

## Course Syllabus

1	<b>Course title</b>	Molecular Biology	
2	<b>Course number</b>	0334382	
3	<b>Credit hours</b>	3	
	<b>Contact hours (theory, practical)</b>	(2,1)	
4	<b>Prerequisites/corequisites</b>	Biology 0304101	
5	<b>Program title</b>	B.Sc. in Biological Sciences	
6	<b>Program code</b>	04	
7	<b>Awarding institution</b>	The University of Jordan	
8	<b>School</b>	School of Science	
9	<b>Department</b>	Biological Sciences	
10	<b>Course level</b>	Third year	
11	<b>Year of study and semester(s)</b>	2022/2023, First Semester	
12	<b>Other department(s) involved in teaching the course</b>	Non	
13	<b>Main teaching language</b>	English	
14	<b>Delivery method</b>	<input checked="" type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online	
15	<b>Online platforms(s)</b>	<input checked="" type="checkbox"/> Moodle <input type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....	
16	<b>Issuing/Revision Date</b>	Oct.10.2022	



### 17 Course Coordinator:

Name: Dr. Khaldoun Al-Hadid

Contact hours: Sun: 9:30- 10:30, Mon: 10:15- 11:15

Office number: 208

Phone number: 22203

Email: kalhadid@ju.edu.jo

### 18 Other instructors:

Name: Non

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

### 19 Course Description:

As stated in the approved study plan.

This course aims to introduce the students to the basic concepts of molecular biology. The first part covers the molecular nature of genes and organization of prokaryotic and eukaryotic chromosomes. The second part covers DNA replication, repair gene expression and gene regulation. Genomics, analysis of gene structure, and gene expression are covered briefly. Students are required to read selected chapters as self-studying. In the laboratory, the students learn hands-on techniques of recombinant DNA technology.

## 20 Course aims and outcomes:

### A- Aims:

This course aims to introduce the students to the basic concepts of molecular biology. The first part covers the molecular nature of genes and organization of prokaryotic and eukaryotic chromosomes. The second part covers DNA replication, repair gene expression and gene regulation. Genomics, analysis of gene structure, and gene expression are covered briefly. Students are required to read selected chapters as self-studying. In the laboratory, the students learn hands-on techniques of recombinant DNA technology.

### B- Students Learning Outcomes (SLOs):

Upon successful completion of this course, students will be able to:

1. Describe the DNA, RNA and chromosomes structures.
2. Describe DNA replication process.
3. Describe the gene transcription process in prokaryotes.
4. Describe gene translation process.
5. Describe the regulation of gene expression.
6. Gaining laboratory skills such as micropipetting, DNA extraction, electrophoresis, and DNA blotting.

SLOs SLOs of the course	SLO (1)	SLO (2)	SLO (3)	SLO (4)
1				
2				
3				
4				
5				
6				

## 21. Topic Outline and Schedule:

Week	Lecture	Topic	Intended Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	E v a l u a t	Resources

								i o n M e t h o d s
1	1.1	Introduction		Face to Face	-	-		
	1.2	Introduction		Face to Face	-	-		
	1.3	<b>Lab 1: Introduction, Safety Instructions</b>		Face to Face	-	-		
2	2.1	Introduction to Molecular Biology_ Chapter 1	1	Face to Face	-	-		Principles of Molecular Biology 1-22
	2.2	Introduction to Molecular Biology_ Chapter 1	1	Face to Face	-	-		
	2.3	<b>Lab 2: Micropipetting, Agarose gel electrophoresis</b>	6	Face to Face	-	-		
3	3.1	Introduction to Molecular Biology_ Chapter 1	1	Face to Face	-	-		
	3.2	Introduction to Molecular Biology_ Chapter 1	1	Face to Face	-	-		

	3.3	<b>Lab 3: <i>E. coli</i> genomic DNA extraction</b>	6	Face to Face	-	-	
4	4.1	Nucleic Acid Structure-Chapter 3	1	Face to Face	-	-	Principles of Molecular Biology 81-108
	4.2	Nucleic Acid Structure-Chapter 3	1	Face to Face	-	-	
	4.3	<b>Lab 4: Quantitative and Qualitative Measurement of DNA</b>	6	Face to Face	-	-	
5	5.1	Nucleic Acid Structure-Chapter 3	1	Face to Face	-	-	
	5.2	Nucleic Acid Structure-Chapter 3	1	Face to Face	-	-	
	5.3	<b>Lab 5: PCR Amplification of <i>E. coli</i> rDNA</b>	6	Face to Face	-	-	
6	6.1	Chromosomes_ Chapter 5	1	Face to Face	-	-	Principles of Molecular Biology _151-180
	6.2	Chromosomes_ Chapter 5	1	Face to Face	-	-	

	6.3	<b>Lab 6: Southern Blot</b>	6	Face to Face	-	-		
7	7.1	DNA Replication_ Chapter 8	2	Face to Face	-	-		Principles of Molecular Biology _ 265-311
	7.2	DNA Replication_ Chapter 8	2	Face to Face	-	-		
	7.3	<b>Lab 7: Plasmid Isolation</b>	6	Face to Face	-	-		
8	8.1	Revision		Face to Face	-	-		
	8.2	Midterm Exam		Face to Face	-	-		
	8.3	<b>Lab 8: Restriction Enzymes</b>	6	Face to Face	-	-		
9	9.1	Expression of Genes_ chapter 17	3 & 4	Face to Face	-	-		Biology – Campbell_ 385-410
	9.2	Expression of Genes_ chapter 17	4	Face to Face	-	-		
	9.3	<b>Lab 9: Restriction mapping of Plasmid DNA</b>	6	Face to Face	-	-		
10	10.1	Expression of Genes_ chapter 17	4	Face to Face	-	-		
	10.2	Expression of Genes_ chapter 17	4	Face to Face	-	-		
	10.3	<b>Lab 10: Bioinformatics</b>	6	Face to Face	-	-		

11	11.1	Expression of Genes_ chapter 17	4	Face to Face	-	-		
	11.2	Expression of Genes_ chapter 17	4	Face to Face	-	-		
	11.3	<b>Lab 11: DNA Cloning</b>	6	Face to Face	-	-		
12	12.1	Bacterial Transcription and Its regulation_ Chapter 12_12.1, 12.2, 12.3, 12.4, 12.5	3	Face to Face	-	-		Principles of Molecular Biology_ 408-436
	12.2	Bacterial Transcription and Its regulation_ Chapter 12_12.1, 12.2, 12.3, 12.4, 12.5	3	Face to Face	-	-		
	12.3	<b>Lab 12: Gene Knockout and Expression</b>	6	Face to Face	-	-		
13	13.1	Control of Gene Expression_ Chapter_18_18.1, 18.2, 18.3	5	Face to Face	-	-		Biology – Campbell_413-429
	13.2	Control of Gene Expression_ Chapter_18_18.1, 18.2, 18.3	5	Face to Face	-	-		
	13.3	<b>Lab 13: Purification of the Green Fluorescent Protein (GFP)</b>	6	Face to Face	-	-		

14	14.1	Control of Gene Expression_Chapter_18_18.1, 18.2, 18.3	5	Face to Face	-	-		
	14.2	Control of Gene Expression_Chapter_18_18.1, 18.2, 18.3	5	Face to Face	-	-		
	14.3	<b>Lab 14: Purification of the Green Fluorescent Protein (GFP), part 2</b>	6	Face to Face	-	-		
15	15.1	Control of Gene Expression_Chapter_18_18.1, 18.2, 18.3	5	Face to Face	-	-		
	15.2	Control of Gene Expression_Chapter_18_18.1, 18.2, 18.3	5	Face to Face	-	-		
	15.3	Lab 15: Final Exam						

## 22 Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
Midterm Exam	30	Chapters: 1,3 & 5	1 & 2	Tus, Dec.6.2022	In Campus
Lab Quizzes	15	The lab of the week	6	Every lab	In campus
Lab Reports	5				





Final Exam	50	All the materials	1, 2, 3, 4, 5, 6	To be announced	In Campus
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### 23 Course Requirements

(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform...etc): Non

### 24 Course Policies:

A- Attendance policies: Absence from lectures should not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course.

B- Absences from exams and submitting assignments on time: You should contact **your instructor** as soon as possible if you miss an exam. All such cases will be dealt with according to the rules outlined in your student handbook.

C- Health and safety procedures: Students should follow the general lab safety rules during conducting the experiments in the lab.

D- Honesty policy regarding cheating, plagiarism, misbehavior: All violations pertaining to cheating, plagiarism, misbehavior will be dealt with in accordance with the rules outlined in your student handbook.

E- Grading policy: All the exams will be conducted in the campus and will be graded according to the evaluation method table mentioned above.

F- Available university services that support achievement in the course:

- University of Jordan's E-Learning online educational portal → <http://www.elearning.ju.edu.jo>
- Optional mobile application to access E-Learning platform (Moodle)

### 25 References:

A- Required book(s), assigned reading and audio-visuals:

Principles of Molecular Biology by Burton E, Tropp\_ 1<sup>st</sup> Ed.\_ 2014, Biology\_Campbell\_ 11<sup>th</sup> Ed.\_2016

B- Recommended books, materials, and media:



Video clips will be posted on e learning website.

## 26 Additional information:

Name of Course Coordinator: ---Dr. Khaldoun Al-Hadid-----Signature: ----- Date: --Oct.9.2022----- -----
Head of Curriculum Committee/Department: -----Signature: ----- -
Head of Department: --Dr. Amer Imraish ----- Signature: -----
Head of Curriculum Committee/Faculty: ----- Signature: ----- -
Dean: ----- Signature: -----