

**The University of Jordan**

**Accreditation & Quality Assurance Center**

**COURSE Syllabus**

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| **1** | Course title | Applied microbiology |
| **2** | Course number | 0304441 |
| **3** | Credit hours (theory, practical) | 3 |
| Contact hours (theory, practical) | 2+3 |
| **4** | Prerequisites/corequisites | General Microbiology 0304341 |
| **5** | Program title | BSc Biological sciences |
| **6** | Program code | 0304 |
| **7** | Awarding institution | University of Jordan |
| **8** | Faculty | Science |
| **9** | Department | Biological Sciences |
| **10** | Level of course | 4th Year |
| **11** | Year of study and semester (s) | 2016, 1st semester |
| **12** | Final Qualification | BSc |
| **13** | Other department (s) involved in teaching the course | Medical Analysis |
| **14** | Language of Instruction | English |
| **15** | Date of production/revision | First semester 2016 |

16. Course Coordinator:

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| *Office numbers, office hours, phone numbers, and email addresses should be listed.*  *Prof. Hala Khyami*  *Office 301*  *Sunday,Tuesday 12-1, Monday,Wednesday 2-3*  *horani-h@ju.edu.jo* |

17. Other instructors:

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

**18. Course Description:**

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| *As stated in the approved study plan.*  This course is directed to students of biology and medical analysis. The major objective of the course is to relate the interaction of microorganisms and food in food bioprocessing, food spoilage, and food borne diseases; it explores food as a substrate for microorganisms, factors affecting growth in food, microorganisms important in food, principles of food preservation, food borne diseases and toxins. The course also investigates some aspects in  industrial microbiology: Primary and secondary metabolites, downstream processing, strain development, microorganisms as food, microbial transformation, water pollution and sewage treatment, microbial treatment and utilization of waste. |

**19. Course aims and outcomes:**

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| **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 food microbiology  Appreciate the early developments in food production and preservation  Recognize how intrinsic and extrinsic factors are used in controlling microbial growth  Comprehend the use of microorganisms as food source and the factors that affect their growth  Identify the methods used in preservation of food  Recognize food spoilage and foodborne diseases  Appreciate how rich the abundance of microorganisms in nature, and their transformation and role in bioconversion  Appreciate the use of microorganisms in biotechnology and industry to create a wide variety of products and to assist maintaining and improving the environment |
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20. Topic Outline and Schedule:

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| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Topic | Week | Instructor | Achieved ILOs | Evaluation Methods | Reference | | Introduction, Foods as a substrate for microorganisms. | 1 |  |  |  |  | | Factors affecting microbial growth in foods: pH, moisture, oxidation-reduction potential, nutrient content, antimicrobial constituents & biological structure. | 1,2 |  |  |  |  | | Microorganisms important in food microbiology:  Molds: General characteristics, molds of industrial importance.  Bacteria: Characteristics, importance in food microbiology. | 3 |  |  |  |  | | Principles of food preservation:Asepsis, anaerobiosis, filtration, chemicals, radiation, low and high temperature. | 4,5 |  |  |  |  | | Food borne diseases: Gastroenteritis caused by microorganism, mycotoxins. | 6,7 |  |  |  |  | | Screening for new metabolites: Primary and secondary metabolites. | 8 |  |  |  |  | | Strain development: Mutation, selection of mutants | 9 |  |  |  |  | | Foods and enzymes produced by microorganisms: Microorganisms as foods, Production of amino acids, organic acids, enzymes | 10-11 |  |  |  |  | | Microbial transformation | 12 |  |  |  |  | | Bioaugmentation, biosensors, bioremediation, biopolymers, biopestcides, bioconversion, biodeteriotation, antitumors | 13-14 |  |  |  |  | |

21. Teaching Methods and Assignments:

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| 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:

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| Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:  Midterm exam, student presentations, lab reports, home works, student participation |

23. Course Policies:

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| A- Attendance policies:  Students are allowed to be absent in 10% of the lectures and practicals.  B- Absences from exams and handing in assignments on time:  Make up exams if excuses are accepted ( valid reasons according to university regulations), during 1-2 weeks of set exam dates for midterm exams  Make up for final according the university regulations  C- Health and safety procedures:  Complies with university regulations  D- Honesty policy regarding cheating, plagiarism, misbehavior:  Complies with university regulations  E- Grading policy: Midterm theory exam (22%), home works and presentations (8%), Final theory exam (35%), Midterm lab exam (10%), Lab reports & evaluation (10%), Final lab exam (15%)  F- Available university services that support achievement in the course: Data show, internet access |

24. Required equipment:

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| Analytical balance  Phase contrast microscopes  pH meter  Blender mixer |

**25. References:**

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| 1. Required book (s), assigned reading and audio-visuals: 2. Modern Food Microbiology, by Jay, J.M.; Loessner, M.; and Golden, D.A. 7th ed., Springer, (2005). 3. Food Microbiology by Martin R. Adams and Maurice O. Moss. 3rd edition. The Royal Society of Chemistry. 2008. 4. Fundamental Food Microbiology by Bibek Ray. 3rd edition. CRC press. 2004. 5. Practical Food Microbiology. Edited by Diane Roberts, Melody Greenwood. 3rd edition. Blackwell Publishing Ltd 6. Introduction to the Microbiology of Food Processing. USDA, food safety and inspection service. 2012. 7. 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. 8. Industrial microbiology 9. Lab manual 10. Recommended books, materials, and media: |

26. Additional information:

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Name of Course Coordinator: الاستاذة الدكتورة هالة الخيمي Signature: ------------------------- Date: 12/ 01/ 2016

Head of curriculum committee/Department: الاستاذة الدكتورة سوسن العورانSignature: ---------------------------------

Head of Department: الدكتورة هناء العبوس Signature: ---------------------------------

Head of curriculum committee/Faculty: الاستاذة الدكتورة أمل العابودي Signature: ---------------------------------

Dean: الاستاذ الدكتور صالح محمود Signature: ---------------------------------

Copy to:

Head of Department

Assistant Dean for Quality Assurance

Course File