Coagulation Assays and Molecular Hemostasis Assays; Approved Guideline,	Wayne,	5th Ed.		

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills	a. Knowledge and	الاسبوع
--------	------------------	---------

d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills					Understanding					الدراس ي
d.5	d.4	d. 3	d.2	d. 1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a. 3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university:	University of Benghazi
Programme name:	Molecular diagnostics
The course name:	Molecular Oncology
Course code:	MOLD-308
Academic year / level:	2023-2024. Third year

1. Basic information:

The course name:	Molecular Oncology
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	4 hours/week
Language	English
Academic year / level:	2023-2024. Third year
Course approval date	

1.1 hours per week

Lecture: (2 hours/week)

Practical: (2 hours/week)

Total: (hours 128)

Training: (-)

2. Aims of Course:

- a. To provide students with a comprehensive understanding of the molecular mechanisms that underlie the development and progression of cancer.
- b. To cover a broad range of topics, including genetics, epigenetics, signal transduction, genomics, proteomics, and metabolomics.
- c. To cover the use of various molecular techniques for cancer diagnosis, treatment, and prevention. The course will include lectures, laboratory sessions, and independent study.

d. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

1. Identify the key concepts and terminology related to cancer biology and molecular oncology
2. Describe the molecular mechanisms underlying oncogenesis, including genetic and epigenetic alterations
3. Outline the molecular pathways involved in tumor progression and metastasis
- Analyze the latest advances in cancer research and emerging trends in the field
4. Underline the potential impact of molecular oncology research on clinical practice and public health
5. Describe a comprehensive understanding of the molecular mechanisms that underlie the development and progression of cancer.
6. Define the role of genetics, epigenetics, signal transduction, genomics, proteomics, and metabolomics in cancer biology.
7. Understand the principles and techniques used in cancer diagnosis, treatment, and prevention.

b- Intellectual Skills:

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

1. Evaluate critically scientific literature related to cancer biology.
2. Design and carry out experiments to investigate the molecular mechanisms of cancer.

3. Analyze and interpret complex data sets related to cancer biology.

c- Professional and Practical Skills:

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

1. Demonstrate proficiency in laboratory techniques used in molecular oncology research
2. Illustrate effective communication skills to convey scientific concepts to both scientific and non-scientific audiences
3. Summarize the ethical issues related to cancer research and its application to clinical practice

d- General Skills:

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

1. Enhance effective time-management and organization skills
2. Develop effective teamwork and collaboration skills
3. Develop critical thinking and problem-solving skills to analyze complex biological problems

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction to Cancer Biology:				
Oncogenes and Tumor Suppressor Genes:				
Genetic and Epigenetic Alterations in Cancer:				
DNA Damage and Repair:				
Cell Signaling Pathways in Cancer:				
Tumor Microenvironment:				
Cancer Immunology and Immunotherapy:				
Molecular Diagnostics and Imaging in Cancer:				
Cancer Therapeutics:				
Precision Medicine:				
Cancer Stem Cells:				
Cancer Genomics:				
Translational Cancer Research:				
Cancer Epidemiology:				
Cancer Prevention				
Emerging Trends in Cancer Research:				
Total				

:Learning Methods .5

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place
The biology of cancer.	Garland Science.		Weinberg, R. A.	
Hallmarks of cancer: the next generation. Cell,			Hanahan, D., & Weinberg, R. A.	
Cellular and Molecular Immunology	Elsevier.	10th ed.	Abbas, A. K., Lichtman, A. H., & Pillai, S.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراس ي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35

																				36
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university:	University of Benghazi
Program name	Molecular diagnostics
The course name:	Biomedical Ethics and Scientific Integrity
Course code:	BMSC-401
Academic year / level:	2023-2024. Fourth year

1- Basic information:

the course name:	Biomedical Ethics and Scientific Integrity
Course coordinator	
Program (s) on which the course is given:	Molecular diagnostics
Teaching hours	2 hours/week
Language	English
Academic year / level:	2023-2024. Fourth year
Course approval date	

1.1 hours per week

Lecture: (2 hours/week)

Training: (-)

Total: (hours 96)

2- Aims of Course:

- a- To introduce students to the fundamental principles of biomedical ethics and scientific integrity, and the importance of these principles in the biomedical sciences
- b-To develop students' critical thinking skills, and their ability to analyze complex ethical issues that arise in biomedical research and practice
- c-To promote ethical decision-making skills in students, and to provide them with the tools necessary to navigate ethical dilemmas that may arise in their future careers in the biomedical sciences

3- Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

After completing this course, students should be able to demonstrate:

1. Understand fundamental principles of biomedical ethics and scientific integrity.
2. Describe the ethical frameworks and principles that are commonly used in biomedical research and practice.
3. Discuss ethical issues that arise in biomedical research and practice, using a range of ethical frameworks and principles

b- Intellectual Skills:

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

1. Evaluate complex ethical issues that arise in biomedical research and practice.
2. Plan well-reasoned arguments to support ethical decision-making.

c- Professional and Practical Skills:

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

1. Interpret scientific reports and communicate findings to colleagues.

d- General Skills:

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

1. Develop skills in teamwork and collaboration.
2. Improve problem-solving skills.
3. Develop time management skills.
4. Develop critical skill required in biomedical research and clinical practice.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction to Biomedical Ethics and Scientific Integrity				
Autonomy and Informed Consent				
Beneficence and Non-Maleficence				
Justice and Fairness				
Confidentiality and Privacy				
End-of-Life Issues				
Animal Research Ethics				
Ethics of Genetic Testing and Gene Editing				
Clinical Trials				
Organ Donation and Transplantation				
Public Health Ethics				
Reproductive Ethics				
Disability Ethics				
End-of-Life Ethics and Decision-Making				
Technology and Privacy Ethics				
Ethics of Innovation and Entrepreneurship in Biomedicine				
Introduction to Scientific Integrity				
Research Design and Data Collection				
Authorship and Publication				
Data Analysis and Interpretation				
Collaboration and Mentoring				
Conflicts of Interest and Professional Responsibility				
Scientific Integrity and Research Misconduct				
Scientific Integrity and Society				
Research Ethics				
International Perspectives on Scientific Integrity				
Total.				

5. Learning Methods:

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place
Principles of Biomedical Ethics.	New York Oxford University Press.	8th ed.	Beauchamp, T.L. and Childress, J.F.	
National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. On Being a Scientist: A Guide to Responsible Conduct in Research.	Washington, DC:The National Academies Press.	3rd ed.		

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills			a. Knowledge and Understanding	الاسبوع الدراس
d. General&	c. Professional & practical	b. Intellectual skills		

transferable skills					skills															☞
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university: University of Benghazi
Programme name: Molecular diagnostics
The course name: Infection Control and Safety
Course code: BMSC-402
Academic year / level: 2023-2024. Fourth year

1. Basic information:

the course name:	Infection Control and Safety
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	2 hours/week
Language	English
Academic year / level:	2023-2024. Fourth year
Course approval date	

1.1 hours per week

Lecture: (2 hours/week) Practical: (-) Training: (-) Total: (hours 64)

2. Aims of Course:

- a. To provide students with an understanding of the principles of infection control and safety in healthcare settings.
- b. to equip students with the knowledge and skills necessary to prevent and control infections, protect themselves and patients from hazards, and promote safe and healthy work environments.
- c. to cover a range of topics, including infection control practices, occupational health and safety, emergency preparedness, and risk assessment.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

- a1. Reproduce a comprehensive understanding of the principles of infection control and safety.
- a2. Identify the different types of infections and their modes of transmission.
- a3. State the role of healthcare professionals in preventing and controlling infections.
- a4. Describe the principles of occupational health and safety in healthcare settings.
- a5. Outline the principles of emergency preparedness in healthcare settings.

b- Intellectual Skills:

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

- b1. Evaluate the effectiveness of infection control practices in healthcare settings.
- b2. Analyze and assess the risks associated with healthcare practices.
- b3. Develop strategies to prevent and control infections in healthcare settings.
- b4. Develop emergency preparedness plans for healthcare settings.
- b5. Interpret and analyze infection control policies and procedures.

c- Professional and Practical Skills:

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

1. Apply infection control practices in healthcare settings.

2. Use appropriate personal protective equipment in healthcare settings.
3. Assess risk assessments in healthcare settings.
4. Illustrate and implement infection control policies and procedures.
5. Operate effectively with colleagues and patients about infection control practices.

d- General Skills:

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

- d1. Develop critical thinking skills.
- d2. Work effectively in teams.
- d3. Develop problem-solving skills.
- d4. Improve time management skills.
- d5. Develop effective communication skills.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction to Infection Control and Safety				
Infection Control Practices				
Personal Protective Equipment (PPE)				
Hand Hygiene				
Environmental Cleaning and Disinfection				
Sterilization and Disinfection of Medical Devices				
Infection Prevention and Control in Special Situations				
Occupational Health and Safety				
Emergency Preparedness				
Risk Assessment				
Healthcare-Associated Infections (HAIs)				
Outbreak Management				
Communicable Diseases				

Topic	Hours	Lectures	Lab.	Practical/ small groups
Immunization and Vaccination				
Infectious Waste Management				
Emerging Infectious Diseases				
Infection Control Policies and Procedures				
Infection Control Auditing and Surveillance				
Management of Infectious Diseases				
Infection Control in the Community				
Infection Control in Outpatient Settings				
Infection Control in Long-Term Care Facilities				
Infection Control in the Laboratory				
Infection Control Program Evaluation				
Infection Control in a Pandemic				
Total				

5. Learning Methods:

- a. Lectures
- b. Tutorial

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	40
2.	Final examination (Written,)	At the end of term	60
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place

--	--	--	--	--

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understandi ng					الاسبوع الدراس ي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21

																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university: University of Benghazi
Programme name: Molecular diagnostics
The course name: Molecular Diagnostic of Infectious Diseases
Course code: MOLD-403
Academic year / level: 2023-2024. Fourth year

1. Basic information:

the course name:	Molecular Diagnostic of Infectious Diseases
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	5 hours/week
Language	English
Academic year / level:	2023-2024. Fourth year
Course approval date	

1.1 hours per week

Lecture: (3 hours/week)

Practical: (2 hours/week)

Total: (hours 160)

Training: (-)

2. Aims of Course:

- a. To equip students with the necessary knowledge and practical skills required to work in a clinical laboratory
- b. to make informed decisions regarding the selection and interpretation of appropriate diagnostic tests for the diagnosis and management of infectious diseases.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

- a1. Define the principles and concepts of molecular diagnostics of infectious diseases.
- a2. Outline the different types of molecular techniques used in the diagnosis of infectious diseases.
- a3. Identify the interpretation of molecular diagnostic results.
- a4. Understand the principles and techniques used in molecular diagnostics of infectious diseases.
- a5. Describe the various molecular diagnostic methods used to identify and diagnose infectious diseases.
- a6. Define the clinical applications of molecular diagnostics in infectious diseases.
- a7. Analyze and interpret molecular diagnostic results in clinical setting.

b- Intellectual Skills:

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

- b1. Adapt critical thinking and problem-solving skills to molecular diagnostic techniques and their application in the diagnosis of infectious diseases.
- b2. Analyze and interpret molecular diagnostic results in a clinical setting.
- b3. Evaluate the performance of diagnostic tests and make informed decisions regarding the selection and interpretation of appropriate tests.

c- Professional and Practical Skills:

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

- c1. Demonstrate practical skills in molecular diagnostic techniques used in the diagnosis of infectious diseases.
- c2. Prepare and apply experimental protocols to optimize molecular diagnostic methods.
- c3. Operate collaboratively in a laboratory environment.

d- General Skills:

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

- d1. Communicate effectively through written and oral presentations.
- d2. Analyze and interpret scientific data.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction to Molecular Diagnostics				
Nucleic Acid Extraction Techniques				
Polymerase Chain Reaction (PCR)				
Real-Time PCR				
Reverse Transcriptase PCR (RT-PCR)				
Loop-Mediated Isothermal Amplification (LAMP)				
Next-Generation Sequencing (NGS)				
Microarray Technology				
Multiplex PCR				
Digital PCR				
Hybridization-Based Techniques				
MALDI-TOF Mass Spectrometry				
Infectious Disease Diagnostics in Developing Countries				
Clinical Applications of Molecular Diagnostics				

Topic	Hours	Lectures	Lab.	Practical/ small groups
Emerging Infectious Diseases				
Pathogen Genomics				
Total				

5. Learning Methods:

- a. Lectures
- b. Tutorial
- c. Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place
Real-time PCR in virology	Nucleic acids research		Mackay IM, Arden KE, Nitsche	
Tolerance of loop-mediated isothermal amplification to a culture medium and biological substances	Journal of bioscience and bioengineering.		Kaneko H, Kawana T, Fukushima E, Suzutani T.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understandi ng					الاسبوع الدراس ي
d. General & transferable skills					c. Professional & practical skills					b. Intellectual skills					a.5	a.4	a.3	a.2	a.1	
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				51
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				32
																				42
																				52
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34

																					35
																					36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university: University of Benghazi
Programme name: Molecular diagnostics
The course name: Molecular Therapeutics
Course code: MOLD-405
Academic year / level: 2023-2024. Fourth year

1. Basic information:

the course name:	Diagnostic Genetics
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	5 hours/week
Language	English
Academic year / level:	2023-2024. Fourth year
Course approval date	

1.1 hours per week

Lecture: (3 hours/week)

Practical: (2 hours/week)

Total: (hours 160)

Training: (-)

2. Aims of Course:

- a. To provide students with a comprehensive understanding of the principles and practices of molecular therapeutics, including the use of genetic, molecular, and cellular approaches to drug development, the optimization of drug efficacy and safety, and the regulatory and ethical considerations of drug development.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

- a1. **Define** the principles of molecular biology and their relevance to medicine
- a2. **Recognize** the techniques involved in the development of molecular therapeutics
- a3. **Describe** the different types of molecular targets for drug development
- a4. **Identify** the role of genomics and proteomics in drug discovery

b- Intellectual Skills:

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

- b1. **Evaluate** critically the scientific literature related to molecular therapeutics
- b2. Design and develop molecular therapeutics based on scientific principles

c- Professional and Practical Skills:

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

- c1. Apply molecular biology techniques in drug discovery and development
- c2. Communicate scientific information effectively to both scientific and non-scientific audiences
- c3. **Illustrate** the regulatory and ethical issues associated with the development and use of molecular therapeutics

d- General Skills:

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

- d1. **Develop** critical thinking and problem-solving
- d2. **Develop** effective communication

- d3. **Develop** Teamwork and collaboration
d4. **Develop** Time management and organization.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction				
Simple protein replacement therapy				
Recombinant protein production				
Recombinant vaccines				
Therapeutic antibodies and immunotherapy				
Transgenic animals				
Transplantation: a form of gene therapy				
Reproductive cloning				
Stem cell therapy				
Gene augmentation therapy				
Gene therapy trials for inherited diseases				
Gene silencing technologies				
Gene therapy for cancer				
Single-nucleotide polymorphisms (SNPs) and therapy				
Legislation, clinical trials and ethical issues				
Total				

5. Learning Methods:

- Lectures
- Tutorial
- Lab.

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	30
2.	Lab. Exam	Before the final examination	20
3.	Final examination (Written,)	At the end of term	50
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place
Principles of Molecular Medicine	Dan Longo	Second	J. Larry Jameson, Joseph Loscalzo,	

			Dennis Kasper, Stephen Hauser	
Molecular Medicine			Jens Kurreck, Tanja Weil, and Stefan Endres.	
Molecular Therapeutics	Springer		Greenwell, P., & McCulley, M.	

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراسي
d. General & transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				15
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				23
																				24
																				25
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

Skills															a. Knowledge and Understanding					الاسبوع الدراسي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				15
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				23
																				24
																				25
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

Skills															a. Knowledge and Understanding					الاسبوع الدراسي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				15
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				23
																				24
																				25
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



The name of university: University of Benghazi
Programme name: Molecular diagnostics
The course name: Seminar in Molecular Diagnostics
Course code: MOLD-408
Academic year / level: 2023-2024. Fourth year

1. Basic information:

the course name:	Seminar in Molecular Diagnostics
Course coordinator	
Programme (s) on which the course is given:	Molecular diagnostics
Teaching hours	1 hours/week
Language	English
Academic year / level:	2023-2024. Fourth year
Course approval date	

1.1 hours per week

Lecture: (1 hours/week) Practical: (-) Training: (-) Total: (hours 32)

2. Aims of Course:

- To develop students' critical thinking and presentation skills in the context of molecular diagnostics.
- To explore and present on a variety of topics related to the application of molecular diagnostic techniques in biomedical research and clinical practice.
- To promote critical thinking, effective communication, and research skills.
- To learn about new topics, share knowledge and ideas, and improve public speaking and presentation skills.

3. Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

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

- Describe** the principles of molecular biology and how they relate to disease diagnosis.
- Outline** the basics of DNA sequencing, PCR, gene expression analysis, and next-generation sequencing.
- Define** the applications of molecular diagnostics in clinical and research settings.

b- Intellectual Skills:

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

- Analyze and evaluate critically molecular diagnostic data.
- Synthesize and interpret molecular diagnostic data to formulate a diagnosis.
- Develop critical thinking and problem-solving skills.

c- Professional and Practical Skills:

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

- Demonstrate proficiency in public speaking and presentation skills.
- Interpret laboratory results and communicate findings effectively.
- Develop skills in conducting literature reviews and presenting scientific information.

d- General Skills:

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

- d1. **Develop** written and oral communication skills.
- d2. Develop teamwork and collaboration skills.
- d3. Develop time management and organizational skills.

4- Course Contents:

Topic	Hours	Lectures	Lab.	Practical/ small groups
Introduction to molecular diagnostics.				
Principles of molecular biology.				
DNA sequencing technologies and applications				
Polymerase chain reaction (PCR) techniques and applications.				
Gene expression analysis.				
Next-generation sequencing technologies and applications.				
Microarray technology and applications.				
Molecular diagnostics in cancer.				
Molecular diagnostics in infectious diseases.				
Molecular diagnostics in genetic disorders.				
Quality control and assurance in molecular diagnostics.				
Ethical considerations in molecular diagnostics.				
Applications of molecular diagnostics in personalized medicine.				
Trends and future directions in molecular diagnostics.				
Oral and written presentation skills in molecular diagnostics.				
Total				

5. Learning Methods:

- a. Lectures
- b. Tutorial

6. Assessment methods:

	Assessment Type	Date	%
1.	First assessment	16 th week of first term.	40
2.	Final examination (Written,)	At the end of term	60
Total			100

7. List of References:

Title	Publisher	copy	authors	Available place

8. Facilities Required for Teaching and Learning:

	Facilities Required	Notes
1.		
2.		
3.		

Course Coordinators

.....

Head of Department

.....

Date:...../...../.....

Skills															a. Knowledge and Understanding					الاسبوع الدراسي
d. General& transferable skills					c. Professional & practical skills					b. Intellectual skills										
d.5	d.4	d.3	d.2	d.1	c.5	c.4	c.3	c.2	c.1	b.5	b.4	b.3	b.2	b.1	a.5	a.4	a.3	a.2	a.1	
																				1
																				2
																				3
																				4
																				5
																				6
																				7
																				8
																				9
																				10
																				11
																				12
																				13
																				14
																				15
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				23
																				24
																				25
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36