

Course Syllabus

1	Course title	Microbial physiology	
2	Course number	0304942	
3	Credit hours	3 credit hours	
	Contact hours (theory, practical)	Theory: 3 hrs weekly	
4	Prerequisites/corequisites	General Microbiology	
5	Program title	PhD in Biological Sciences	
6	Program code	04	
7	Awarding institution	The University of Jordan	
8	School	Faculty of Science	
9	Department	Department of Biological Sciences	
10	Course level		
11	Year of study and semester(s)	2022/2023, Second 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	20.02.2023	



17 Course Coordinator:

Name: Prof. Hesham M. Al-Younes

Contact hours:

Office number: 103

Phone number: +962 6 5355 000, extension 22201

Email: alyounes@ju.edu.jo

18 Other instructors:

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

19 Course Description:

As stated in the approved study plan.

The course includes the following topics: the prokaryotic cell structure and function (briefly); kinetics of microbial growth; nutritional diversity in microorganisms; microbial catabolism including energy release and conservation in chemotrophic, chemolithotrophic and phototrophic microorganisms; microbial anabolic pathways including principles governing biosynthesis, precursor metabolites, CO₂ fixation, synthesis of carbohydrates, synthesis of amino acids, synthesis of nucleotides and lipid.



20 Course aims and outcomes:

A- Aims:

- Detailed study of bacterial cell structure and function.
- Dynamics of bacterial growth and physiological adaptations of bacteria to various environmental factors.
- Bacterial metabolism and diversity of energy production pathways used by various microorganisms.

B- Course Learning Outcomes (CLOs):

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

1. Understand the meaning of the phylogenetic classification of living organisms and differentiation between bacteria, archaea and eukaryotes.
2. Distinguish between morphological characteristics of microorganisms and detailed study of bacterial cell structure and function.
3. Dynamics of bacterial growth and physiological adaptations of bacteria to various environmental factors.
4. Bacterial metabolism and diversity of energy production pathways used by various microorganisms.

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
1-4		Organization, structure and function of		Face to Face			Exams Discussions	See recommend- ed books below

		microorganisms.						
5, 6		Microbial growth: The cell cycle. Microbial growth in natural environment. Cell-cell communication. Resting cells. Microbial growth curve and mathematics of microbial growth. Continuous culture systems.		Face to Face			Exams Discussions	See recommended books below
7, 8		Catabolism (Energy release and conservation) Chemoorganotrophy (Chemotrophic microorganisms and fueling processes). Aerobic respiration. Anaerobic respiration. Fermentation.		Face to Face			Exams Discussions	See recommended books below

9, 10		Catabolism of other carbohydrates. Lipid catabolism. Protein and amino acid catabolism.		Face to Face			Exams Discussions	See recommend- ed books below
11, 12		Chemolithotrophy (Chemolithotrophic microorganisms and fueling processes). Phototrophy (Phototrophic microorganisms and fueling processes).		Face to Face			Exams Discussions	See recommend- ed books below
13, 14		Anabolism (The use of energy in biosynthesis) Principles governing biosynthesis. Precursor metabolites. CO ₂ fixation. Synthesis of carbohydrates. Synthesis of amino acids. Synthesis of purines, pyrimidines and nucleotides. Lipid synthesis.		Face to Face			Exams Discussions	See recommend- ed books below



<p>Some time will also be dedicated to student presentations.</p> <p><u>SUGGESTED TOPICS for the PRESENTATION and the TERM PAPER</u></p> <p>Topics may focus on prokaryotic motility and diversity, nutrition and growth, metabolism and physiology. Other interesting subjects related to cellular microbiology and infection biology (pathogenesis and virulence factors) may also serve as material for presentations and reviews. Topics of presentations that will shed some light on modern scientific experimental approaches will have the highest priority. Titles have to be decided after discussion with the instructor before the end of the first month of the semester.</p>								

22 Evaluation Methods:

Opportunities to demonstrate achievement of the CLOs are provided through the following assessment methods and requirements:					
Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
Presentations/Term papers	30	Selected topics		Last weeks	In-class
Midterm theory exam	30	All topics		7	In-class exam
Final theory exam	40	All topics		16	In-class exam

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

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:

COURSE BOOK and references:

1. Bacterial Physiology and Metabolism. 2008. B. H. Kim and G. M. Gadd. Cambridge University Press, Cambridge, UK.
2. Prescott's Microbiology. 2019. J. M. Willey, K. M. Sandman and D. H. Wood. 11th Edition. McGraw-Hill Publishers, New York, USA.

B- Recommended books, materials, and media:

1. " Brock Biology of Microorganisms. 2012. M. Madigan, J. Martinko, D. Stahl and D. Clark. 13th Edition. Pearson Publishers, San Francisco, USA.
2. Microbiology: A System Approach. 2009. M. K. Cowan and K. P. Talaro. 2nd Edition. McGraw-Hill Publishers, New York, USA.

26 Additional information:

Development of ILOs is promoted through the following teaching and learning methods:

1. Lecturing and discussions throughout the semester
2. Exams
3. PowerPoint presentation and movies
4. Preparing term papers
5. Presentations of scientific research
6. Office hours



Name of Course Coordinator: Prof. Hesham M. Al-Younes	Signature: -----
Head of Curriculum Committee/Department:	Signature: -----
Head of Department:	Signature: -----
Head of Curriculum Committee/Faculty:	Signature: -----
Dean:	Signature: -----