



Course Specifications

Course Title:	Microbial Biotechnology
Course Code:	2054104-3
Program:	Bachelor of Biotechnology
Department:	Department of Biotechnology
College:	College of Science
Institution:	Taif University

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A. Course Identification

1. Credit hours: 3 (2 Lecture, 1 Lab)
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 10th level/4th year
4. Pre-requisites for this course (if any): Immunology, 2053104-3
5. Co-requisites for this course (if any): None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	Blended		
3	E-learning		
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	30
3	Tutorial	
4	Others (specify)	
	Total	60

B. Course Objectives and Learning Outcomes

<p>1. Course Description</p> <p>This course covers the microbial applications of biotechnology. Topics include microorganisms as genetic model organisms, genetic manipulation of microorganisms, fermentation technology, microorganisms with biotechnological applications: (bacterial conjugation, microbial hosts for genetic manipulation, cultivation, starter culture technology, bioreactors). The course also will cover the use of microorganisms for production of chemicals and pharmaceuticals, for production and transformation of food and beverages, for production of natural antimicrobials and their application in the food industry, for bioremediation, for generation of energy, and for production of biotherapeutics.</p>
<p>2. Course Main Objective</p> <p>The objective of this course is to study the various applications of Microbial biotechnology including gene transfer methods in microorganisms, the use of microbial biotechnology in the production of food and pharmaceuticals, and bioremediations processes and generation of energy.</p>

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Recognize the application of microbial biotechnology	K1
1.2	Describe the fermentation process using microorganisms	K5
2	Skills :	
2.1	Evaluate the production of recombinant enzymes and biological products	S4
2.1	Practice the use of microorganisms in industrial production	S4
3	Values:	
3.1		

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to microbial applications in Biotechnology	3
2	Genetics and recombinant DNA technology in microorganisms	3
3	Manipulation of gene expression in prokaryotes	3
4	Fermentation technology and bioreactors design	3
5	Industrial Application of Microorganisms	3
6	Production of enzymes, food and beverages	3
7	Production of natural antimicrobials	3
8	Production of recombinants vaccines and antibodies	3
9	Production of biopolymers	3
10	Generation of biofuels using various bioremediation processes	3
Total		30

List of practical topics	Contact hours
Cultivation of microorganisms using various culture media	3
Estimation of culture growth	3
Transformation and gene transfer in microorganisms	3
Gene manipulations	3
Selection of recombinant microorganisms	3
Bioreactor design	3
Manufacture of enzymes and food production	3
Manufacture of biopharmaceuticals production	3
Evaluation of products	3
Purification of products	3
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 and Understanding		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.1	Recognize the application of microbial biotechnology	Lecture	Written Exam
1.2	Describe the fermentation process using microorganisms	Lecture	Written Exam
2.0	Skills		
2.1	Evaluate the production of recombinant enzymes and biological products	Problem solving	Written Exam (Practical)
2.2	Practice the use of microorganisms in industrial production	Projects	Report
3.0	Values		
3.1			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm exam	5	20%
2	Periodical Exam	8	10%
3	Report	9	10%
4	Practical Exam	10	20%
5	Final Exam	11	40%

*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:

- Office hours, 6 hours per week of office hours are allocated in schedule of every faculty member for student academic consultations, advice about registration and drop/add courses, and academic difficulties if any.
- The Academic Guidance Unit of the program offers personal, academic, and professional counseling to support students academically, behaviorally, and emotionally.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Glazer, Alexander N. Microbial biotechnology: fundamentals of applied microbiology, 3rd Ed., Cambridge University Press, 2007
Essential References Materials	--
Electronic Materials	NBCI website (www. Prenhall.com/madigan)

Other Learning Materials	--
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2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	One classroom with internet connection for 2 hours a week and one laboratory for 3 hours a week with internet facility.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show, Smart board, and internet connection.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	1. Microscopes 2. Incubator, Autoclave, Micropipettes, Direct flame, needle loop, glassware, bacterial media, basic salts, slides, Petri dish, stains. 3. Fermintor

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Course management and planning	Students	Indirect
Effectiveness of teaching and assessment	Students	Indirect
Quality of learning resources	Students	Indirect
Effectiveness of Evaluation and exams	Students, Independent Reviewer	Indirect, Direct

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	Department Council
Reference No.	7
Date	16-6-1443