

Course Specifications

Course Title:	Environmental Microbiology	
Course Code:	ENS 207	
Program:	Environmental Sciences and Technologies Program as well as Environmental Health Program	
Department:	Environmental Sciences Department	
College:	Faculty of Meteorology, Environment and Arid Land Agriculture	
Institution:	King Abdulaziz University	







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A. Course Identification

1. Credit hours: 4		
2. Course type		
a. University Colleg Department x Others		
b. Required x Elective		
3. Level/year at which this course is offered:		
3^{rd} Level / 2^{nd} Year		
4. Pre-requisites for this course (if any):		
Non		
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	3	70%
2	Blended	-	-
3	E-learning (computer assisted instruction)	2	30%
4	Correspondence	-	-
5	Other	-	-

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours		
Contac	Contact Hours			
1	Lecture	45		
2	Laboratory/Studio	45		
3	Tutorial	-		
4	Others (specify)	-		
	Total	-		
Other Learning Hours*				
1	Study			
2	Assignments	-		
3	Library			
4	Projects/Research Essays/Theses	-		
5	Others (specify)			
	Total	90		

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description:

This course covers the following topics:

- 1. Location of different microorganisms groups in the environmental system and their positive and negative impact.
- 2. Nutrition, growth, destruction of microorganisms and factors affecting these topics as well as enumeration of microorganisms in the different environmental elements.
- 3. Fundamentals of microorganism's taxonomy.
- 4. Recognition of different microbial groups (Bacteria, algae, fungi, protozoa and viruses) and their relationship with environmental elements of water, air, soil and waste...etc.
- 5. Relationship of microorganisms with the different environmental elements of water, air and soil.
- 6. Relationship of microorganisms with the environmental wastes and their role in recycling and utilization of these wastes.

2. Course Main Objective

• Studding the role of microorganisms as an important part of the environmental system, as well as the relationship of microorganisms with different elements of the environmental system as well as theoretical and practical identification methods of these microorganisms, and also positive and negative controlling means for the benefits of the environmental system.

By the end of the course the student should be able to:

- Enumeration of microorganisms in environmental elements.
- Know the relationship between microorganisms groups (bacteria, algae, fungi, and viruses) as well as its relation to environmental elements of water, air, food, soil and wastes.
- Clarifying the fundamentals of microorganism's taxonomy and microbial groups
- Elucidating the principles of water, air and soil microbiology.
- Elucidating the principles an factors affecting of nutrition, growth, destruction of microorganisms.
- The relationship of microorganisms to different environmental wastes and their role in the purification of utilization of them.
- List the positive and negative roles of microbial groups in the environmental system.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	Knowledge:	
1.1	Describe relationship between microorganisms groups.	
1.2	Outline the principles of nutrition, growth, destruction and enumeration of microorganisms.	

	CLOs	Aligned PLOs
1.3	Define the fundamentals of microorganism's taxonomy and microbial groups.	
1.4	Recognize the principles of water, air and soil microbiology.	
2	Skills :	
2.1	Recognizing principles of environmental microbiology in our life	
2.2	Explain problems associated with specified topics.	
3	Competence:	
3.1	Demonstrate independent role and as part of a team.	
3.2	Assess resources, time and other members of the group.	
3.3	Analyze and evaluate results in contrast with others'	

C. Course Content

No	List of Topics	Contact Hours
1	Location of different microorganisms groups in the environmental system and their positive and negative impact.	3
2	Nutrition, growth, destruction of microorganisms and factors affecting these topics as well as enumeration of microorganisms in the different environmental elements.	9
3	Fundamentals of microorganism's taxonomy.	6
4	Recognition of different microbial groups (Bacteria, algae, fungi, protozoa and viruses) and their relationship with environmental elements of water, air, soil and wasteetc.	9
5	Relationship of microorganisms with the different environmental elements of water, air and soil.	9
6	Relationship of microorganisms with the environmental wastes and their role in recycling and utilization of these wastes.	9
	Total	45

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		
1.1	Describe relationship between microorganisms groups.	 In-class lecturing where the previous knowledge is linked to the current and future topics. Periodically discussion of the relation between environmental microbiology and our life. 	 Short reports. Periodic, mid-term and final exams.
1.2	Outline the principles of nutrition, growth, destruction and enumeration of	• In-class lecturing	• Short reports.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	microorganisms.	 where the previous knowledge is linked to the current and future topics. Periodically discussion of the relation between environmental microbiology and our life. 	• Periodic, mid-term and final exams. •
1.3	Define the fundamentals of microorganism's taxonomy and microbial groups.	 In-class lecturing where the previous knowledge is linked to the current and future topics. Periodically discussion of the relation between environmental microbiology and our life. 	 Short reports. Periodic, mid-term and final exams.
Recognize the principles of water, air • and soil microbiology.		 In-class lecturing where the previous knowledge is linked to the current and future topics. Periodically discussion of the relation between environmental microbiology and our life. 	 Short reports. Periodic, mid-term and final exams.
2.0	Skills		
2.1	Recognizing principles of environmental microbiology in our life	 Homework assignments Problem solving. Laboratory experiments. 	 Short reports. Periodic, mid- term, practical, and final exams.
2.2	Explain problems associated with specified topics.	 Homework assignments Problem solving. Laboratory experiments. 	 Short reports. Periodic, mid- term, practical, and final exams.
3.0	Competence		
3.1	Demonstrate how to work independently and as part of a team.	* Writing group reports * Solving problems in groups.	Grading homework assignments
3.2	Illustrate how to manage resources, time and other members of the group.	* Writing group reports * Solving problems in groups.	Grading homework assignments

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.3	Analyse the results of work with others.	* Writing group reports * Solving problems in groups.	Grading homework assignments

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Periodic exam I	4	10%
2	Mid-term exam	8	20%
3	Periodic exam II	11	10%
4	Practical exam	15	25%
5	Final exam	16	35%

*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 h / week

F. Learning Resources and Facilities 1.Learning Resources

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Required Textbooks	• Pepper, L; Gerba, and Gentry, T. (2014): Environmental Microbiology, 3 rd Edition, Elsevier Publishing.
Essential References	 Sing, A; Srivastava,S.; Rathor,D. and Pant, D (2020): Environmental Microbiology and Biotechnology, Springer Publishing. Eugene, M. (2007): Environmental Microbiology, Blackwell Publishing Ralph, M. (1989): Introduction to Environmental Microbiology, Prentice Hall Inc., Englewood, California, USA.
Electronic Materials	Relevant Internet websites.
Other Learning Materials	Handouts (soft and hard)

2. Facilities Required

Item	Resources	
Accommodation		
(Classrooms, laboratories,	- Lecture room with max 30 seats.	
demonstration rooms/labs, etc.)	- Laboratory with a capacity of not less than 20 seats.	
Technology Resources		
(AV, data show, Smart Board,	Data show	
software, etc.)		
Other Resources		
(Specify, e.g. if specific laboratory	Equipment and illustration tools related to the	
equipment is required, list	experimental part of the course.	
requirements or attach a list)		

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Course contents covering	Students (direct through	Online questionnaire and
	meetings, or indirect using the	Students- faculty meetings
	central online questionnaires	(advisory committee)
Quality of teaching	Students (direct through	Online questionnaire and
	meetings, or indirect using the	students- faculty meetings
	central online questionnaires	(advisory committee)
Office hours commitment	Students (direct through	Online questionnaire and
	meetings, or indirect using the	Students- faculty meetings
	central online questionnaires	(advisory committee)

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	END Dept. Council and Faculty Academic Accreditation Committee
Reference No.	
Date	April 29, 2021