هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

Course Title:	**Environmental Microbiology**
Course Code:	**MICR 432**
Program:	**Biology**
Department:	**Biology**
College:	**Science**
Institution:	**Jazan University**
Version:	**T-104**
Last Revision Date:	**20 March 2023**

Table of Contents:

Content	Page
A. General Information about the course	3
1. Teaching mode (mark all that apply) 2. Contact Hours (based on the academic semester)	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	5
C. Course Content	6
D. Student Assessment Activities	7
E. Learning Resources and Facilities	8
1. References and Learning Resources	8
2. Required Facilities and Equipment	8
F. Assessment of Course Qualit	8
G. Specification Approval Data	8

A. General information about the course:

Course Identification					
1. Credit hours:					
2. Course type					
a.	University ☐	College ☐	Department☐	Track☐	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered: Level 11-4th year					
4. Course general Description **☐ The environmental microbiology course deals with illustrating the roles and interactions of microorganisms in their natural environments** **☐ This course focuses on topics such as microbial roles in biogeochemical cycles, usage of microbes as biological indicators, as well as usage of microbes to solve environmental problems such as pollutions.**					
5. Pre-requirements for this course (if any): **Microbial Physiology (MICR 334)** **Fundamentals of Ecology (BIOL 301)**					
6. Co- requirements for this course (if any): None					
7. Course Main Objective(s) **1. Understand the roles and the interactions of microorganisms in their natural environments.** **2. Understand the roles of microbes in the biogeochemical cycles.** **3. Recognize microbes as indicators of changes or alteration occurring in ecosystem or in a particular environment.** **4. Study microbial processes aimed to solve environmental problems such as pollution.** **5. Identify methods and techniques used in the field of environmental microbiology**					

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	10	80%
2.	E-learning	-	
3.	Hybrid • Traditional classroom • E-learning	1	10%

No	Mode of Instruction	Contact Hours	Percentage
4.	Distance learning	1	10%

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	11
2.	Laboratory/Studio	22
3.	Field	-
4.	Tutorial	-
5.	Others (self-learning)	2
	Total	35

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Know basic principles, concepts and terminology in the field of environmental microbiology.	K1.1	Lectures	Quiz, SAQ and written exam
1.2	Compare between different microbial functions, growth requirements, and interactions occurring in different environments.	K2.1	Lectures	SAQ and written exam
…	Explain all microbial roles, processes and mode of action involved in the biogeochemical cycles occurring in the environment.	K2.2	Lectures, Lab work, self-directed study	SAQ, assignment, written exam and lab work assessment.
2.0	Skills			
2.1	Debate/explain theories, processes, environmental phenomena, and impact of different environmental factors on microbial roles and processes occurring in different environments.	S1.1	Lectures, Lab work, self-directed study	Written exam, lab work assessment, assignment.
2.2	Apply theoretical knowledge and understanding in laboratory experiments and techniques related to environmental microbiology.	S1.2	Lectures, Lab work, Group Discussion, self-directed study	SAQ, assignment, written exam and lab work assessment.

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
…	Prepare well-organized scientific document related to environmental microbiology using scientific resources and present it orally or in a written form using appropriate media.	S3.3	Group Discussion	Assignment
3.0	Values, autonomy, and responsibility			
3.1	Develop competencies in critical thinking, delivering scientific information, reporting and data analysis	V3.2	Group Discussion, Lab work	Lab work assessment and assignment
3.2				
…				

C. Course Content

No	List of Topics	Contact Hours
1.	Aeromicrobiology: components of air, 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	2
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	Wastewater microbiology.	Self-directed study
6	Soil as an environment, soil structure, microbial communities of soil, bacteria, actinomycetes, fungi, algae, protozoa, rhizosphere, Interaction among soil microorganisms.	2
7	Role of soil microorganisms in biogeochemical cycle of carbon.	1
8	Role of soil microorganisms in biogeochemical cycle of Nitrogen.	1
9	Role of soil microorganisms in biogeochemical cycles of sulfur.	1

10	Role of soil microorganisms in biogeochemical cycles of phosphorus.	Self-directed study
11	Biodegradation, bioremediation, bioconversion, and biological control.	Self-directed study
Total		11

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Theory assignment	8	5
2.	Theoretical quiz	3	5
3.	Mid-term exam	5	10
4.	Practical quiz	6	5
5.	Practical assignment	7	5
6.	Final practical exam	11	20
7.	Final Exam	12	50
...			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	الميكروبيولوجيا التطبيقية (1996)عبد الوهاب محمد عبد الحافظ - محمد الصاوى محمد مبارك. المكتبة االكاديمية- مصر
Supportive References	Pepper I. L., C. P. Gerba, T. Gentry, Raina Maier (2008) Environmental Microbiology, Academic Press
Electronic Materials	YouTube video links, pictures and photos related to the course will be uploaded in Blackboard few times during the semester to strengthen student knowledge and understanding.
Other Learning Materials	-

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	1 Lecture room(s) for groups of 50 students. 1 Laboratory for group of 25 students.
Technology equipment (projector, smart board, software)	AV, data show, Smart Board
Other equipment (depending on the nature of the specialty)	Light microscopes, glassware, chemicals, consumables.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Faculty	Direct (Questionnaire)
Effectiveness of students assessment	Peer Reviewer	Direct (Cross Check marking)
Quality of learning resources	QA. Committee	Indirect (Benchmarking)
The extent to which CLOs have been achieved	Program Leader	Indirect (QA Committee)
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Biology Department Board
REFERENCE NO.	BIO2214
DATE	20/9/2022AD