



Academic Course Specification Form

استمارة توصيف المقرر الأكاديمي

القسم الخاص بالطالب Section Concerning the Student

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| 1. Course Code: | BIOLS 352 | 1. رمز المقرر: |
| 2. Course Title | Applied Microbiology | 2. اسم المقرر: |
| 3. College: | College of Science | 3. الكلية: |
| 4. Department: | Biology | 4. القسم: |
| 5. Academic Program: | Bachelor of Science in Biology | 5. البرنامج الأكاديمي: |
| 6. Course Credits: | 2-2-3 | 6. عدد الساعات المعتمدة: |
| 7. Course NQF Level: | 8 | 7. مستوى المقرر وفقاً للإطار الوطني للمؤهلات: |
| 8. Notional Hours: | 124 | 8. عدد الساعات الافتراضية: |
| 9. NQF Credits: | 12 | 9. عدد الساعات المعتمدة للمقرر وفقاً للإطار الوطني للمؤهلات: |
| 10. Prerequisite: | BIOLS 250 | 10. المتطلب السابق للمقرر: |
| 11. Lectures Timing & Location: | | 11. وقت المحاضرة ومكانها: |
| 12. General Mode of Teaching and Learning | تقليدي Traditional | 12. النمط العام للتعليم والتعلم: |

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| 13. Course Coordinator: | | 13. منسق المقرر: |
| 14. Course Instructor: | | 14. مدرّس المقرر: |
| 15. Office Hours and Location: | | 15. الساعات المكتبية ومكانها: |
| 16. Instructor's Email: | | 16. البريد الإلكتروني لمدرّس المقرر: |
| 17. Academic Year: | | 17. السنة الأكاديمية: |
| 18. Semester: | | 18. الفصل الدراسي: |
| 19. Textbook(s): | | 19. الكتب الدراسية للمقرر: |
| Ray Bibek and Bhunia Arun: Fundamental food microbiology, 6 th Edition, CRC PRESS, 2025. This textbook is intended for undergraduate students | | |
| 20. References: | | 20. المراجع: |
| Food microbiology an introduction by Montville et al., (2012) and 2- Food microbiology: a laboratory manual by Elmeleigy Y (2003) | | |
| 21. Other Learning Resources Used (e.g. e-learning, field visits, periodicals, software, etc.): | | 21. مصادر التعلّم الأخرى (مثال: التعلّم الإلكتروني، زيارات ميدانية، دوريات، برمجيات، إلخ....) |
| 22. Course Description (as published in the College Catalogue): | | 22. توصيف المقرر (حسب ما ورد في دليل الكلية): |
| Foods as substrates for microorganisms; microorganisms important in food and fermentation industries; contamination, spoilage and preservation of foods. Single cell protein production; secondary metabolite production; antibiotics, alcohols, amino acids, enzymes, microbial toxins. New approaches to improve novel metabolite production through modern microbial biotechnology techniques | | |
| 23. Course Intended Learning Outcomes (3 to 5 CILOs): | | 23. مخرجات التعلّم للمقرر (CILOs) (3 إلى 5 مخرجات تعليمية): |
| 1. Analyze the relationships between food and microorganisms, as well as different food preservation techniques and their impact on microbial safety and quality. | | |
| 2. Describe the use of microorganisms in the production of foods and industry. | | |
| 3. Explain the enumeration of bacterial cells and factors influencing control of microbial growth and their effects on food safety. | | |
| 4. Identify the classification, nomenclature, size and cultural characteristics of bacteria, yeasts and molds. | | |
| 5. Illustrate the sanitation techniques applied in food processing and the importance of foodborne pathogens. | | |

| 24. Course Assessment Percentages (as per Regulations of Study and Examination at the University of Bahrain): | | 24. أساليب التقييم ونسبها المئوية (بحسب نظام الدراسة والامتحانات في جامعة البحرين): | |
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| Assessment التقييم | Type النوع | Percentage النسبة | Assessment Date تاريخ التقييم |
| Theory quiz | Individual فردى | 5% | |
| Midterm Exam | Individual فردى | 15% | |
| Assignment: Field trip | Individual فردى | 10% | |
| Laboratory: Assignments, reports | Individual فردى | 15% | |
| Lab-exam | Individual فردى | 15% | |
| Final Exam | Individual فردى | 40% | |
| Total | 100% | | |
| 25. Description of Topics Covered | | 25. وصف الموضوعات التي ينبغي تناولها: | |
| Topic Title (e.g. chapter/experiment title) الموضوع | | Description التفصيل | |
| Factors that influence microbes in foods | | Microbial growth in food is influenced by intrinsic factors like pH, water activity, and nutrient content, as well as extrinsic factors such as temperature, humidity, and the gaseous environment. These factors interact to determine the types of microbes that can survive and grow in a particular food. | |
| Microbial physiology and metabolism | | Microbial physiology encompasses the study of how microorganisms' function, grow, and reproduce, including their structure, genetics, and biochemistry. Microbial metabolism focuses on the biochemical processes by which microbes obtain energy and nutrients to fuel their life processes, involving a wide range of metabolic pathways. | |
| Spores and their significance | | Spores are dormant, highly resistant structures produced by certain bacteria and fungi that allow them to survive harsh environmental conditions like extreme temperatures, desiccation, and radiation. Their significance lies in their ability to ensure the survival and propagation of these microorganisms, enabling them to persist in unfavorable environments and cause spoilage or disease when conditions become suitable again. | |

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| Spore biology | Spore biology is the study of the formation, structure, and function of spores, which are dormant, reproductive cells produced by a wide range of organisms, including bacteria, fungi, algae, and plants. | | |
| Detection and enumeration of microbes in food material | Detection and enumeration of microbes in food material involves a range of techniques to identify and quantify the microorganisms present. Traditional methods often involve culturing samples on specific media to encourage growth and then counting colonies or using statistical estimations like the Most Probable Number (MPN). | | |
| Rapid and automated microbial methods | Modern techniques like PCR and ELISA can rapidly detect specific microbial DNA or proteins, providing faster and more sensitive results. | | |
| Indicator microorganisms and microbiological criteria Indicators of food toxins | Indicator microorganisms are specific microbes whose presence in food suggests potential contamination or poor hygiene, while microbiological criteria are standards that define acceptable levels of these microbes in food products to ensure safety and quality. | | |
| Gram-negative foodborne pathogenic bacteria | Gram-negative foodborne pathogenic bacteria are a group of microorganisms that can cause illness when ingested through contaminated food. They possess a unique cell wall structure that makes them more resistant to some antibiotics and environmental stresses. | | |
| Enterohemorrhagic Escherichia coli | Enterohemorrhagic Escherichia coli (EHEC) is a specific type of E. coli bacteria that produces a potent toxin called Shiga toxin. | | |
| Gram-positive foodborne pathogenic bacteria | Gram-positive foodborne pathogenic bacteria are a group of microorganisms that can cause illness when ingested through contaminated food. ¹ They have a thick cell wall that retains a specific stain in the Gram staining technique. | | |
| Clostridium botulinum | Clostridium botulinum is a bacterium that produces a potent neurotoxin, one of the most poisonous substances known. | | |
| 26. Weekly Schedule | | | |
| 26. الجدول الأسبوعي | | | |
| Week الأسبوع | Date التاريخ | Topics Covered الموضوعات المتناولة | CILOs مخرجات التعلم للمقرر (CILOs) |
| | | | Teaching/Assessment Mode and Method منهجية ونمط التدريس/التقييم |

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| 1 | | Factors that influence microbes in foods No-Lab | 1, 3 | Traditional تقليدي |
| 2 | | Microbial physiology and metabolism LAB: Physical and chemical agents for the control of microbial growth | 1, 2 | Traditional تقليدي |
| 3 | | Spores and their significance LAB: Physical and chemical agents for the control of microbial growth | 1, 5 | Traditional تقليدي |
| 4 | | Spores in food LAB: Cultivation and morphology of fungi | 1, 4, 5 | Traditional تقليدي |
| 5 | | Spore biology LAB: Cultivation and morphology of fungi | 1, 4, 5 | Traditional تقليدي |
| 6 | | Detection and enumeration of microbes in food material LAB: Bacterial count in vegetables and fruits & Bacteriological analyses of meats and poultry | 3, 4 | Traditional تقليدي |
| 7 | | Sample collection and data analysis | 3, 4 | Traditional تقليدي |

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| | | LAB: Bacterial count in vegetables and fruits & Bacteriological analyses of meats and poultry | | |
| 8 | | Rapid and automated microbial methods LAB: Bacteriological analysis of seafood Bacteriological examination of milk and quality control | 3 | Traditional تقليدي |
| 9 | | Indicator microorganisms and microbiological criteria LAB: Bacteriological analysis of seafood Bacteriological examination of milk and quality control | 1, 3, 5 | Traditional تقليدي |
| 10 | | Indicators of food toxins LAB: Standard qualitative analysis of water | 1, 3, 5 | Traditional تقليدي |
| 11 | | Gram-negative foodborne pathogenic bacteria LAB: Standard qualitative analysis of water | 5 | Traditional تقليدي |
| 12 | | Gram-negative foodborne pathogenic bacteria Field trip | 3, 5 | Traditional تقليدي |
| 13 | | Enterohemorrhagic Escherichia coli | 3, 5 | Traditional تقليدي |
| 14 | | Gram-positive foodborne pathogenic bacteria | 3, 5 | Traditional تقليدي |

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| | | LAB: | | |
| 15 | | Clostridium botulinum | 3, 4, 5 | تقليدي Traditional |
| 16 | | | | Choose an item. |
| 27. Academic Integrity Statement | | | 27. بيان النزاهة الأكاديمية | |
| Students are to observe the highest level of honesty and academic ethics in pursuit of their academic goals as per UOB Regulations of Student Conduct and Academic Integrity, Anti-plagiarism Policies , and Students' Rights and Responsibilities Handbook . The consequences for cheating, plagiarism, unauthorized collaboration, and other forms of academic dishonesty can be very serious and will be dealt with as per the aforementioned policies and regulations. | | | يتعيّن على الطلبة الالتزام بأعلى مستويات الصدق والأمانة والأخلاق الأكاديمية في سعيهم لتحقيق أهدافهم الأكاديمية وفقاً للوائح سلوك الطلاب والنزاهة الأكاديمية، سياسات مكافحة الانتحال ، و دليل حقوق الطلبة وواجباتهم ، المعمول بها في جامعة البحرين. يمكن لعواقب الغش والسرقة الأدبية والتعاون غير المصرح به وغيرها من أشكال عدم الأمانة الأكاديمية أن تكون خطيرة للغاية وسيتم التعامل معها وفقاً للسياسات واللوائح المذكورة آنفاً. | |
| 28. Attendance and Absence Regulations | | | 28. نظام الحضور والغياب | |
| Students are required to adhere to regular attendance for class lectures and practical sessions, as determined by the nature of the course, as per Article (33) of Regulations of Study and Examination at the University of Bahrain . | | | يجب على الطلبة الالتزام بالحضور المنتظم للمحاضرات الصفية والعملية، حسبما تحدده طبيعة المقرر الدراسي، ووفقاً للمادة (33) من نظام الدراسة والامتحانات في جامعة البحرين . | |