

Course Syllabus

1	Course title	General Microbiology	
2	Course number	0334341	
3	Credit hours	4 credit hours (3 hrs theory + 1 hr lab)	
	Contact hours (theory, practical)	Theory: 3 hrs weekly Lab: 3 hrs weekly	
4	Prerequisites/corequisites	Organic Chemistry for Non-Chemistry Students 0333233	
5	Program title	B.Sc. in Biological Sciences	
6	Program code	04	
7	Awarding institution	The University of Jordan	
8	School	Science	
9	Department	Biological Sciences	
10	Course level	Third year	
11	Year of study and semester(s)	2023-2024, first semester	
12	Other department(s) involved in teaching the course	None	
13	Main teaching language	English	
14	Delivery method	<input checked="" type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online	
15	Online platforms(s)	<input type="checkbox"/> Moodle <input type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....	
16	Issuing/Revision Date	05.10.2023	



17 Course Coordinator:

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18 Other instructors:

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Contact hours:

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19 Course Description:

As stated in the approved study plan.

General Microbiology is a four credit hour-course that consists of three 50-minute lectures and on three-hour laboratory session per week. The course is considered as an overview of the field of microbiology. This course investigates the history and scope of microbiology, prokaryotic cell structure and function, microbial metabolism and nutrition, microbial growth, requirements for microbial growth, environmental factors affecting microbial growth, effects of antimicrobial agents on growth, microbial genetics and gene cloning, bacterial reproduction, microbial taxonomy, major groups of bacteria, microorganisms and environment, elements cycling, symbiotic associations, immune response and antigen-antibody reactions *in vitro*. The laboratory focuses on pure culture techniques, methods of staining and microscopic, colonial and biochemical identification of microorganisms.



20 Course aims and outcomes:

A- Aims:

1. To have a solid grasp of the scope of the microbial world and its role in shaping this planet and all its inhabitants.
2. To be aware of levels of organization of microbial agents and criteria used for categorization of organisms belonging to the world of microbiology.
3. To have knowledge about morphology, microbial metabolism and nutrition, microbial growth, requirements for microbial growth and factors affecting microbial growth.
4. To provide a conceptual and experimental background in microbiology sufficient to enable students to take more advanced courses in related fields.
5. To have knowledge about morphology, microbial metabolism and nutrition, microbial growth, requirements for microbial growth and factors affecting microbial growth.

B- Course Learning Outcomes (CLOs):

Upon successful completion of this course students will be able to:

1. distinguish the basic categories of microorganisms, including prokaryotic microbes (archaeons and bacteria), viruses and eukaryotic microbes.
2. understand the processes and mechanisms needed for and involved in bacterial reproduction.
3. compare and contrast major metabolic pathways and list the key products of each pathway.
4. draw a typical curve of bacterial growth, predict the effect of different environmental conditions on the bacterial growth (curve), and compare major methods for control of microbial growth.
5. compare between eukaryotic and prokaryotic genomes, and gene expression in each group.
6. be familiar with mechanisms for the acquisition of novel genetic information in microbes via mutations and genetic exchange, specifically conjugation, transformation and transduction.
7. specify the role of microbes in global elements cycling (C, N, S, and P cycles), and list examples of microbes that contribute to key metabolic aspects of these cycles.
8. identify the different types of symbiotic relationships between microbes and other organisms, including commensalism, mutualism, and parasitism, and provide examples of each.
9. summarize common features of microbial pathogens, with emphasis on bacteria and viruses.
10. list some beneficial and harmful uses of microorganisms, including applications in biotechnology and bioterrorism.

Upon completion of the lab sessions, students will acquire basic microbiology techniques and principles. The students will get first-hand experience that will coincide with what is taught in the theory portion of this course.

CLOs \ SLOs	SLO (1) An ability to identify, formulate, and solve broadly-defined technical or Scientific problems by applying knowledge of mathematics and science and /or technical topics to areas relevant to discipline	SLO (2) An ability to formulate or design a system, process, procedure or program to meet desired needs	SLO (3) An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgement to draw conclusions	SLO (4) An ability to communicate effectively with a range of audiences	SLO (5) An ability to understand ethical and professional responsibilities and the impact of technical and /or scientific solutions in global , economic, environmental, and societal contexts	SLO (6) An ability to function effectively on teams that establish goals plan tasks , meet deadlines and analyze risk and uncertainty
1. distinguish the basic categories of microorganisms, including prokaryotic microbes (archaeons and bacteria), viruses and eukaryotic microbes			X			
2. understand the processes and mechanisms needed for and involved in bacterial reproduction						
3. compare and contrast major metabolic pathways and list the key products of each pathway						
4. draw a typical curve of bacterial growth, predict the effect of different environmental conditions on the bacterial growth (curve), and compare major methods for control of microbial growth						
5. compare between eukaryotic and prokaryotic genomes, and gene expression in each group						
6. be familiar with mechanisms for the acquisition of novel genetic information in microbes via mutations and genetic exchange, specifically conjugation, transformation and transduction						
7. specify the role of microbes in global elements						



cycling (C, N, S, and P cycles), and list examples of microbes that contribute to key metabolic aspects of these cycles						
8. identify the different types of symbiotic relationships between microbes and other organisms, including commensalism, mutualism, and parasitism, and provide examples of each						
9. summarize common features of microbial pathogens, with emphasis on bacteria and viruses						
10. list some beneficial and harmful uses of microorganisms, including applications in biotechnology and bioterrorism						

21. Topic Outline and Schedule:

Week	Lecture	Topic	Intended Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1	The Microbial World and You		Face to Face			Exams Discussions	See recommend- ed books below
	1.2			Face to Face			Exams Discussions	See recommend- ed books below
	1.3			Face to Face			Exams Discussions	See recommend- ed books below
2	2.1	Functional Anatomy of Prokaryotic and		Face to Face			Exams Discussions	See recommend- ed books below

		Eukaryotic Cells						
	2.2			Face to Face			Exams Discussions	See recommend- ed books below
	2.3			Face to Face			Exams Discussions	See recommend- ed books below
3	3.1	Functional Anatomy of Prokaryotic and Eukaryotic Cells		Face to Face			Exams Discussions	See recommend- ed books below
	3.2			Face to Face			Exams Discussions	See recommend- ed books below
	3.3			Face to Face			Exams Discussions	See recommend- ed books below
4	4.1	Observing Microorganisms Through a Microscope and Methods of Culturing Microorganisms		Face to Face			Exams Discussions	See recommend- ed books below
	4.2			Face to Face			Exams Discussions	See recommend- ed books below
	4.3			Face to Face			Exams Discussions	See recommend- ed books below
5	5.1	Observing Microorganisms Through a Microscope and Methods of Culturing		Face to Face			Exams Discussions	See recommend- ed books below
	5.2			Face to Face			Exams Discussions	See recommend- ed books below

	5.3	Microorganisms		Face to Face			Exams Discussions	See recommend- ed books below
	6.1			Face to Face			Exams Discussions	See recommend- ed books below
6	6.2			Face to Face			Exams Discussions	See recommend- ed books below
	6.3	Microbial Growth and Nutrition		Face to Face			Exams Discussions	See recommend- ed books below
	7.1			Face to Face			Exams Discussions	See recommend- ed books below
7	7.2			Face to Face			Exams Discussions	See recommend- ed books below
	7.3	The Control of Microbial Growth		Face to Face			Exams Discussions	See recommend- ed books below
	8.1			Face to Face			Exams Discussions	See recommend- ed books below
8	8.2			Face to Face			Exams Discussions	See recommend- ed books below
	8.3	The Control of Microbial Growth		Face to Face			Exams Discussions	See recommend- ed books below
9	9.1			Face to Face			Exams	See recommend-

		Microbial Metabolism					Discussions	ed books below
	9.2			Face to Face			Exams Discussions	See recommend- ed books below
	9.3			Face to Face			Exams Discussions	See recommend- ed books below
10	10.1	Microbial Metabolism		Face to Face			Exams Discussions	See recommend- ed books below
	10.2			Face to Face			Exams Discussions	See recommend- ed books below
	10.3			Face to Face			Exams Discussions	See recommend- ed books below
11	11.1	Microbial Genetics		Face to Face			Exams Discussions	See recommend- ed books below
	11.2			Face to Face			Exams Discussions	See recommend- ed books below
	11.3			Face to Face			Exams Discussions	See recommend- ed books below
12	12.1	Classification of Microorganisms		Face to Face			Exams Discussions	See recommend- ed books below
	12.2			Face to Face			Exams	See recommend- ed books

							Discussions	below
	12.3			Face to Face			Exams Discussions	See recommend- ed books below
13	13.1	The Prokaryotes: Domains Bacteria and Archaea		Face to Face			Exams Discussions	See recommend- ed books below
	13.2			Face to Face			Exams Discussions	See recommend- ed books below
	13.3			Face to Face			Exams Discussions	See recommend- ed books below
14	14.1	The Prokaryotes: Domains Bacteria and Archaea		Face to Face			Exams Discussions	See recommend- ed books below
	14.2			Face to Face			Exams Discussions	See recommend- ed books below
	14.3			Face to Face			Exams Discussions	See recommend- ed books below

22 Evaluation Methods:

Opportunities to demonstrate achievement of the CLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	CLOs	Period (Week)	Platform



23 Course Requirements

(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform...etc):

Overhead projectors

Data show projectors

Microscopes

Bacterial isolates

Lab materials, tools and equipment

Charts

Models

24 Course Policies:

A- Attendance policies:

Absence from lectures should not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course.

B- Absences from exams and submitting assignments on time:

You should talk to your instructor as soon as possible if you miss an exam. All such cases will be dealt with according to the rules outlined in your student handbook.

C- Health and safety procedures:

Lab coat must be worn during the entire laboratory sessions. Gloves must also be worn in certain occasions.



Masks must be worn during the whole period of the lab session. In addition, physical distancing must be taken in consideration. Hands must be properly and thoroughly washed.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

All violations pertaining to cheating, plagiarism, misbehaviour will be dealt with in accordance to the rules outlined in your student handbook.

E- Grading policy:

All exams are made up of the following question forms: multiple choice questions, True or False questions, matching questions, essay questions, "fill in the blank" questions.

F- Available university services that support achievement in the course:

25 References:

A- Required book(s), assigned reading and audio-visuals:

1. The text book: "Microbiology: An Introduction". 2016. Twelfth Edition. Gerard J. Tortora, Berdell R. Funke and Christine L. Case. Publisher: Pearson.
2. Laboratory manual: "Microbiology Laboratory Manual". 2006. Second Edition. Adel M. Mahasneh and Salwa. M. Bdour. Academics for Publishing and Distributing Co., Amman, Jordan.

B- Recommended books, materials, and media:

1. "Brock Biology of Microorganisms". 2014. Fourteenth Edition. Michael T. Madigan, John M. Martinko, Kelly S. Bender, Daniel H. Buckley, David A. Stahl and Thomas Brock. Publisher: Pearson.
2. "Prescott's Microbiology". 2019. J. M. Willey, K. M. Sandman and D. H. Wood. 11th Edition. McGraw-Hill Publishers, New York, USA.
3. "Microbiology: A Human Perspective". Sixth Edition. 2009. Eugene W. Nester, Denise G. Anderson, C. Evans Robert, Jr. And Martha T. Nester. Publisher: McGraw Hill.

26 Additional information:

Name of Course Coordinator: Prof. Hesham M. Al-Younes Date: 05.10.2023	Signature: -----
Head of Curriculum Committee/Department: Dr. Amer Imraish	Signature: -----
Head of Department: Dr. Mamoun Irshaidat	Signature: -----
Head of Curriculum Committee/Faculty: Prof. Saber Al-Rousan	Signature: -----
Dean: Prof. Mahmoud I. Jaghoub	Signature: -----