هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	**Industrial Microbiology**
Course Code:	**431MIC-2**
Program:	Bachelor
Department:	Biology
College:	Science
Institution:	Jazan University

- **Table of Contents**

- **A. Course Identification**

1. Credit hours: 2H.
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 7/4th year
4. Pre-requisites for this course (if any)**:** Microbial Physiology 334MIC-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**	13	86.7%
2	**Blended**	2	13.3%
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	**45**

- **B. Course Objectives and Learning Outcomes**

1. Course Description

Of major economic, environmental and social importance, industrial microbiology involves the utilization of microorganisms in the production of a wide range of products, including enzymes, foods, beverages, chemical feedstocks, fuels and pharmaceuticals, and clean technologies employed for waste treatment and pollution control

2. Course Main Objective

The aim of the course is to give the students broad theoretical and practical skills in industrial microbiology. This course covers the principles of various processes associated with the production and recovery of different bio-products derived from microorganisms. The students will be able to discuss the role of microorganisms in industry, as well as to carry out experiments to produce microbial metabolites.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Demonstrate structures, features, and processes related to industrial microbiology	K1

CLOs		Aligned PLOs
1.1	Define all principals, concepts, theories and aspects concerning with Industrial Microbiology.	K1-1
1.2	List all characteristics, importance, features, steps of Industrial Microbiology aspects.	K1-3
1.3	Differentiate (Compare) between different mechanisms, functions, practices and aspects related to Industrial Microbiology.	K2-1
1.4	Interpret by using your knowledge and understanding some of Industrial Microbiology phenomena.	K3-2
2	**Skills :**	
2.1	Examine theoretically or practically the slides, photos, diagrams or statements of Industrial Microbiology aspects.	S1-3
2.2	Argue different biological approaches in laboratory or field or even theoretically	S2-2
2.3	Design a biological experiment and procedures in laboratory or in the field or even theoretically.	S3-1
3	**Values:**	
3.1	Illustrate awareness of risk assessment and safety observation when dealing with various equipment at various fields.	V2-1

- **C. Course Content**

No	List of Topics	Contact Hours
1	**Principals of Industrial Microbiology and Fermentation Technology.**	2
2	**Oxygen Transfer and Industrial Production Processes.**	2
3	**Discovery and Manufacture of Antibiotics and Vaccines.**	2
4	**Industrial Production of Organic Acids , Vitamins amino acids**	2
5	**Industrial Production of Enzymes.**	2
6	**Industrial Production of biogas**	2
7	**Industrial Production of Baker's yeast and their applications**	2
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	Define all principals, concepts, theories and aspects concerning with Industrial Microbiology.	Lectures, Lab work	Quizzes, Short Answer Question, MCQs, Assignments
1.2	List all characteristics, importance, features, steps of Industrial Microbiology aspects.	Lectures, Lab work	Quizzes, Short Answer Question, MCQs, Assignments
1.3	Differentiate (Compare) between different mechanisms, functions, practices and aspects related to Industrial Microbiology.	Lectures, Lab work	Quizzes, Short Answer Question, MCQs, Assignments
1.4	Interpret by using your knowledge and understanding some of Industrial Microbiology phenomena.	Lectures, Lab work	Quizzes, Short Answer Question, MCQs, Assignments
2.0	**Skills**		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.1	Examine theoretically or practically the slides, photos, diagrams or statements of Industrial Microbiology aspects.	Lectures, Lab work	Quizzes, Short Answer Quizzes
2.2	Argue different biological approaches in laboratory or field or even theoretically	Lectures, Lab work	Quizzes, Short Answer Question, Lab work assessment
2.3	Design a biological experiment and procedures in laboratory or in the field or even theoretically.	Lab work +Filed work	Short Answer Question, Assignments
3.0	**Values**		
3.1	Illustrate awareness of risk assessment and safety observation when dealing with various equipment at various fields.	Lectures, Lab work	Short Answer Question, Assignments

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Theoretical written assignment	3	5
2	Theoretical quiz	5	5
3	Theoretical Mid-term exam	7	10
4	Practical Mid-term exam	9	5
5	Practical assignment or Quiz	11	5
6	Final practical exam	13	20
7	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	Glazer A.N., Nikaido H. (2010) Microbial Biotechnology - Fundamentals of Applied Microbiology, Cambridge University Press, Cambridge. كتاب: الميكروبيولوجيا التطبيقية د .عبد الوهاب محمد عبد الحافظ واخرون 1996 أساسيات الميكروبيولوجيا الصناعية جابر زايد واخرون 2011
Essential References Materials	Nair A.J. (2008) Introduction to Biotechnology and Genetic Engineering (CD-ROM). Infinity Science Press, USA
Electronic Materials	Web Sites, Facebook, Twitter, etc. https://www.ncbi.nlm.nih.gov/pubmed/ - http://www.biology.clc.uc.edu/
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)	HPLC, fermenter, glassware, chemicals, applied microbiology books and software.

- **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	**Board of Biology Program**
Reference No.	**6TH MEETING OF THE BOARD OF BIOLOGY DEPARTMENT 1440-1441**
Date	**Updated/Revised Nov26, 2020**