



الجمهورية اليمنية
وزارة التعليم العالي والبحث العلمي
جامعة ٢١ سبتمبر للعلوم الطبية والتطبيقية
كلية الطب المخبري
قسم الكيمياء الحيوية
وحدة التطوير وضمان الجودة

Republic of Yemen
Ministry of Higher Education & Scientific Research
21 SEPTEMBER UMAS
Faculty of Laboratory medicine
Department of
Unit of Development & Quality assurance

Republic of Yemen
Ministry of Higher Education & Scientific Research
21 SEPTEMBER UNIVERSITY of MEDICALS & APPLIED
SCIENCES



Faculty of Laboratory Medicine.

Department of BIOCHEMISTRY And Molecular Biology
Course Specification of Molecular Biology and Genetics
Course No. (03.01.315)

2022-2023

I. Course Identification and General Information:

1	Course Title:	Molecular Biology and Genetics		
2	Course Code & Number:	03.01.315		
3	Credit Hours:	Theory Hours		Credit Hours
		Lecture	Practical	
		2	2	
4	Study Level/ Semester at which this Course is offered:	2nd Level / 2nd Semester		
5	Pre –Requisite (if any):	General Biology		
6	Co –Requisite (if any):	None		
7	Program (s) in which the Course is Offered:	Faculty of Laboratory medicine		
8	Language of Teaching the Course:	English		
9	Study System:	Semester		
10	Mode of Delivery:	Regular		
11	Location of Teaching the Course:	University Campus		
12	Prepared by:	Dr. Nabeel Aloery		
13	Date of Approval:	2022-2023		

II. Course Description:

This course provides an overview of the principles and techniques of molecular biology and genetics. It covers topics such as DNA replication, transcription, translation, genetic regulation, genetic engineering, and genomics.

III. Alignment Course Intended Learning Outcomes with program outcomes		
III. Course Intended Learning Outcomes (CILOs)		Referenced PILOs
A. Knowledge and Understanding: <i>Upon successful completion of the course, students will be able to:</i>		
a1	Understanding of the principles of molecular biology and genetics.	A1
B. Intellectual Skills: <i>Upon successful completion of the course, students will be able to:</i>		
b1	Develop critical and analytical thinking to apply molecular biology and genetics concepts to solve problems.	B3
C. Professional and Practical Skills: <i>Upon successful completion of the course, students will be able to:</i>		
c1	Critically evaluate the scientific literature in molecular genetics and the advantages and disadvantages of different molecular diagnostic techniques.	C3
D. Transferable Skills: <i>Upon successful completion of the course, students will be able to:</i>		
d1	Demonstrate responsibility for professional Laboratory Medicine practice including the essential values of ethics, self-respect, honesty, autonomy, humanity and social justice.	D4

IV. Alignment Course Intended Learning Outcomes with Teaching Strategies and Assessment Methods :			
(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1	Understanding of the principles of molecular biology and genetics.	Lectures	exam
(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:			

	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1	Develop critical and analytical thinking to apply molecular biology and genetics concepts to solve problems.	Lectures	exam
C Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1	Critically evaluate the scientific literature in molecular genetics and the advantages and disadvantages of different molecular diagnostic techniques.	Practical Lectures	Practical exam
(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1	Demonstrate responsibility for professional Laboratory Medicine practice including the essential values of ethics, self-respect, honesty, autonomy, humanity and social justice.	Lectures, seminars	Exam, seminars

V. Course Content:					
A – Theoretical Aspect:					
N O.	Units/Topics List	Sub Topics List	Number of Weeks		Learning Outcomes (CILOs)
1	Introduction to Molecular Biology and Genetics	<ul style="list-style-type: none"> - Definition of Molecular Biology and Genetics - Historical Development of Molecular Biology and Genetics - The Central Dogma of Molecular Biology - Research Methods in Molecular Biology and Genetics 	1	2	a1

2	DNA Structure and Replication	-DNA Structure and Function -DNA Replication Mechanisms -DNA Repair Mechanisms -DNA Recombination	1	2	a1
3	Transcription and RNA Processing	- RNA Structure and Function - Transcription Mechanisms - RNA Processing - RNA Editing	1	2	a1
4	The Central Dogma of Molecular Biology The flow of genetic information The replication of DNA The transcription of DNA into RNA The translation of RNA into protein Translation and Protein Synthesis	- Protein Structure and Function - Translation Mechanisms - Post-Translational Modifications - Protein Folding and Quality Control	1	2	a1,b1
5	Genetic Regulation	- Gene Expression Regulation - Transcriptional Regulation - Post-Transcriptional Regulation - Epigenetics	1	2	a1,b1
6	Med tem exam		1	2	
7	Genetic Analysis	- Mendelian Genetics - Pedigree Analysis - Linkage and Mapping - Quantitative Genetics	2	4	b1,c1
8	Genetic Engineering	- Restriction Enzymes and DNA Cloning - Polymerase Chain Reaction (PCR) - Gene Editing Technologies - Transgenic Organisms	2	4	a1,b1,c1
9	Genomics	- Genome Sequencing - Genome Annotation - Comparative Genomics - Functional Genomics	1	2	a1,b1
10	Ethical and Legal Issues	- Ethical Issues in Genetic	1	2	b1,d1



	in Molecular Biology and Genetics	Research - Genetic Counseling and Testing - Intellectual Property Rights - Regulation of Genetic Engineering			
11	FINAL THEORTICAL		1	2	
			11	22	

V. Teaching Strategies of the Course:

1-	Lectures
2-	Practical session
3-	seminars

VI. Assessment Methods of the Course:

No	Assignment
1	Written Exams (Short Essays) and Quizzes
2	Written Exams (MCQ)
3	Practical exams

VII. Assignments:

No.	Assignments	Week Due	Mark	Proportion of Final Assessment	Aligned CILOs (symbols)
1	Midterm Exam	8	20	20%	a1,b1,d1
4	Practical exam	12	30	30%	a1,b1,c1,d1
5	Final Exam	16	50	50%	a1,b1,d1
Total					

Learning Resources:
1- Required Textbook(s)
1- Robert L. Nussbaum - Thompson & Thompson Genetics in Medicine - 8th Edition 2016.
2- Nancy Craig, Rachel Green, Carol Greider · 2014: Molecular Biology:Principles of Genome Functionbooks. 7th Edition google.com › books
2- Essential References.
1 - peter d. turnpenny – emery; elements of medical genetics – 13th edition.
2- william b. coleman and gregory j. tsongalis – 2010 - molecular diagnostics – second edition - springer new york dordrecht heidelberg london
3- Electronic Materials and Web Sites etc.
1- <u>Learn Genetics</u> ;
2- <u>The World Health Organization (WHO) website</u> : https://www.who.int/
3- <u>American Society of Human Genetics</u> ;

X. Course Policies: (Based on the Uniform Students' By law (2007))



1	<p>Class Attendance: Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.</p>
2	<p>Tardiness: A student will be considered late if he/she is not in class after 10 minutes of the start time of class.</p>
3	<p>Exam Attendance/Punctuality: No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.</p>
4	<p>Assignments & Projects: Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.</p>
5	<p>Cheating: Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
6	<p>Forgery and Impersonation: Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
7	<p>Other policies: The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.</p>