هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

Course Title:	Microbial Physiology
Course Code:	MICR 334
Program:	**Biology**
Department:	**Biology**
College:	**Science**
Institution:	**Jazan University**
Version:	4
Last Revision Date:	Second Semester 2022

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	3				
2. Course type					
a.	University ☐	College ☐	Department☒	Track☐	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered: **Level 8/3rd Year**					
4. Course general Description To study the principal characteristics of microorganisms, structure and function of their different organelles, growth, their biological activities and metabolism. Environmental and nutritional factors affecting microbial growth.					
5. Pre-requirements for this course (if any): MICR 231& MICR 333					
6. Co- requirements for this course (if any): No					
7. Course Main Objective(s) This course is designed to provide students with the following concepts: 1- Study of the growth of microorganisms. 2-Study the factors affecting microbial growth including Physical Chemical and Biological 3-Nutritional mechanisms in microorganisms, metabolism and role of cell membranes in transport 4-Classification of microorganisms according to nutritional categories 5-Chemical control of microbial growth and their mechanisms 6-Study the methanogenic bacteria and its role in environment.					

1. Teaching mode (**mark all that apply)**

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	44	100%
2.	E-learning		
3.	Hybrid • Traditional classroom • E-learning		
4.	Distance learning		

2. Contact Hours **(based on the academic semester)**

No	Activity	Contact Hours
1.	Lectures	22
2.	Laboratory/Studio	22
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	44

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	Define all principals, concepts, theories and aspects concerning with Microbial Physiology.	K1-1	Interactive lectures. Classroom discussions Tutorials. Self-learning activities.	MCQs. Short answer questions. True/False.
1.2	List all characteristics, importance, features, steps of Microbial Physiology aspects.	K1-3	Interactive lectures. Classroom discussions Tutorials. Self-learning activities.	MCQs. Short answer questions. True/False. Compare
1.3	Differentiate (Compare) between different mechanisms, functions, practices and aspects related to Microbial Physiology.	K2-1	Interactive lectures. Classroom discussions Tutorials. Self-learning activities.	MCQs. Short answer questions. True/False.
1.4	Interpret by using your knowledge and understanding some of Microbial Physiology phenomena.	K3-2	Interactive lectures. Classroom discussions Tutorials. Self-learning activities.	MCQs. Short answer questions. True/False.
2.0	Skills			
2.1	Examine theoretically or practically the slides, photos, diagrams or statements of Microbial Physiology aspects.	S1-3	Interactive lectures. Classroom discussions Tutorials. Self-learning activities.	MCQs. Short answer questions. True/False. Quizzes. Midterm. Final.
2.2	Argue different biological approaches in laboratory or field or even theoretically	S2-2	Interactive lectures. Classroom discussions Tutorials. Self-learning activities.	MCQs. Short answer questions. True/False. Quizzes. Midterm. Final.
2.3	Design a biological experiment and procedures in laboratory or in the field or even theoretically.	S3-1	Interactive lectures. Classroom discussions Tutorials. Self-learning activities.	MCQs. Short answer questions. True/False. Quizzes.

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
				Midterm. Final.
3.0	Values, autonomy, and responsibility			
3.1	Illustrate awareness of risk assessment and safety observation when dealing with various equipment at various fields.	V2-1	Individual assignments. Group discussion. Lab-work. Self-learning activities. Micro-Project Presentation (individual and teamwork)	Group Assignment. Observation. Group Discussion. Oral exam. Laboratory work.

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction: Introduction of microbial physiology. Growth in microorganisms. Measuring Microbial Growth	3
2.	Microbial growth curve. Lag phase. Exponential phase. Stationary phase. Death phase.	1
3.	Culture systems: Closed system, open system: continuous culture.	1
4.	Physical factors affecting microbial growth: Temperature. pH. Oxygen. Water activity.	3
5.	Physical factors affecting microbial growth: Redox potential. Surface tension. Osmotic pressure. Pressure. Radiation. Visible light	Self-Learning
6.	Chemical factors affecting microbial growth: Germistatic agents. Germicidal agents. Disinfectants. Antibiotic. Growth-Factor Analogues.	2
7.	Microbial interactions: Neutral , Antagonism and Synergism Relationships	Self-Learning
8.	Microbial nutrition: Macronutrients. Micronutrients. Physiological functions of the basic elements. Growth factor. Autotrophic. Heterotrophic. Metabolism in microorganisms. Enzymes.	6
9.	Photosynthesis in microorganisms. Nitrogen fixation (Symbiotic and asymbiotic)	2
10.	Microbial Metabolism: Microbial Metabolism of carbohydrates, proteins, and lipids.	4
11.	Transport of nutrients : passive diffusion, facilitated diffusion, active transport.	Self-Learning
Total		22

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Theoretical written assignment	3	5
2.	Theoretical quiz	4	5
3.	Theoretical Mid-term exam	6	10
4.	Practical Quiz	5	5
5.	Practical assignment	6	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	أ.د كوثر فؤاد عابد (فسيولوجيا الكائنات الأحياء الدقيقة) دار الأندلس للنشر والطباعة، ا العربية السعودية 2006 Albert G. Moat, John W. Foster, Michael P. Spector (2002) Microbial Physiology. John Wily & Sons, New York
Supportive References	Microbiology an introduction 12th edition (2016). Gerard J. Tortora. Pearson Education. USA
Electronic Materials	https://www.ncbi.nlm.nih.gov/pubmed/
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)	-Incubators, Autoclaves, Chemical indicator and reagents , chemicals, Media for microbial growth, enzymes etc. -Light microscopes, glassware, chemicals, Microbiology books and software.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer to peer Reviewer, students	Indirect (Surveys)
Effectiveness of students assessment	Program quality committee, Program leader, peer reviewer	Direct (Cross Check), Indirect (Surveys)
Quality of learning resources	Students	Indirect (Surveys)
The extent to which CLOs have been achieved	Course coordinator	Excel sheet of CLOs assessment (direct), Surveys (indirect)
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	BIOLOGY PROGRAM BOARD
REFERENCE NO.	BIO2214
DATE	20/9/2022AD