**جامعة آل البيت**
**دائرة ضمان الجودة والتخطيط**

بسم الله الرحمن الرحيم

جامعة آل البيت

**كلية العلوم**
**قسم العلوم الطبية المخبرية**

# توصيف مساق. General Microbiology
## الاحياء الدقيقة العامة (0406251)

### 1. معلومات مدرس المساق (Instructor)

| | |
|---|---|
| اســـــــــم ( مدرس / منسق ) المساق : | Prof. Adnan S. Jaran أ.د عدنان سليم خليل جرن<br>مي العبد الله |
| الساعـــــــــــــات المكتبيـــــــــــــــــــــة : | حد -ثل 10.30 – 11.30 , ثن – ربع 12.45 – 1.45 |
| رقم المكتب والرقـــــــــم الفرعـــــــــــــي : | 2119 |
| البريـــــــــــــــــــــد الالكترونـــــــــــــــــــي : | jaran@aabu.edu.jo alabdullahmai100@gmail / |
| مساعد البحث والتدريس/المشرف/الفني (إن وجد): | |

### 2. وصف المساق (Course Description)

The course will cover eukaryotic and prokaryotic microbes and viruses but will emphasize bacteria. This course will provide a conceptual and experimental background in microbiology sufficient to enable students to take more advanced courses in related fields.
The course will cover a broad range of knowledge in the field, history of the science, microscopy, microbial cell structure and function, microbial physiology, microbial nutrition, microbial metabolism, microbial genetics, microbial growth. Growth control in vitro and in vivo, microbial taxonomy, diversity of microorganisms (acellular microorganisms: viruses, viroids, and prions; prokaryotic microorganisms: Bacteria and Archaea; and eukaryotic microorganisms: fungi, protozoa, algae, and slime molds). EPIDEMIOLOGY AND PUBLIC HEALTH, DIAGNOSING INFECTIOUS DISEASES, PATHOGENESIS OF INFECTIOUS DISEASES, SPECIFIC and NONSPECIFIC HOST DEFENSE MECHANISMS.

### 3. بيانات المساق (Course Title)

| | | |
|---|---|---|
| **رقم المساق: 406413** | **اسم المساق: احياء دقيقة عامة** | **المستوى: الثاني** |

| | | |
|---|---|---|
| طبيعة المساق: نظري | المتطلب السابق 0406115 | وقت المحاضرة: 10– 11 |
| العام الجامعي: 2020 / 2021 | الفصل الدراسي: الاول | عدد الساعات الدراسية: 3 |

## 4. أهداف المساق (Course Objectives)

| | |
|---|---|
| أ- | Differentiate between main groups of microorganisms. |
| ب- | Demonstrate or apply the use basic laboratory techniques to manipulate microorganisms |
| ج- | Know the impact of microorganisms on human health. |
| د- | Understand the impact of microorganisms as agents of food spoilage and foodborne illnesses. |
| | Know the role of microorganisms in pathogenesis and body defenses |

## 5. مخرجات التعلم (Intended Student Learning Outcomes)
**(المعرفة والمهارات والكفايات)**

يفترض بالطالب بعد دراسته لهذا المساق أن يكون قادرا على:

Compare and distinguish the basic groups of microbes, including prokaryotic microbes (Archaea, Bacteria), and Viruses, and eukaryotic microbes. • Understand the processes needed for one bacterium to become two, and understand the mechanisms involved. • Compare and contrast major pathways of catabolism, specify the relative energy yield from each pathway, list the key products of each pathway, and describe biochemical pathways used for microbial taxonomy. • Compare and contrast major pathways of biosynthesis and list the key products of each pathway. • Draw a typical microbial growth curve and predict the effect of different environmental conditions on the curve. • Compare and contrast eukaryotic and prokaryotic genomes, and gene expression in each group. • Compare and contrast the acquisition of novel genetic information in microbes via mutations and genetic exchange, specifically conjugation, transformation and transduction, • Specify the role of microbes in global C, N, S, and P cycles, and list examples of microbes that contribute to key metabolic aspects of these cycles. • List different types of symbiotic interactions between microbes and other organisms, including commensalism, mutualism, and parasitism, and provide examples of each. • Summarize common features of microbial pathogens, with emphasis on bacterial and viral pathogens. • Summarize mechanisms of animal defenses to infection, including primary defenses, innate immunity, and acquired immunity. • Compare and contrast beneficial and harmful uses of organisms, including applications in biotechnology and bioterrorism. • Have a solid grasp of the scope of the microbial world and its role in shaping this planet and all its inhabitants

## 6. محتوى المساق (Course Content)

| الأسبوع | الموضـــوع |
|---|---|

| | |
|---|---|
| **MICROBIOLOGY**: WHAT IS MICROBIOLOGY? WHY STUDYMICROBIOLOGY.<br>CAREERS IN MICROBIOLOGY. FIRST MICROORGANISMS ON EARTH. EARLIEST KNOWN INFECTIOUS DISEASE. PIONEERS IN THE SCIENCE OF MICROBIOLOGY.<br>**MICROSCOPY:**<br>INTRODUCTION: USING THE METRIC SYSTEM TO EXPRESS THE SIZES OF MICROORGANISMS. MICROSCOPES | الأول |
| **CELL STRUCTURE AND TAXONOMY**<br>INTRODUCTION: EUKARYOTIC CELL STRUCTURE, PROCARYOTIC CELL STRUCTURE. | الثاني |
| RECAP OF STRUCTURAL DIFFERENCES BETWEEN PROCARYOTIC AND EUCARYOTIC CELLS. REPRODUCTION OF ORGANISMS AND THEIR CELLS<br>TAXONOMY, DETERMINING RELATEDNESS AMONG ORGANISMS | الثالث |
| **DIVERSITY OF MICROORGANISMS**<br>**Diversity 1**: ACELLULAR AND PROCARYOTIC MICROBES.CATEGORIES OF MICROORGANISMS. ACELLULAR INFECTIOUS AGENTS<br>THE DOMAIN BACTERIA. THE DOMAIN ARCHAEA | الرابع |
| **Diversity 2:** Eukaryotic Microbes<br>certain alga, all protozoa, certain fungi, all lichens and all slime molds | الخامس |
| **MICROBIAL PHYSIOLOGY AND GENETICS**. MICROBIAL PHYSIOLOGY, METABOLIC ENZYMES. **METABOLISM:** BACTERIAL GENETICS GENETIC ENGINEERING. GENE THERAPY | السادس |
| **الامتحان الأول** | |
| **CONTROLLING MICROBIAL GROWTH IN VITRO**<br>INTRODUCTION: FACTORS THAT CONTROL GROWTH OF MICROORGANISMS IN VITRO<br>INHIBITING THE GROWTH OF MICROORGANISMS IN VITRO | الثامن |
| **ANTIMICROBIAL AGENTS TO CONTROL MICROBIAL GROWTH IN VIVO**<br>INTRODUCTION | التاسع |
| ANTIBACERIAL AGENTS<br>ANTRIFUNGAL AGENTS, ANTIPROTOZOAL AGENTS<br>ANTIVIRAL AGENTS, DRUG RESISTANCE<br>WHAT PHYSICIANS AND PATIENTS CAN DO TO HELP IN THE WAR AGAINST DRUG RESISTANCE? EMPIRICAL THERAPY<br>UNDESIRABLE EFFECTS OF ANTIMICROBIAL AGENTS | العاشر |

| | |
|---|---|
| **EPIDEMIOLOGY AND PUBLIC HEALTH**<br>EPIDEMOLOGY, INTERACTIONS AMONG PATHOGENS, HOSTS, AND THE ENVIRONMENT.CHAIN OF INFECTION. RESERVOIRS OF INFECTION MODES OF TRANSMISSION. PUBLIC HEALTH AGENCIES BIOTERRORIST AND BIOLOGICAL WARFARE AGENTS. WATER SUPPLIES AND SEWAGE DISPOSAL<br>HEALTHCARE EPIDEMIOLOGY: NOSOCOMIAL INFECTIONS AND INFECTION CONTROL. INTRODUCTION: NOSOCOMIAL INFECTIONS. INFECTION CONTROL. | الحادي عشر |
| **الامتحان الثاني** | |
| **DIAGNOSING INFECTIOUS DISEASES**<br>INTRODUCTION: CLINICAL SPECIMENS, THE PATHOLOGY DEPARTMENT ("THE LAB"), THE CLINICAL MICROBIOLOGY LABORATORY<br>**PATHOGENESIS OF INFECTIOUS DISEASES**<br>INTRODUCTION: INFECTION VERSUS INFECTIOUS DISEASE. WHY INFECTION DOES NOT ALWAYS OCCUR. FOUR PERIODS OR PHASES IN THE COURSE OF AN INFECTIOUS DISEASE. LOCALIZED VERSUS SYSTEMIC INFECTIONS. ACUTE, SUBACUTE, AND CHRONIC DISEASES SYMPTOMS OF A DISEASE VERSUS SIGNS OF A DISEASE<br>LATENT INFECTIONS PRIMARY VERSUS SECONDARY INFECTIONS. STEPS IN THE PATHOGENESIS OF INFECTIOUS DISEASE.<br>VIRULENCE: VIRULENCE FACTORS (ATTRIBUTES THAT ENABLE PATHOGENS TO ATTACH, ESCAPE DESTRUCTION, AND CAUSE DISEASE) | الثالث عشر |
| **NONSPECIFIC HOST DEFENSE MECHANISMS**<br>INTRODUCTION: NONSPECIFIC HOST DEFENSE MECHANISMS FIRST LINE OF DEFENSE. SECOND LINE OF DEFENSE | الرابع عشر |
| **SPECIFIC HOST DEFENSE MECHANISMS**: AN INTRODUCTION TO IMMUNOLOGY<br>INTRODUCTION<br>IMMUNITY, HUMORAL IMMUNITY, CELL-MEDIATED IMMUNITY<br>HYPERSENSITIVITY AND HYPERSENSITIVITY REACTIONS<br>IMMUNOSUPPRESSION, IMMUNOLOGY LABORATORY | الخامس عشر |
| **الامتحان النهائي** | السادس عشر |

**7. استراتيجيات التعليم والتعلم وطرق التقويم**
**(Teaching and learning Strategies and Evaluation Methods)**

| نوع التقويم/القياس (امتحان/عروض صفية/مناقشة/واجبات) | أنشطة التعلم | استراتيجيات التدريس | مخرجات التعلم | ت |
|---|---|---|---|---|
| **Exam/quiz** | **lecture** | Brain storming, discussion | **The students should know history and pioneers of microbiology** | 1 |
| **Exam/quiz** | **Lecture** | Brain storming, discussion | **The student should know structure and function of microorganisms** | 2 |
| **Exam/quiz** | **lecture** | Brain storming, discussion | **The students should know the physiology, metabolism and genetics of microorganisms** | 3 |
| Exam/assignment | **Lecture** | Group discussion brain storming | The students should know the diversity of prokaryotic and eukaryotic microorganisms | 4 |
| **Exam /assignment** | **Lecture** | Group discussion and brain storming | The students should know the epidemiology, pathogenicity and nosocomial infections | 5 |
| **Exam/quiz** | **Lecture** | **Brain storming** | The students should know the role of specific and non-specific defense mechanisms | 6 |

**8. تقييم الطلبة (Assessment)**

| الأساليب المستخدمة | توقيت التقييم | توزيع الدرجات لكل أسلوب |
|---|---|---|
| 1-أعمال الفصل: (تقرير، وظائف، حضور) | خلال الفصل | 10 |
| 2-امتحان تحريري أول | الأسبوع السابع | 20 |
| 2-امتحان تحريري ثاني | الأسبوع الثاني عشر | 20 |
| 3-امتحان تحريري نهائي | أسبوع الامتحانات النهائية | 50 |

**9. الكتاب المقرر (Text Book)**

| | |
|---|---|
| **المرجع الرئيس** | Burton's Microbiology for the Health Sciences |
| **المؤلف** | Paul G. Engelkirk Gwendolyn R.W. Burton |
| **الناشر** | Lippincott Williams & Wilkins; |
| **السنة** | 2014 |
| **الطبعة** | 10th International e edition |
| **الموقع الالكتروني للمرجع** | |

**10. المراجع الإضافية (References) (وتشمل الكتب والبحوث المنشورة في الدوريات او المواقع الالكترونية)**

| | |
|---|---|
| -1 | Microbiology for the health sciences, by Jensen, and Wright. Fourth edition. |
| -2 | |

| | |
|---|---|
| | -3 |