



Course Specifications

Course Title:	Microbial interactions
Course Code:	MBIO 345
Program:	Microbiology (B.Sc.)
Department:	Botany and microbiology
College:	Science
Institution:	King Saud university

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A. Course Identification

1. Credit hours: 2 (1+2)
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input type="checkbox"/> Elective <input checked="" type="checkbox"/>
3. Level/year at which this course is offered: 8
4. Pre-requisites for this course (if any): 140 MBIO
5. Co-requisites for this course (if any): NA

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	Correspondence		
5	Other		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	15
2	Laboratory/Studio	30
3	Tutorial	
4	Others (specify)	
	Total	45
Other Learning Hours*		
1	Study	28
2	Assignments	6
3	Library	14
4	Projects/Research Essays/Theses	6
5	Others (specify)	
	Total	54

* 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

Study of the ecosystem, interaction between microorganisms, interactions between microorganisms and plants, microorganisms in the root ocean, lichens, Modern applications of interactions between microorganisms.

2. Course Main Objective

Knowing more about the interaction between microorganisms in their habitats.

Recognize the different Microbial relationships.

The student will be able to understand microbial relationships and their modern applications.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
1.1	By the end of the course, the student will be able to record types of microbial interactions	K2
1.2	By the end of the semester, the student will be able to list different symbiotic relationships between the microorganisms	K3
1.3	By the end of the course, the student will be able to list the most important factors that influence the interactive relationships between living organisms.	K1
1.4	By the end of the course, the student will be able to know modern applications of interactions between microorganisms.	K4
2	Skills :	
2.1	By the end of the course, the student will be able to differentiate between microbial interactions & association methods and realize the role and importance of modern applications of interactions between microorganisms in the environment.	S1
2.2	By the end of the semester, the student will be able to involve in research work, analyze the research data, design, and write lab report.	S2
3	Values::	
3.1	At the end of the course, the student will have the ability to self-learn, take responsibility, work in a team spirit and time management.	V1

C. Course Content

No	List of Topics	Contact Hours
1	Introduction	(1+0+2)
2	Types of Microbial Interactions	(3+0+6)
3	Symbiotic Interactions	(1+0+2)
4	Mycorrhizae, characteristics, structure, commercial uses.	(3+0+6)
5	Nitrogen Fixation Bacteria, characteristics, structure, commercial uses.	(3+0+6)
6	Lichens, characteristics, structure, commercial uses.	(3+0+6)
7	Modern applications of interactions between microorganisms.	(1+0+2)
Total		15+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		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.1	By the end of the course, the student will be able to record types of microbial interactions	Lecture	exam (final, midterm)
1.2	By the end of the semester, the student will be able to list different symbiotic relationships between the microorganisms	Lecture	exam (final, midterm)
1.3	By the end of the course, the student will be able to list the most important factors that influence the interactive relationships between living organisms.	Lecture	exam (final, midterm)
1.4	By the end of the course, the student will be able to know modern applications of interactions between microorganisms.	Lecture	exam (final, midterm)
2.0	Skills		
2.1	By the end of the course, the student will be able to differentiate between microbial interactions & association methods and realize the role and importance of modern applications of interactions between microorganisms in the environment.	Practical lessons	Practical exam
2.2	By the end of the semester, the student will be able to involve in research work, analyze the research data, design, and write lab report.	Project – small group work - group discussion	Performance based assessment using rubrics
3.0	Values		
3.1	At the end of the course, the student will have the ability to self-learn, take responsibility, work in a team spirit and time management.	Project – small group work-group discussion	Performance based assessment using rubrics

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm test or mini exam(1)	7	15%
2	Midterm test or mini exam(2)	12	15%
3	Practical exam	14	30%
4	Final exam	15	40%
5			
6			
7			
8			

*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 :

- During a declare office hours and by booking in advance through the e mail address of the tutor.
- By using the messenger electronic mail or e mailing between the tutor and the student at any available time.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Brock, Biology of Microorganisms 12th Edition by Madigan, Martinko, Dunlap and Clark, Pearson Benjamin Cummings, San Francisco, CA . 2008 The Biology Of Symbiosi. Smiyh & Douglas. 1987 The Ecology OF Mycorrhizae. M. F. Allen. 1991 Lichen Biology by Thomas H.nash.2008.cambridge uni.press. The Biology Of Lichens. 3rd. Ed. M. A. Hale. 1983 Interaction between microorganisms by Dr. Abdullah Msaad Alfalih. Al Obeikan,2022
Essential References Materials	Canadian Journal of Botany Nordic Journal of Botany Journal of Environmental Quality and Nature
Electronic Materials	
Other Learning Materials	Microbial Interactions-Wikipedia Microbial Interactions and biocontrol in the rhizosphere

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	(1 Data show room (2 Laboratory (3 E learning room
Technology Resources (AV, data show, Smart Board, software, etc.)	Computer supported with important soft wares, printer and scanner, Smart Board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Student, peer Reviewer, program leaders	Course evaluation questioner Students- faculty meetings


Evaluation Areas/Issues	Evaluators	Evaluation Methods
Extent of achievement of course learning outcomes	Program Leaders, faculty, quality and development unit	Preparation of course report Peer consultation on teaching Departmental council discussions Self-evaluation
Quality of learning resources	Student, faculty, internal and external auditors	Course evaluation Self-study report

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	Academic Accreditation and Evaluation Committee 
Reference No.	Update-1443
Date	20/09/1443 H