

Course Title:	Microbial Physiology
Course Code:	334MIC
Program:	Bachelor
Department:	Biology
College:	Science
Institution:	Jazan University

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• **A. Course Identification**

1. Credit hours: 3H.			
2. Course type			
a.	University <input type="checkbox"/>	College <input type="checkbox"/>	Department <input checked="" type="checkbox"/>
b.	Required <input checked="" type="checkbox"/>	Elective <input type="checkbox"/>	Others <input type="checkbox"/>
3. Level/year at which this course is offered:		6/3	
4. Pre-requisites for this course (if any): Bacteriology 231MIC			
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	30	100%
2	Blended	--	--
3	E-learning	--	--
4	Distance learning	--	--
5	Other	--	--

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	30
3	Tutorial	-
4	Others (specify)	-
	Total	60

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

1. Course 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.

a) Course Objectives:

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

- Study of the growth of microorganisms.
- Study the factors affecting microbial growth including Physical Chemical and Biological
 - Nutritional mechanisms in microorganisms, metabolism and role of cell membranes in transport
 - Classification of microorganisms according to nutritional categories
 - Chemical control of microbial growth and their mechanisms
 - Study the methanogenic bacteria and its role in environment.

b) Course Contents:

- 1- Introduction of microbial physiology and Microbial growth curve.
- 2- Closed system, open system: continuous culture.
- 3- Physical and chemical factors affecting microbial growth, Microbial nutrition
- 4- Nitrogen fixation, photosynthesis, Microbial Metabolism of carbohydrates, Microbial Metabolism of proteins, Microbial Metabolism of lipids



c) Practical:

Using necessary reagents and equipments the student must be able to:

- Perform experiments to determine growth curve of bacteria, bacterial population count by turbidimetry and large scale growth of microorganisms by wet weight and dry weight.
- Perform experiments to investigate the effect of temperature, pH, osmotic pressure, radiation and Oxygen and chemicals on microbial growth.
- Perform experiments to determine the ability of microorganisms to lipid hydrolysis, carbohydrates fermentation, nitrates reduction, starch hydrolysis, and Catalase production .

d) Assessment:

- Periodic Exams and Quizzes: 30 %
- Assignments, and Classroom Activities: 20 %
- Final exam: 50%

e) Teaching Methods:

- Lectures, Reports and Essay Assignments, Homework, and Web-based Assignments.

f) Text Books:

أ.د. كوثر فؤاد عابد (فسيولوجيا الكائنات الأحياء الدقيقة) دار الأندلس للنشر والطباعة، المملكة العربية السعودية

Albert G. Moat, John W. Foster, Michael P. Spector (2002) Microbial Physiology. John Wiley & Sons, New York 2006

g) References:

- Microbiology an introduction 12th edition (2016). Gerard J. Tortora. Pearson Education. USA

2. Course Main Objective

Principal characteristics of microorganisms, structure and function of their different organelles, their biological activities and metabolism

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Recall information relevant to courses content in Microbial Physiology	K1
1.2	Define structures, features, and processes related to the course contents.	K2
1.3	Label and explain the items and their related functions on the diagram.	K3
2	Skills :	
2.1	Explain aspects, theories, and processes relevant to Microbial physiology	S1
2.2	Compare different structures and features related to Microbial physiology	S2
2.3	Interpret experimental data and apply in relevant situations,	S3
3	Values:	
3.1	Illustrate ability to work in groups and responsibility,	V1
3.2	Illustrate ability to communicate effectively in oral and written exams utilizing IT resources,	V2

• C. Course Content

No	List of Topics	Contact Hours
1	Introduction of microbial physiology and Microbial growth curve.	2
2	Closed system, open system, continuous culture	2



4	Microbial nutrition	2
5	Nitrogen fixation, photosynthesis	3
6	Microbial Metabolism of carbohydrates	3
7	Microbial Metabolism of proteins	3
8	Microbial Metabolism of lipids	2
9	Methanogenic bacteria	2
10	Chemical control of microbial growth and their mechanisms	3
11	Transport of nutrients	2
12	Microbial interactions	2
Total		30

• 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	Recall information of Microbial physiology	Lectures	Quizzes, Short Answer Question, MCQs
1.2	Define structures, features, and processes related to Microbial physiology	Lectures, Lab work	Quizzes, Short Answer Question, MCQs
1.3	Label and explain the items and their related functions on the diagram.	Lectures, Group Discussion	Assignments
2.0	Skills		
2.1	Explain aspects, theories, and processes relevant to Microbial physiology	Lectures, Lab work	Quizzes, Short Answer Ques
2.2	Compare the different structures and features related to the Microbial physiology	Lectures, Lab work, Group Discussion	Quizzes, Short Answer Question, Lab work assessment
2.3	Compare different structures and features related to Microbial physiology	Lab work +Filed work	Short Answer Question, Assignments
3.0	Values		
3.1	Illustrate ability to work in groups and responsibility,	Group Discussion, Lab work	Lab work assessment
3.2	Illustrate ability to communicate effectively in oral and written exams utilizing IT resources,	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
3	Theoretical quiz	5	5
4	Mid-term exam	7	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	أ.د. كوثر فؤاد عابد (فسيولوجيا الكائنات الحية الدقيقة) دار الأندلس للنشر والطباعة، المملكة العربية السعودية 2006 Albert G. Moat, John W. Foster, Michael P. Spector (2002) Microbial Physiology. John Wily & Sons, New York
Essential References Materials	<ul style="list-style-type: none"> 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. Facilities Required

Item	Resources
Accommodation Classrooms, laboratories, demonstration) (rooms/labs, etc)	1 Lecture room(s) for groups of 50 students .Laboratory for group of 25 students 1
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	-Incubators, Autoclaves, Chemical indicator and reagents , chemicals, Media for microbial growth, enzymes etc. Light microscopes, glassware, chemicals, 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	Program Leader	Indirect (QA 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	Board of Biology Program
Reference No.	6TH MEETING OF THE BOARD OF BIOLOGY DEPARTMENT 1440-1441
Date	Updated/Revised Nov26, 2020

