



Course Specifications

Course Title:	Biotechnology
Course Code:	412 BIO
Program:	Biology
Department:	Biology
College:	Science
Institution:	Jazan University

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A. Course Identification

1. Credit hours:			
2. Course type			
a.	University <input type="checkbox"/>	College <input type="checkbox"/>	Department <input checked="" type="checkbox"/>
b.	Required <input checked="" type="checkbox"/>	Elective <input type="checkbox"/>	Others <input type="checkbox"/>
3. Level/year at which this course is offered: 8/4 th year			
4. Pre-requisites for this course (if any): Molecular biology 411BIO			
5. Co-requisites for this course (if any): Non			

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	13 H	86.7%
2	Blended	2 H	13.3%
3	E-learning	-	-
4	Distance learning	-	-
5	Other	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	10
2	Laboratory/Studio	3
3	Tutorial	-
4	Others (specify)	-
	Total	45

B. Course Objectives and Learning Outcomes

1. Course Description							
Course Title	Course No.	Credit Units			Year	Level	Pre-Requisite
		Theoretical	Practical	Total			
Biotechnology	412BIO	1	1	2	4 th	8 th	411Bio
1) Course Objectives: Study of applications of biotechnology in the different fields.							
2) Course Contents: This course covers the different branches and applications of biotechnology with special emphasis on the fundamental principles of handling and manipulating DNA in the different organisms							
3) Practical:							

The techniques for isolating genes and the subsequent engineering of these genes are discussed with an emphasis on the way engineered genes may be used to create transgenic, microbes, animals and plants or to produce recombinant proteins in cell factories.

4) Assessment:

Theoretical: Essay/Objective, oral, class work, research work, Exams

Practical: Identifying and modern techniques in biotechnology.

Theoretical: 25% marks

Practical: 25% marks

Final: 50% marks

5) Teaching Methods:

Lectures, photographs, multimedia, web-based learning.

6) Text Books:

١. رولف د. شميذ. ٢٠٠٣. دليل التقانة الحيوية و الهندسة الوراثية. سلسلة كتب التقنيات الاستراتيجية و المتقدمة. مدينة الملك عبد العزيز للعلوم و التقنية.
٢. عبد المنعم محمد الاعسر. ٢٠١٤. مقدمة في التقنية الحيوية. المكتبة الاكاديمية. القاهرة.

7) References:

- Glazer A.N., Nikaido H. (2010) **Microbial Biotechnology - Fundamentals of Applied Microbiology**, Cambridge University Press, Cambridge.
- F. Sambrook, R.W. Russell (2008) **Molecular Cloning. Laboratory Manual**. Cold Spring Harbour Laboratory Press.

2. Course Main Objective

This course aims at giving the student knowledge in the fields:

- DNA and RNA.
- Use Microbes in biotechnology.
- Human Genome Project, Proteomes and Bioinformatics.
- Tools of Biotechnology.
- Traditional biotechnology and fermentation.
- Farm Products
- Pharmaceutical Products
- Gene Therapy.
- Forensics
- Bioremediation
- Food technology.
- Bio-ethics

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Display a broad understanding and critical view of the principal, theories, functions, concepts and terminology of Biotechnology.	K1
1.2	Demonstrate significant knowledge in a range of different perspectives or schools of thought that underpin the principal, concepts, theories, functions, practices, and literature of Biotechnology.	K2
1.3	Appraise the current academic relevance of biological techniques, theories, mechanisms, functions, and methodologies to the new trends in Biotechnology.	K3
2	Skills :	
2.1	Explain aspects, mechanisms, theories, functions, and processes relevant to Biotechnology.	S1
2.2	Compare different structures, functions, and features related to Biotechnology.	S2

CLOs		Aligned PLOs
2.3	Analysis of complex information related to Biotechnology.	S4
3	Values:	
3.1	Conduct independent research and methodologies in biological laboratories, either individually or in groups using IT resources considering risk assessment and lab safety,	V1

C. Course Content

No	List of Topics	Contact Hours
1	DNA and RNA.	1
2	Use Microbes in Biotechnology.	1
3	Human Genome Project, Proteomes and Bioinformatics.	1
4	Tools of Biotechnology.	2
5	Traditional biotechnology and fermentation.	2
6	Farm Products	1
7	Pharmaceutical Products	1
8	8- Gene Therapy.	1
9	Forensics	1
10	Bioremediation	1
11	Food technology.	1
12	Bioethics	1
Total		14

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 and Understanding		
1.1	Concepts and terminology of Biotechnology	Lectures, Lab work	Quizzes, Short Answer Question (SAQ), MCQs
1.2	Theories, functions, practices of Biotechnology	Lectures, Lab work	Quizzes, SAQ, MCQ,
1.3	Methodologies to the new trends in Biotechnology.	Lectures, Lab work	Quizzes, SAQ, MCQ,
2.0	Skills		
2.1	Explain aspects and processes relevant to Biotechnology	Lectures, Lab work,	Quizzes, SAQ
2.2	Compare different structures and features related to Biology courses,	Lectures, Lab work, Group Discussion	Quizzes, SAQ, Lab work assessment
2.3	Analysis of complex information related to Biotechnology.	Lab work and Lectures	SAQ, Lab work assessment
3.0	Values		
3.1	Illustrate ability to work in groups and peer individual responsibility. Demonstrate risk assessment and safety responsibilities in their fields.	Group Discussion, Lab work	Lab work assessment and assignments

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Written assignment	3	3
2	Group assignment	4	2
3	1 st Theoretical quiz	5	5
4	Mid-term exam	7	10
5	Practical Mid-term exam	9	10
6	2 nd Theoretical quiz	11	5
7	Final practical exam	13	15
8	Final Exam	15	50

*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 :

10 Office hours/Faculty/week

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	1. رولف د. شميد. ٢٠٠٣. دليل التقنية الحيوية و الهندسة الوراثية. سلسلة كتب التقنيات الاستراتيجية و المتقدمة. مدينة الملك عبد العزيز للعلوم و التقنية. عبد المنعم محمد الاعسر. ٢٠١٤. مقدمة في التقنية الحيوية. المكتبة الاكاديمية. القاهرة. 2.
Essential References Materials	- Glazer A.N., Nikaido H. (2010) Microbial Biotechnology - Fundamentals of Applied Microbiology, Cambridge University Press, Cambridge. - F. Sambrook, R.W. Russell (2008) Molecular Cloning. Laboratory Manual. Cold Spring Harbour Laboratory Press.
Electronic Materials	
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1 Lecture room(s) for groups of 50 students. 1 Laboratory for group of 25 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	AV, data show, Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Light microscopes, glassware, chemicals, consumables, dissection tools.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students, Faculty	Direct (Questionnaire)
Effectiveness of assessment	Peer Reviewer	Direct (Cross Check marking)
Extent of achievement of course learning outcomes	Program Leader	Indirect (QA Committee)
Quality of learning resources	QA. Committee	Indirect (Benchmarking)

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	
Reference No.	
Date	