



**Benha university**  
**Faculty of Agriculture**



**Course Title: Agricultural microbiology**

<b>University</b>	<b>Benha</b>
<b>Faculty</b>	<b>Faculty of Agriculture</b>
<b>COURSE SPECIFICATIONS:</b>	
Program of which the course is given	<b>All programs</b> Agricultural Biotechnology, Food safety and Agribusiness
Major or Minor element of Program	<b>General course</b>
Departments offering the Program	<b>Agric. Botany (microbiology branch)</b>
Department offering the course	<b>Agric. Botany (microbiology branch)</b>
Academic year / Level	<b>First level / Second semester</b>
Date of specification approval	

<b>A- BASIC INFORMATION</b>	
Title	Agriculture microbiology
Code	
Credit Hours	56 hours
Lecture	2 Hours / week
Practical	2 Hours / week
Total:	4 Hours/ week

<b>B- PROFESSIONAL INFORMATION</b>	
<b>1 – OVERALL AIMS OF COURSE</b>	
<ul style="list-style-type: none"> <li>• Knowing the students with the basic information about the importance, characteristics and taxonomy of microorganisms. Also, providing the students with the knowledge and skills to increase the growth and reproduction of microorganisms.</li> <li>• Understanding the environmental conditions affecting microorganism's growth.</li> <li>• Applications of these knowledge in the area of soil, water and food.</li> </ul>	

<b>2 – Intended Learning Outcomes of Course (ILOs)</b>	
<b>A. Knowledge and Understanding:</b>	
1-	Understand the importance of microorganisms in different habitats.
2-	Know the environmental conditions affecting growth and reproduction of microorganisms.
3-	Understand the metabolism of carbohydrates and nitrogen compounds by microorganisms.
4-	Know the role of microorganisms in soil fertility.
5-	Know new techniques in field of Silage production, rotting of fiber plants and biological control.

<b>B. Intellectual Skills:</b>	
<i>Successful completion of this course will allow students to:</i>	
1-	Determine the optimal use of microorganisms.
2-	Solve problems concerning microorganism's growth and ability to solve such problems.
3-	Choose the best methods for getting rid of food and milk contamination.

<b>C. Professional and Practical Skills:</b>	
1-	Plan and implement of microbiological tasks under lab conditions.
2-	Use of the appropriate isolate and identifying of microorganisms for applicable practices.

<b>D. General and Transferable Skills:</b>	
1-	Work individually with minimum supervision.
2-	Use of new technologies tools of agricultural microbiology.
3-	Utilize the different references concerning the Agric. microbiology.

<b>3. a- LECTURES CONTENTS</b>		
<b>Topic</b>	<b>No. of hours</b>	<b>Lectures</b>
1. Introduction to applications of microbiology in agriculture.	2	1
2. Organic manures, farmyard manure, and composts and importance to soil fertility.	4	2
3. 3-Biofertilizer and biofertilization: Microorganisms used as biofertilizers: (a) N <sub>2</sub> fixing micro-organisms including bacteria, cyanobacteria, azolla, and frankia. (b) P-dissolving microorganisms including bacteria and fungi, (c)	4	2

Silicate-dissolving microorganisms. (d)S-oxidizing microorganisms.		
4. Inocula preparation: Preparation of Rhizobia, Azotobacter, Cyanobacteria, Azolla, Frankia, Azospirillum, and Phosphate- solubilizing inocula.	2	1
5. Composting and compost preparation: Manure composts, biogas composts and its use as a manure. City refuses compost. Green manure	4	2
6. Silage production as animal feed stuff	4	2
7. Rotting of fiber plants.	4	2
8. Biological control: Microorganisms used in biological control and their application.	4	2

### 3. b- PRACTICAL CONTENTS

Topic	No. of hours	Practical
Introduction to applications of microbiology in agriculture.	2	1
Organic manures, farmyard manure, and composts and importance to soil fertility.	4	2
3-Biofertilizer and biofertilization: Microorganisms used as biofertilizers: (a) N <sub>2</sub> fixing micro-organisms including bacteria, cyanobacteria, azolla, and frankia. (b) P-dissolving microorganisms including bacteria and fungi, (c) Silicate-dissolving microorganisms. (d)S-oxidizing microorganisms.	4	2
Inocula preparation: Preparation of Rhizobia, Azotobacter, Cyanobacteria, Azolla, Frankia, Azospirillum, and Phosphate- solubilizing inocula.	2	1
Composting and compost preparation: Manure composts, biogas composts and its use as a manure. City refuses compost. Green manure	4	2
Silage production as animal feed stuff	4	2
Rotting of fiber plants.	4	2
Biological control: Microorganisms used in biological control and their application.	4	2

### 4. TEACHING AND LEARNING METHODS

- 1) The main subject areas are covered in the lectures (see syllabus Plan).
- 2) Several student seminar sessions give the opportunity for students to bring questions or discuss any aspects of the course with the tutor.
- 3) Students are given a topic to research in small groups which they report as an oral presentation. Collective feedback on the strengths and weaknesses of the presentations are provided.

## 5. STUDENT ASSESSMENT METHODS

*Students will be evaluated by attendance, fulfillment and effort in exercises and presentations, and examination grades:*

- 1) Laboratory work: to assess the ability of students to understand and perform small laboratory experiments.

## 6. ASSESSMENT SCHEDULE

No	Assessment	Week
1	Periodical exam	4th, 8th and 12th Week
2	Practical exam	14th Week
3	Oral exam	15th Week
4	Final exam	16th Week

## 7. WEIGHTING OF ASSESSMENT

No	Assessment	%
1	Periodical exam	15%
2	Practical exam	15%
3	Oral exam	10 %
4	Final exam	60 %
<b>TOTAL</b>		<b>100 %</b>

## 8. LIST OF REFERENCES

**-Bergey's Manual of Systematic Bacteriology (2001). Williams & Wilkins, Baltimore, U.S.A.**

## 9. FACILITIES REQUIRED FOR TEACHING AND LEARNING

- 1) Teaching aids/ materials: e.g. boards – overhead projector – data-show projector – stationary.. etc.
- 2) Teaching room/hall.
- 3) Computers.
- 4) Facilities for site visits etc., which are necessary for teaching the course.

**Course Coordinators:**

**Prof. Dr.  
Prof. Dr.**

**Date: / / 2015**