

## Course Outline of Basic Microbiology مبادئ الاحياء الدقيقة

### 1. Instructor's Information

Instructor's / Coordinator's Name:	أ.د. يعقوب حسن يعقوب
Office Hours:	Sun-thu: 9:30 – 11 PM
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Research and Teaching Assistant / Supervisor / Technical (if any):	-

### 2. Course Description

This is an introductory course in microbiology covering a broad range of fundamental topics in the field. Major areas to be covered include the history of the science, microscopy, microbial cell structure and function, nutrition of microorganisms, microbial metabolism, microbial genetics, microbial growth and growth control *in vitro* and *in vivo*, microbial taxonomy, diversity of microorganisms (acellular microorganisms: viruses, viroids, and prions; prokaryotic microorganisms: *Bacteria* and *Archaea*; and eukaryotic microorganisms: fungi, protozoa, algae, and slime molds), and microbial ecology.

### 3. Course Information

Course No.: 404330	Course Title: <b>Basic microbiology</b>	Level: 3
Course Type: <b>Theoretical</b> / Practical	Prerequisite / co-requisite: 404102	Class Time: mon & wed: 9:30 – 11 PM
Academic Year: 2020 / 2021	Semester: 1 <sup>st</sup>	Study hours: 3

### 4. Course Objectives:

a)	- Be familiar with the historical roots of microbiology
b)	- Study and compare different types of microscopy
c)	- Describe the eukaryotic and prokaryotic microbial cell structures and their function
d)	- Study the nutritional requirements of microorganisms and how they are isolated from different sources in nature
e)	- Study metabolism diversity in microorganisms
f)	- Learn about the genetics of microorganisms, types of mutations, how mutagenic potential of suspicious mutagens is tested.
g)	- Study how microorganisms grow and how to control growth <i>in vivo</i> and <i>in vitro</i>
h)	- Learning how microorganisms are classified and positioned in the tree of life
i)	- Gain knowledge about viruses, virioids, and prions, Bacteria, Archaea, fungi,

	algae, protozoa, and slime molds.
j)	- Study the interactions between microorganisms and their environment

## 5. Learning Outcomes

### (Knowledge, Skills, and Competencies)

Upon successful completion of the course, the students will be able to:

1. Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea
2. Know how microorganisms are classified
3. Describe how microorganisms are used as *model systems* to study basic biology, genetics, metabolism and ecology.
4. Identify ways microorganisms play an *integral role* in disease.
5. Explain why microorganisms are *ubiquitous in nature*; inhabiting a multitude of habitats and occupying a wide range of ecological habitats.
6. Cite examples of the *vital role* of microorganisms in biotechnology, fermentation, medicine, and other industries important to human well being.

## 6. Course Content

Week	Subject
First	<b>Introduction and History of the Science</b>
Second	<b>Microscopy</b>
Third	<b>Microbial Cell Structure and Function</b>
Fourth	<b>Nutrition of Microorganisms</b>
Fifth	<b>Microbial Metabolism</b>
Sixth	<b>Microbial Genetics</b>
	<b>First Exam</b>
Eighth	<b>Microbial Growth and Growth Control <i>in vitro</i></b>
Ninth	<b>Microbial Growth Control <i>in vivo</i></b>
Tenth	<b>Microbial Taxonomy</b>
Eleventh	<b>Diversity of Microorganisms Part 1</b> Acellular microbes

	<b>Second Exam</b>
Thirteenth	<b>Diversity of Microorganisms Part 2</b> Prokaryotic microbes: <i>Bacteria</i> and <i>Archaea</i>
Fourteenth	<b>Diversity of Microorganisms Part 3</b> Eukaryotic microbes
Fifteenth	<b>Microbial Ecology</b>
Sixteenth	<b>Final Exam</b>

## 7. Teaching and Learning Strategies and Evaluation Methods

No.	Learning Outcomes	Teaching Strategies	Learning Activities	Evaluation /Measurement Method (Exam/ discussion/ assignments/ presentations/ assignments)
1	Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea	Direct Instruction, PowerPoint presentations	Discussion, Assignments	Quizzes, exams, direct discussion
2	Know how microorganisms are classified	Direct Instruction, PowerPoint presentations	Discussion	Quizzes, exams, direct discussion
3	Describe how microorganisms are used as <i>model systems</i> to study basic biology, genetics, metabolism and ecology.	Direct Instruction, PowerPoint presentations	Discussion, Assignments	Quizzes, exams, direct discussion
4	Identify ways	Direct	Discussion	Quizzes, exams, direct

	microorganisms play an <i>integral role</i> in disease.	Instruction, PowerPoint presentations		discussion
5	Explain why microorganisms are <i>ubiquitous in nature</i> ; inhabiting a multitude of habitats and occupying a wide range of ecological habitats.	Direct Instruction, PowerPoint presentations	Discussion, Assignments	Quizzes, exams, direct discussion
6	Cite examples of the <i>vital role</i> of microorganisms in biotechnology, fermentation, medicine, and other industries important to human well being.	Direct Instruction, PowerPoint presentations	Discussion	Quizzes, exams, direct discussion

## 8. Assessment

Methods Used	Assessment Time	Distribution of grades
1- semester work (report, assignments, attendance)	During semester	10
2- First Exam	Seventh week	20
3- Second Exam	Twelfth week	20
4- Final Exam	Week of the final exams	50

## 9. Textbook

Main Reference	Brock Biology of Microorganisms
Author	Madigan and Martinko
Publisher	Pearson

Year	2019
Edition	15
Textbook Website	<a href="https://www.amazon.com/Brock-Biology-Microorganisms-Michael-Madigan/dp/0134261925">https://www.amazon.com/Brock-Biology-Microorganisms-Michael-Madigan/dp/0134261925</a>

**10. Extra References (books and research published in periodicals or websites)**

1-	Microbiology by Prescott, Harley, and Klein
2-	Burton's Microbiology by Engelkirk and Burton
3-	Microbiology: An Introduction by Tortora