



**The University of Jordan**

**Accreditation & Quality Assurance Center**

**COURSE Syllabus**

1	Course title	Applied microbiology
2	Course number	0304945
3	Credit hours (theory, practical)	3
	Contact hours (theory, practical)	3
4	Prerequisites/corequisites	General Microbiology 0304341
5	Program title	PhD Biological sciences
6	Program code	0304
7	Awarding institution	University of Jordan
8	Faculty	Science
9	Department	Biological Sciences
10	Level of course	PhD
11	Year of study and semester (s)	2017-2018, 1 <sup>st</sup> semester
12	Final Qualification	PhD
13	Other department (s) involved in teaching the course	
14	Language of Instruction	English
15	Date of production/revision	September 2017

#### 16. Course Coordinator:

*Office numbers, office hours, phone numbers, and email addresses should be listed.*

Prof. Hala Khyami

Office 301Biology

Sunday, Tuesday 12-1, Monday, Wednesday 2-3

horani-h@ju.edu.jo

#### 17. Other instructors:

*Office numbers, office hours, phone numbers, and email addresses should be listed.*

#### 18. Course Description:

*As stated in the approved study plan.*

The course will study certain microorganisms used in industry and focuses on ways to genetically modifying it. Also the course will cover the broad subject of biotechnology and its utilization in the production of secondary products such as organic acids, antibiotics, vitamins,, hormones, enzymes and mycotoxins. Moreover, the course will discuss the role of some microorganisms in the processes of biorehabilitation and bioremediation to achieve a healthy environment.

**19. Course aims and outcomes:**

**A- Aims:**

Deepen knowledge of Microbiology & its broad applications in biotechnology and food industries, in addition to industrial applications of microorganisms. The course will strengthen microbiological laboratory skills.

**B- Intended Learning Outcomes (ILOs):** Upon successful completion of this course students will be able to ...

- Understand the goal of industrial microbiology
- Appreciate how rich the abundance of microorganisms in nature, and their transformation and use in biotechnology and industry to create a wide variety of products and to assist maintaining and improving the environment
- Critically evaluate the role of micro-organisms in specific biotechnological processes
- Demonstrate a clear understanding of how biochemical pathways relate to industrial applications
- Conduct a comprehensive search for original research literature pertinent to a selected area of applied microbiology
- Communicate complex scientific principles and ideas effectively
- Provide examples of current applications of microorganisms in the different areas like medical, microbial, environmental, bioremediation, agricultural, plant, and animal innovative approaches & strategies for discovering products of industrial and environment importance


**20. Topic Outline and Schedule:**

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Some microorganisms commonly used in industrial applications	1				
Screening for productive strains and strain improvement	2				
Factors affecting microbial growth in foods: pH, moisture, oxidation-reduction potential, nutrient content, antimicrobial constituents & biological structure. Media and nutrients	3				
Screening for new metabolites: Primary and secondary metabolites	4				
Regulation of overproduction of metabolites	5				
Culture preservation	6				
Fermentation processes and fermenters.	7				
Downstream processing	8				
Use of whole cells for food related purposes	9-10				
Production of some metabolites important in industry	11				
Production of commodities of medical importance	12				
Bioaugmentation, biosensors, bioremediation, biopolymers, biopesticides, bioconversion, biodeterioration, antitumors	13				
Agricultural applications of microorganisms	14				

**21. Teaching Methods and Assignments:**

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

Lectures, Overhead projector, Power Point presentations, videos: to understand key concepts of food microbiology and practical applications, and how to apply theory to practice, Personal reading (prescribed sections of textbooks): to reinforce/strengthen students' understanding of principles and applications, student presentations and discussions

Laboratory practicals: to become skilled in a range of microbiological techniques.

**22. Evaluation Methods and Course Requirements:**

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

Midterm exam, student presentations, lab projects, home works, student participation

**23. Course Policies:**

A- Attendance policies:

Students are allowed to be absent in 10% of the lectures

B- Absences from exams and handing in assignments on time:

Make up exams if excuses are accepted, during 1-2 weeks of set exam dates for midterm exams

Make up for final according the university regulations

C- Health and safety procedures:

D- Honesty policy regarding cheating, plagiarism, misbehavior:

E- Grading policy: Midterm theory exam (25%), home works and presentations (15%), lab project(20%) Final theory exam (40%)

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

**24. Required equipment:**

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**25. References:****A- Required book (s), assigned reading and audio-visuals:**

1. Modern Food Microbiology, by Jay, J.M.; Loessner, M.; and Golden, D.A. 7<sup>th</sup> ed., Springer, (2005).
2. Food Microbiology by Martin R. Adams and Maurice O. Moss. 3<sup>rd</sup> edition. The Royal Society of Chemistry. 2008.
3. Fundamental Food Microbiology by Bibek Ray. 3<sup>rd</sup> edition. CRC press. 2004.
4. Practical Food Microbiology. Edited by Diane Roberts, Melody Greenwood. 3<sup>rd</sup> edition. Blackwell Publishing Ltd
5. Introduction to the Microbiology of Food Processing. USDA, food safety and inspection service. 2012.
6. Brock: Biology of Microorganisms, 14th edition. Pearson Education Inc. 2015.  
Review papers and original research papers as specified in the course curriculum.  
Manual of practical exercises.
7. Industrial microbiology
8. Lab manual

**B- Recommended books, materials, and media:**

- Barton, L., Northup, D.E. Microbial Ecology. 2013  
Okafor N. *Modern Industrial Microbiology and Biotechnology*. USA: Science Publishers; 2007.  
Saxena, S. Applied Microbiology. Springer Publishers, 2015.  
Applied Microbiology Journals

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**26. Additional information:**

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Name of Course Coordinator: -----Signature: *Hala Khyami* Date: 7/1/2018

Head of curriculum committee/Department: ----- Signature: -----

Head of Department: ----- Signature: -----

Head of curriculum committee/Faculty: ----- Signature: -----

Dean: ----- -Signature: -----

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Head of Department  
Assistant Dean for Quality Assurance  
Course File