



## Course Specifications

<b>Course Title:</b>	Molecular Biology
<b>Course Code:</b>	ZOO 342
<b>Program:</b>	Zoology
<b>Department:</b>	Zoology
<b>College:</b>	Science
<b>Institution:</b>	King Saud University

## B. Course Objectives and Learning Outcomes

### 1. Course Description

Molecular Biology is the study of biological systems at the molecular level. The course is dealing with the interaction between nucleic acids and proteins. In other words, the course is mainly dealing with the central dogma of molecular biology and the information flow from DNA to protein in both eukaryotic and prokaryotic cells. The course will also deal with the different types of regulations that are involved in this information flow process. The students also will be provided with the experimental approaches used to perform research in molecular biology. Important molecular biology methodologies will be introduced in this course such as gene cloning, PCR, DNA sequencing, PCR, and others. Emphasis will be placed on understanding basic concepts and on the integration of these concepts for problem-solving.

### 2. Course Main Objective

- Structures and interactions of macromolecules (DNA, RNA, and Proteins).
- Flow of genetic information from DNA to proteins
- DNA replication.
- Transcription regulation in Prokaryotes and eukaryotes
- Post-transcriptional events (splicing, capping and polyadenylation)
- Overview of Translation and Translation control
- Techniques and applications of molecular biology.

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
<b>1</b>	<b>Knowledge and Understanding</b>	
1.1	Identifying characteristics of the genetic material and DNA structure.	K1, K2
1.2	Recognizing DNA organization in chromosomes and DNA replication.	K1, K2
1.3	Describing gene expression regulation process.	K1, K2
1.4	Identifying polymerase Chain Reaction (PCR) and DNA sequencing.	K3
<b>2</b>	<b>Skills :</b>	
2.1	Prepare lab solutions and reagents.	S1
2.2	Understanding instructions and operate equipment	S1, S2
<b>3</b>	<b>Values:</b>	
3.1	Ability to work in a team to conduct a specific experiment.	V1
3.2	Ability to present results of work to classmates.	V2

## C. Course Content

No	List of Topics	Contact Hours
1	Introduction to the macromolecules of life DNA, RNA, and Protein	1
2	Structures of DNA, RNA, and Proteins	2
3	DNA organization and Replication in prokaryotes and eukaryotes	2
4	The central dogma of molecular Biology and Gene expression concept	2
5	Transcriptional regulation in prokaryotes	1
6	Transcriptional regulation in Eukaryotes	1
7	Overview of translation control	1
8	Post-translational modifications	1
9	Important techniques in Molecular biology	2

<b>Total</b>	13
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## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and Understanding</b>		
1.1	Identifying characteristics of the genetic material and DNA structure.	In class lecturing (using PowerPoint presentation and illustrations) Laboratory practice on new techniques involved in DNA technology, DNA extraction and PCR implication. Activities and Assignments	Written and oral periodical and final exams
1.2	Recognizing DNA organization in chromosomes and DNA replication.		Evaluation of lab activities results.
1.3	Describing gene expression regulation process.		Written and oral periodical and final exams
1.4	Identifying polymerase Chain Reaction (PCR) and DNA sequencing.		Lab exams and reports.
<b>2.0</b>	<b>Skills</b>		
2.1	Prepare lab solutions and reagents.	Use of genetic illustrations and power point presentation Laboratory training on different DNA techniques. Instructions on search engines for molecular biology	Evaluation of student lab. activities
2.2	Understanding instructions and operate equipment		Evaluation of lab reports on operating equipment
<b>3.0</b>	<b>Values</b>		
3.1	Ability to work in a team to conduct a specific experiment.	Close monitoring while performing Practical work Using power point presentation and illustration	Assessment of student cooperation in lab sessions.
3.2	Ability to present results of work to classmates.		Evaluation of group discussions.

### 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	<b>Class activates ( Homework, activities, discussion)</b>	<b>3, 5, 8, 12</b>	<b>10%</b>
2	<b>Monthly Exams.</b>	<b>7, 12</b>	<b>20%</b>
3	<b>Lab. Exam.</b>	<b>13</b>	<b>30%</b>
4	<b>Final Exam.</b>	<b>15</b>	<b>40%</b>
5			
6			
7			
8			

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)