



Course Specifications

Course Title:	Molecular Biology
Course Code:	MBIO 251
Program:	Microbiology (B.Sc.)
Department:	Botany and Microbiology
College:	Science
Institution:	King Saud University

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A. Course Identification

1. Credit hours: 2 (1+0+2)
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input type="checkbox"/> Elective <input checked="" type="checkbox"/>
3. Level/year at which this course is offered:
4. Pre-requisites for this course (if any): MBIO140
5. Co-requisites for this course (if any):

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100
2	Blended	-	-
3	E-learning	-	-
4	Distance learning	-	-
5	Other	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	15
2	Laboratory/Studio	30
3	Tutorial	-
4	Others (specify)	-
	Total	30

B. Course Objectives and Learning Outcomes

1. Course Description

Overview of genetic material DNA assembly and structure/function relationships. DNA replication and gene expression and regulation – Gene cloning and chemical analysis of DNA restriction enzyme – Genetic engineering concept and its applications in the field of microbiology - The basic molecular Biology techniques such as DNA extractions, DNA restriction enzyme, PCR and related techniques.

2. Course Main Objective

This course is designed to provide students with a background in molecular biology. The three main objectives of this course are:

- 1-Students will identify the genetic material, DNA assembly and the relationship between structure and function.
- 2- Students will understand the gene expression and gene regulation.
- 3- Students will recognize the approaches used in molecular biology.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding:	
1.1	At the end of this course, students will be able to identify characteristics of the DNA and RNA structures	K4
1.2	At the end of this course, students will be able to understand the mechanisms of replication, transcription, translation, genetic code and protein structures	K4
1.3	At the end of this course, students will be able to outline gene cloning, genetic engineering, its application and Molecular tools for studying genes and gene activity	K4
2	Skills:	
2.1	At the end of this course, students will be able to prepare lab solutions and reagents.	S1
2.2	At the end of this course, students will be able to understand instruction manual and operate DNA equipment's.	S1
2.3	At the end of this course, students will be able to build a strong background in the principles/methods of molecular biology.	S1
2.4	At the end of this course, students will be able to improve scientific writing skills.	S2
2.5	At the end of this course, students will be able to improve presentation skills and gain experience with online databases.	S3
3	Values:	
3.1	At the end of this course, students will be able to work cooperatively in a small group environment.	V1

C. Course Content

No	List of Topics	Contact Hours
1	Introduction of molecular biology	2(1+0+2)
2	Physical Chemistry of Nucleic Acids and DNA structure.	2(1+0+2)
3	DNA replication.	2(1+0+2)
4	RNA structure and its types	4(2+0+4)
5	Gene expression and regulation	6(3+0+6)
6	Genetic code and protein structures.	4(2+0+4)
7	Gene cloning	4(2+0+4)
8	Genetic engineering and its application	2(1+0+2)
9	Molecular tools for studying genes and gene activity	4(2+0+4)
Total		30

D. Teaching and Assessment

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

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge		
1.1	At the end of this course, students will be able to identify characteristics of the DNA and RNA structures	Lecture (using PowerPoint presentation and illustrations).	Theoretical exams, Quizzes
1.2	At the end of this course, students will be able to understand the mechanisms of replication, transcription, translation, genetic code and protein structures	Lecture (using PowerPoint presentation and illustrations) Homework, tasks	Theoretical exams, Quizzes, Performance-based assessments using rubrics.
1.3	At the end of this course, students will be able to outline gene cloning, genetic engineering, its application and Molecular tools for studying genes and gene activity	Lecture (using PowerPoint presentation and illustrations).	Theoretical exams, Quizzes
2.0	Skills		
2.1	At the end of this course, students will be able to prepare lab solutions and reagents.	Practical activities	Practical exam.
2.2	At the end of this course, students will be able to understand instructions and operate DNA equipment's.	Practical activities	Practical exam.
2.3	At the end of this course, students will be able to build a strong background in the principles/methods of molecular biology.	Practical activities	Practical exam.
2.4	At the end of this course, students will be able to improve scientific writing skills.	Writing lab reports.	Performance-based assessments using rubrics.
2.5	At the end of this course, students will be able to improve presentation skills and gain experience with online databases.	-Reading and evaluating scientific articles. - Oral presentation -Searching through the internet.	Performance-based assessments using rubrics.
3.0	Values:		
3.1	At the end of this course, students will be able to work cooperatively in a small group environment.	Practical activities.	Direct observation using rubrics

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	First exam	7 th	13
2	Second exam	11 th	13
3	Final practical exam	13 th	30
4	Final theoretical exams	16 th	40
5	Homework, quizzes, tasks.....		4

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

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

- Email, blackboard and faculty personal website
- Office hours
- Practical support

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Molecular Biology 4 th edition by Weaver, Robert F. (2008)
Essential References Materials	http://www.asbmb.org/
Electronic Materials	https://www.ncbi.nlm.nih.gov/
Other Learning Materials	Microsoft office package

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Modern lecture rooms equipped with all materials.
Technology Resources (AV, data show, Smart Board, software, etc.)	Computer room containing at least 20 systems connected to the internet to be used by the students
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Availability of chemicals, glassware and equipment relevant to the course material. Safety facilities

G. Course Quality Evaluation


Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching & assessment, learning resources	Students, Graduates, teaching staff	Student's questionnaires and course reports (indirect)
Achievement of students and learning outcomes	Teaching staff and students	practical and theoretical exams, reports, Quizzes (direct)
Quality of learning resources	Student, Teaching staff, internal and external auditors	Course Survey and visits (indirect)
Curriculum and learning resources	Students, teaching staff	Course evaluation surveys (indirect)
Availability of Facilities and Equipment	Students and teaching staff	Student and teaching staff questionnaires.

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Academic Accreditation and Evaluation Committee 
Reference No.	Update-1443
Date	7/10/1443H