هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Environmental Microbiology**
Course Code:	**432MIC**
Program:	**Biology**
Department:	**Biology**
College:	**Science**
Institution:	**Jazan University**

Table of Contents

A. Course Identification

1. Credit hours: 2
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 8/4th year
4. Pre-requisites for this course (if any)**:** **Microbial Physiology 334MIC**
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 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**	**15**
2	**Laboratory/Studio**	**30**
3	**Tutorial**	**-**
4	**Others** (specify)	-
	Total	**45**

B. Course Objectives and Learning Outcomes

1. Course Description

This course is designed to provide students with the following concepts:

- Understand the roles and the interactions of microorganisms in their natural environments.
- Understand the roles of microbes in the biogeochemical cycles.
- Recognize microbes as indicators of changes or alteration occurring in ecosystem or in a particular environment.
- Study microbial processes aimed to solve environmental problems such as pollution.
- Identify methods and techniques used in the field of environmental microbiology.

2. Course Main Objective

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

- Air microbiology
- Aquatic microbiology
- Drinking water microbiology
- Waste water microbiology
- Soil microbiology
- Roles of soil microorganisms in pesticides biodegradation, soil microorganisms as biofertilizers, biogas production.

3. Course Learning Outcomes

CLOs		Aligned PLOs
Knowledge and Understanding		
K1	Define all principles, concepts, and theories in the field of environmental microbiology.	K1.1
K2	Compare and contrast the different microbial functions and interactions occurring in different environments.	K2.1
K3	Explain all microbial roles, processes and mode of action involved in the biogeochemical cycles occurring in the environment.	K2.2
K4	Classify microorganisms based on habitat, with examples of microbial species found in these habitats.	K3.3
Skills:		
S1	Debate the impact of different environmental factors and conditions on microbial roles and processes occurring in different environments.	S1.1
S2	Argue different approaches and applications in the field of environmental microbiology.	S2.2
S3	Prepare well-organized scientific document related to environmental microbiology using scientific resources and present it orally or in a written form using appropriate media.	S4.3
Values:		
V1	Illustrate awareness of risk assessment and safety when dealing with different laboratory equipment and environmental samples.	V2.1
V2	Mange team work effectively by integrating different skills and abilities of team members	V3.1

C. Course Content

No	List of Topics	Contact Hours
1	Components of air gases, microbes in the air, spread of diseases, factors controlling air microorganisms.	1
2	Aquatic microbiology: classification of aquatic environments, factors influencing microbes in these environments	1
3	Drinking water microbiology: water purification, bioindicators, chemical analysis of water.	1
4	Bacteriological analysis of water, differentiation between members of coliform bacteria, membrane filter technique, endo-agar technique, coli titre test, contamination of swimming pools.	2
5	Sewage treatment	1
6	Soil as an environment, soil structure, microbial communities of soil, bacteria, actinomycetes, fungi, algae, protozoa, rhizosphere	2

7	Interaction among soil microorganisms,	1
8	Role of soil microorganisms in biogeochemical cycle of carbon and nitrogen.	2
9	Role of soil microorganisms in biogeochemical cycles of phosphorus and sulfur.	2
10	Role of soil microorganisms in pesticides biodegradation, soil microorganisms as biofertilizers, biogas production.	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	Define all principles, concepts, and theories in the field of environmental microbiology.	Lectures	Quizzes, SAQ and written exam
1.2	Compare and contrast the different microbial functions and interactions occurring in different environments.	Lectures	Quizzes and written exam
1.3	Explain all microbial roles, processes and mode of action involved in the biogeochemical cycles occurring in the environment.	Lectures, Lab work	Quizzes, SAQ, assignments, written exam and lab work assessment.
1.4	Classify microorganisms based on habitat, with examples of microbial species found in these habitats.	Lectures, Lab work	Quizzes, SAQ and written exam
2.0	**Skills**		
2.1	Debate the impact of different environmental factors and conditions on microbial roles and processes occurring in different environments.	Lectures, Lab work	Written exam, lab work assessment.
2.2	Argue different approaches and applications in the field of environmental microbiology.	Lectures, Lab work, Group Discussion	Quizzes, SAQ, written exam
2.3	Prepare well-organized scientific document related to environmental microbiology using scientific resources and present it orally or in a written form using appropriate media.	Group Discussion, Lab work	Assignments
3.0	**Values**		
3.1	Illustrate awareness of risk assessment and safety when dealing with different laboratory equipment and environmental samples.	Lab work	Lab work assessment
3.2	Demonstrate the ability to work in groups and use learning resources.	Group Discussion, Lab work	Lab work assessment

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Written assignment	3	3
2	Group assignment	4	2

#	Assessment task*	Week Due	Percentage of Total Assessment Score
3	Theoretical quiz	5	5
4	Mid-term exam	7	10
5	Practical Mid-term exam	9	10
6	Practical assignment	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	الميكروبيولوجيا التطبيقية (1996)عبد الوهاب محمد عبد الحافظ - محمد الصاوى محمد مبارك. المكتبة االكاديمية- مصر.
Essential References Materials	Pepper I. L., C. P. Gerba, T. Gentry, Raina Maier (2008) Environmental Microbiology, Academic Press
Electronic Materials	http://aleilmia.blogspot.com/2017/04/pdf_30.html
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.

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	