# Academic Program Description Form

**University Name: Al-Muthanna**

**Faculty/Institute: .Science of collage**

**Scientific Department: Biology**

**Academic or Professional Program Name: .BSc**

**Final Certificate Name: .BSc in Biology**

**Academic System: .....**

**Description Preparation Date: 26\5\2024**

**File Completion Date:26\5\2024**

**Signature:**

**Head of Department Name:**

**Dr. Hanaa Ali Aziz**

**Date:26/5/2024**

**Signature:**

**Scientific Associate Name:**

**أ.م. ميثم عباس مكي**

**Date: 26/5/2024**

**The file is checked by:**

**Department of Quality Assurance and University Performance**

**Director of the Quality Assurance and University Performance Department:**

**Date:**

**Signature:**

**Approval of the Dean**

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **clinical analysis** | | | **Module Delivery** | |
| **Module Type** | **Elective** | | | ☒ **Theory**<br>☒ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **Bio47028** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | 4 | | **Semester of Delivery** | 7 | |
| **Administering Department** | BIO | | **College** | COS | |
| **Module Leader** | **Yasir Adil Jabbar Alabdali** | | **e-mail** | **Yasir.alabdali@mu.edu.iq** | |
| **Module Leader's Acad. Title** | **Assist. Professor** | | **Module Leader's Qualification** | **PhD** | |
| **Module Tutor** | Name (if available) (التدريسي المساعد) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | Name (اللجنة العلمية) | | **e-mail** | E-mail | |
| **Scientific Committee Approval Date** | 01/06/2023 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | **Microbiology I, Microbiology II** | **Semester** | 3,4 |
| **Co-requisites module** | **None** | **Semester** | 7 |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>**أهداف المادة الدراسية** | 1. The aim is to familiarize students with the fundamental concepts, theories, and methodologies employed in clinical pathology. This includes topics such as laboratory testing, specimen collection and handling, quality control, and interpretation of results.<br>2. Focuses on providing students with an extensive understanding of various laboratory and diagnostic tests used in clinical analysis. Students will learn about the indications, methodologies, interpretation, and clinical significance of different tests, including blood tests, urine tests, imaging studies, and genetic tests.<br>3. To develop a comprehensive understanding of pathological processes and diseases.<br>4. To acquire knowledge of a wide range of laboratory and diagnostic tests.<br>5. To gain proficiency in the identification and characterization of microorganisms in diagnostic microbiology.<br>6. To develop critical thinking and problem-solving skills in clinical analysis.<br>7. To understand the importance of quality assurance and quality control in clinical analysis.<br>8. To develop effective communication skills for reporting and presenting clinical analysis findings. |
| **Module Learning Outcomes**<br>**مخرجات التعلم للمادة الدراسية** | 1. Demonstrate a comprehensive understanding of the principles and techniques of clinical pathology, including laboratory tests, and diagnostic microbiology.<br>2. Apply acquired knowledge to accurately interpret and analyze laboratory test results, and microbiological data.<br>3. Utilize critical thinking skills to integrate clinical data, laboratory results, and pathological findings to formulate accurate diagnoses and develop appropriate treatment plans.<br>4. Communicate effectively and professionally with healthcare professionals, patients, and other stakeholders regarding clinical analysis findings, including test results, diagnostic interpretations, and recommendations for further investigations.<br>5. Apply ethical and legal principles in the context of clinical analysis, ensuring patient confidentiality, informed consent, and adherence to relevant regulations and guidelines.<br>6. Stay updated with advancements in clinical analysis, new laboratory techniques, and emerging diagnostic methodologies through continuous professional development.<br>7. Collaborate effectively as part of an interdisciplinary healthcare team, demonstrating teamwork, leadership, and effective communication skills in the context of clinical analysis and patient care. |

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|---|---|
| **Indicative Content**<br>**المحتويات الارشادية** | 1. Introduction to Clinical Analysis:<br>• Overview of clinical analysis and its importance in healthcare.<br>• Historical perspective of microbiology and infection.<br>• Glossary of key terms used in clinical analysis.<br>2. Examination of Urine:<br>• Importance of urine analysis in clinical diagnosis.<br>• Chemical components of urine and their significance.<br>• Techniques and procedures for urine examination.<br>3. Renal Function Tests:<br>• Assessment of renal function through laboratory tests.<br>• Interpretation of renal function test results.<br>4. Liver Function Tests:<br>• Evaluation of liver function using laboratory tests.<br>• Interpretation of liver function test results.<br>5. Examination of Feces:<br>• Significance of fecal examination in clinical analysis.<br>• Techniques for analyzing fecal samples and interpreting the results.<br>6. Semen Analysis:<br>• Importance of semen analysis in assessing male fertility.<br>• Procedures and parameters measured in semen analysis.<br>7. Pregnancy Tests:<br>• Different types of pregnancy tests and their principles.<br>• Interpretation of pregnancy test results.<br>8. Blood Analysis and Diabetes Mellitus:<br>• Understanding the components of blood and their functions.<br>• Laboratory tests for assessing blood sugar levels.<br>• Differentiating between types of Diabetes Mellitus and associated blood glucose abnormalities (Hypoglycemia and Hyperglycemia).<br>9. Laboratory Tests in Anemia:<br>• Importance of laboratory tests in diagnosing anemia.<br>• Different types of anemia and their diagnostic markers.<br>• Laboratory techniques for evaluating anemia.<br>10. Laboratory Tests in Hematological Malignancies:<br>• Role of laboratory tests in diagnosing hematological malignancies.<br>• Assessment of coagulation factors and bleeding disorders.<br>11. Erythrocyte Sedimentation Rate:<br>• Understanding the Erythrocyte Sedimentation Rate (ESR) test.<br>• Interpretation of ESR results and its clinical significance.<br>12. Examination of Sputum:<br>• Significance of sputum examination in diagnosing respiratory infections.<br>• Techniques for collecting and analyzing sputum samples.<br>13. Examination of Cerebrospinal Fluid:<br>• Importance of cerebrospinal fluid examination in diagnosing |

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|---|---|
| | neurological conditions.<br>• Procedures and tests used for analyzing cerebrospinal fluid samples.<br>14. Laboratory Diagnosis of Sexually Transmitted Diseases (STDs):<br>• Overview of common sexually transmitted diseases.<br>• Laboratory tests used for the diagnosis of STDs.<br>15. Serological Tests for Autoimmune Diseases:<br>• Principles and techniques of serological tests used in diagnosing autoimmune diseases.<br>• Focus on rheumatoid arthritis as an example.<br>16. Introduction to Molecular Diagnostics:<br>• Overview of molecular diagnostic techniques.<br>• Polymerase chain reaction (PCR) and real-time PCR in clinical analysis. |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 1. Active Participation and Interaction: Encourage students to actively participate during lectures by asking questions, sharing insights, and engaging in discussions related to clinical analysis topics.<br>2. Active Listening: Emphasize the importance of attentive listening skills during explanations and demonstrations.<br>3. Engagement in Extra-curricular Activities: Provide opportunities for students to engage in hands-on activities, such as laboratory sessions, case studies, and practical workshops.<br>4. Professional Behavior Development: Teach students the importance of maintaining confidentiality, demonstrating empathy and respect towards patients, and adhering to professional standards and guidelines.<br>5. Communication Skills Training: Include modules or workshops focusing on effective communication skills specific to clinical analysis.<br>6. General and Transferable Skills: Integrate general and transferable skills into the curriculum, such as critical thinking, problem-solving, time management, and research skills.<br>7. Practical Training in Sample Collection and Handling: Provide hands-on training to students on different pathological sample collection techniques, proper handling, transportation, and storage procedures.<br>8. Laboratory Techniques and Infection Prevention: Teach students essential laboratory techniques involved in clinical analysis, including conducting laboratory tests, making tissue sections, and following infection prevention protocols.<br>9. Job Interview Preparation: Offer guidance and resources to help students prepare for job interviews |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>**الحمل الدراسي المنتظم للطالب خلال الفصل** | **74** | **Structured SWL (h/w)**<br>**الحمل الدراسي المنتظم للطالب أسبوعيا** | **5** |
| **Unstructured SWL (h/sem)**<br>**الحمل الدراسي غير المنتظم للطالب خلال الفصل** | **51** | **Unstructured SWL (h/w)**<br>**الحمل الدراسي غير المنتظم للطالب أسبوعيا** | **3** |
| **Total SWL (h/sem)**<br>**الحمل الدراسي الكلي للطالب خلال الفصل** | **125** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due**<br>الاسبوع المستحق | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | **2** | **10% (10)** | **5, 10** | **LO #1, 2,** |
| | **Assignments** | **2** | **10% (10)** | **2, 12** | **LO # 3,** |
| | **Projects / Lab.** | **1** | **10% (10)** | **Continuous** | |
| | **Report** | **1** | **10% (10)** | **13** | **LO # 1,2** |
| **Summative assessment** | **Midterm Exam** | **1 hr** | **10% (10)** | **7** | **LO # 1** |
| | **Final Exam** | **4hr** | **50% (50)** | **16** | **All** |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Examination of Urine |
| **Week 2** | Renal Function Tests |
| **Week 3** | Chemical components of urine |
| **Week 4** | Liver Function Tests |
| **Week 5** | Examination of Feces |
| **Week 6** | Semen Analysis |
| **Week 7** | Pregnancy Tests |
| **Week 8** | Blood and components, blood sugar Diabetes Mellitus types and disease (Hypoglycemia and Hyperglycemia) |

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|---|---|
| **Week 9** | Laboratory Tests in Anemia<br>Blood disease Anemia Aplastic anemia<br>Pernicious anemia<br>Megaloblastic anemia |
| **Week 10** | Laboratory Tests in<br>Hematological Malignancies |
| **Week 11** | Coagulation factors<br>bleeding disorder<br>Erythrocyte Sedimentation Rate |
| **Week 12** | Examination of Sputum |
| **Week 13** | Examination of Cerebrospinal Fluid |
| **Week 14** | Sexually Transmitted Diseases (STD) |
| **Week 15** | Science Serology<br>Serological tests for autoimmune diseases<br>Rheumatoid Arthritis<br>C-Reactive Protein C.R.P<br>Widal test<br>Wrights agglutination test or Rose Bengal<br>Antistreptolysin test (A.S.O.T)<br>ELISA test principal<br>Poly chain reaction PCR, and real-time PCR |
| **Week 16** | **Preparatory week before the final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Principles of Pathological Analysis Laboratory |
| **Week 2** | Urine test , urine strips |
| **Week 3** | Urine culture |
| **Week 4** | Biochemical Test |
| **Week 5** | Stool test |
| **Week 6** | Semen test |
| **Week 7** | Pregnancy Test |
| **Week 8** | Blood sugar |
| **Week 9** | Blood smear such as Hb , Pvc, RBC counts and WBC counts |
| **Week 10** | Blood smear for Leukemia patients |
| **Week 11** | ESR, bleeding time, blood groups |

| | |
|---|---|
| **Week 12** | Acid fast stains for TB bacteria and Samples cultures |
| **Week 13** | Acid fast stains for TB bacteria and Samples cultures |
| **Week 14** | Swabs cultures |
| **Week 15** | Serological tests<br>Rheumatoid Arthritis<br>C-Reactive Protein C.R.P<br>Widal test<br>Rose Bengal<br>Antistreptolysin test (A.S.O.T)<br>ELISA test<br>Poly chain reaction PCR, and real-time PCR |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Essentials of Clinical Pathology Book First Edition: 2010 ISBN 978-93-80704-19-7 | **NO** |
| **Recommended Texts** | Manual of laboratory and Diagnostic Tests. Edition (8) copyright2009 Vol. (1) (2).by Lippincott Williams& wilkins. | **Yes** |
| | Robbins Pathology Books | **Yes** |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | **التقدير** | **Marks (%)** | **Definition** |
| **Success Group (50 - 100)** | **A - Excellent** | **امتياز** | **90 - 100** | **Outstanding Performance** |
| | **B - Very Good** | **جيد جدا** | **80 - 89** | **Above average with some errors** |
| | **C - Good** | **جيد** | **70 - 79** | **Sound work with notable errors** |
| | **D - Satisfactory** | **متوسط** | **60 - 69** | **Fair but with major shortcomings** |
| | **E - Sufficient** | **مقبول** | **50 - 59** | **Work meets minimum criteria** |
| **Fail Group (0 – 49)** | **FX – Fail** | **راسب (قيد المعالجة)** | **(45-49)** | **More work required but credit awarded** |
| | **F – Fail** | **راسب** | **(0-44)** | **Considerable amount of work required** |
| | | | | |

**Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.**

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Comparative Anatomy** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ Theory<br>☒ Lecture<br>☒ Lab<br>☒ Tutorial<br>☐ Practical<br>☐ Seminar | |
| **Module Code** | **BIO47027** | | | | |
| **ECTS Credits** | 6 | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | **4** | | **Semester of Delivery** | **7** | |
| **Administering Department** | **BIO** | | **College** | **COS** | |
| **Module Leader** | **Hanaa Ali Aziz** | | **e-mail** | **hanabio-1983@mu.edu.iq** | |
| **Module Leader's Acad. Title** | **Assist. Professor** | | **Module Leader's Qualification** | **Ph.D** | |
| **Module Tutor** | **Name (if available)** | | **e-mail** | **E-mail** | |
| **Peer Reviewer Name** | **Name** | | **e-mail** | **E-mail** | |
| **Scientific Committee Approval Date** | **01/06/2023** | | **Version Number** | **1.0** | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | None | **Semester** | |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>**أهداف المادة الدراسية** | **1. This course is designed to cover Introducing students to the most important phenotypic and anatomical characteristics through the similarities and differences between different types of vertebrate organisms such as mammals, birds, fish, and providing the student with the necessary skill to study the anatomical characteristics of various organisms.**<br>**2. This course give an overview Define the physiological science in the deferent systems .Diagnosis the main character of specific signs of cells Determined the relationship between the internal and external environment**<br>**3. Develop and encourage the field of scientific research and provide all students with a broad education in the basic aspects and understand laboratory tests** |
| **Module Learning Outcomes**<br>**مخرجات التعلم للمادة الدراسية** | **1- Understand the basic principles of comparative anatomy**<br>**2- Studying the internal anatomy of different animals and making an anatomical comparison between them**<br>**3- Finding functional and structural similarities and differences between neighborhoods**<br>**4- Studying the link between the different branches, such as studying the relationship between comparative anatomy, physiology, and histology** |
| **Indicative Content**<br>**المحتويات الارشادية** | **Chordate definition, evolutionary foundations, characteristics, and origin(10hr)**<br>**Respiratory system and respiratory mechanism(10hr)**<br>**Digestive system and glands attached to the digestive system(10hr)**<br>**Circulation and circulatory system(9hr)**<br>**excretory system(9hr)**<br>**dermatology(9hr)**<br>**Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit(1hr)**<br>**male reproductive system(9hr)**<br>**female reproductive system(9hr)**<br>**Oral cavity and digestive system(9hr)**<br>**Comparative anatomy of organs in different chordates(9hr)**<br>**Types of gills and comparative anatomy(9hr)**<br>**The lymphatic system and the movement of lymphatic fluid(9hr)**<br>**Types of gills and comparative anatomy(7hr)**<br>**Chordate definition, evolutionary foundations, characteristics, and origin(7hr)** |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | **The main strategy that will be adopted to study the animal phyla. It will be expected to be familiar with the names and characteristics of the phyla, be able to identify specimens and their morphology, and discuss their ecology and evolution. We will leave for field trips promptly when lab begins, so be on time. You will not be allowed to make up missed labs** |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>**الحمل الدراسي المنتظم للطالب خلال الفصل** | **74** | **Structured SWL (h/w)**<br>**الحمل الدراسي المنتظم للطالب أسبوعيا** | **5** |
| **Unstructured SWL (h/sem)**<br>**الحمل الدراسي غير المنتظم للطالب خلال الفصل** | **76** | **Unstructured SWL (h/w)**<br>**الحمل الدراسي غير المنتظم للطالب أسبوعيا** | **5** |
| **Total SWL (h/sem)**<br>**الحمل الدراسي الكلي للطالب خلال الفصل** | **150** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due**<br>الاسبوع المستحق | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | **2** | **10% (10)** | **5, 10** | **LO #1, 2, 10 and 11** |
| | **Assignments** | **2** | **10% (10)** | **2, 12** | **LO # 3, 4, 6 and 7** |
| | **Projects / Lab.** | **1** | **10% (10)** | **Continuous** | |
| | **Report** | **1** | **10% (10)** | **13** | **LO # 5, 8 and 10** |
| **Summative assessment** | **Midterm Exam** | **1 hr** | **10% (10)** | **7** | **LO # 1-7** |
| | **Final Exam** | **4hr** | **50% (50)** | **16** | **All** |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | **Chordate definition, evolutionary foundations, characteristics, and origin** |
| **Week 2** | **Respiratory system and respiratory mechanism** |
| **Week 3** | **Digestive system and glands attached to the digestive system** |
| **Week 4** | **Circulation and circulatory system** |
| **Week 5** | **excretory system** |
| **Week 6** | **dermatology** |
| **Week 7** | **Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit** |
| **Week 8** | **male reproductive system** |
| **Week 9** | **female reproductive system** |
| **Week 10** | **Oral cavity and digestive system** |
| **Week 11** | **Comparative anatomy of organs in different chordates** |
| **Week 12** | **Types of gills and comparative anatomy** |
| **Week 13** | **The lymphatic system and the movement of lymphatic fluid** |
| **Week 14** | **Types of gills and comparative anatomy** |
| **Week 15** | **Chordate definition, evolutionary foundations, characteristics, and origin** |
| **Week 16** | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | **الحبليات تعريفها، اسسها التطورية، صفاتها، ونشأتها** |
| **Week 2** | **الجهاز التنفسي والية التنفس** |
| **Week 3** | **الجهاز الهضمي والغدد الملحقة بالجهاز الهضمي** |
| **Week 4** | **جهاز الدوران والدورة الدموية** |
| **Week 5** | **الجهاز الابرازي** |
| **Week 6** | **الجهاز الجلدي** |
| **Week 7** | **Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit** |
| **Week 8** | **الجهاز التناسلي الذكري** |
| **Week 9** | **الجهاز التناسلي الانثوي** |
| **Week 10** | **التجويف الفمي وطرق الهظم** |
| **Week 11** | **تشريح مقارن للاعضاء في مختلف الحبليات** |
| **Week 12** | **المشتقات الجلدية** |
| **Week 13** | **تشريح مقارن للمجاميع التصنيفية للحبليات** |
| **Week 14** | **انواع الخياشيم والتشريح المقارن** |
| **Week 15** | **الجهاز اللمفاوي وحركة السائل اللمفي** |
| **Week 16** | **Preparatory week before the final Exam** |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | **•Anatomy & Physiology of Animals, Floron C. Faries, Jr., DVM, MS,2015**<br>**•Color atlas of avian anatomy, J.McLelland 1990**<br>• **التشريح المقارت للفقريات (د. منى فريد عبد الرحمن)** | **No** |
| **Recommended Texts** | **Biology journals, medical journal,** | **Yes** |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | **التقدير** | **Marks (%)** | **Definition** |
| **Success Group (50 - 100)** | **A - Excellent** | **امتياز** | **90 - 100** | **Outstanding Performance** |
| | **B - Very Good** | **جيد جدا** | **80 - 89** | **Above average with some errors** |
| | **C - Good** | **جيد** | **70 - 79** | **Sound work with notable errors** |
| | **D - Satisfactory** | **متوسط** | **60 - 69** | **Fair but with major shortcomings** |
| | **E - Sufficient** | **مقبول** | **50 - 59** | **Work meets minimum criteria** |
| **Fail Group (0 – 49)** | **FX – Fail** | **راسب (قيد المعالجة)** | **(45-49)** | **More work required but credit awarded** |
| | **F – Fail** | **راسب** | **(0-44)** | **Considerable amount of work required** |
| | | | | |

**Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.**

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **English Language II** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **UNI4816** | | | | |
| **ECTS Credits** | **2** | | | | |
| **SWL (hr/sem)** | **50** | | | | |
| **Module Level** | 4 | | **Semester of Delivery** | 8 | |
| **Administering Department** | Type Dept. Code | | **College** | College of sciences | |
| **Module Leader** | Yasir Adil Jabbar Alabdali | | **e-mail** | Yasir.alabdali@mu.edu.iq | |
| **Module Leader's Acad. Title** | Asst. Prof. Dr. | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | Name | | **e-mail** | E-mail | |
| **Scientific Committee Approval Date** | 01/06/2023 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | None | **Semester** | |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | 1. Develop students' English language proficiency across the four language skills: speaking, listening, reading, and writing.<br>2. Enhance students' understanding and usage of grammar and vocabulary.<br>3. Foster students' confidence in using English in various everyday contexts. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Demonstrate improved proficiency in speaking, listening, reading, and writing in English.<br>2. Apply grammatical structures and vocabulary accurately and appropriately.<br>3. Comprehend and engage with a range of texts in English.<br>4. Communicate effectively in various everyday situations. |
| **Indicative Contents**<br>المحتويات الإرشادية | 1. Introduction to basic greetings and expressions.<br>2. Vocabulary expansion related to various topics (e.g., personal information, daily routines, family and relationships, food and eating).<br>3. Grammar instruction and practice covering essential structures (e.g., present simple tense, past tense, present perfect tense, conditionals).<br>4. Speaking activities promoting interaction and communication (e.g., role plays, discussions, presentations).<br>5. Listening exercises for comprehension and listening skills development.<br>6. Reading comprehension activities involving a variety of text types and genres.<br>7. Writing tasks focusing on different text types (e.g., emails, letters, short essays).<br>8. Grammar and vocabulary consolidation and revision. |
| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
| **Strategies** | 1. Interactive group and pair work activities to encourage student participation and collaboration.<br>2. Guided discussions and debates to develop speaking and critical thinking skills.<br>3. Listening exercises with audio materials to enhance listening comprehension.<br>4. Reading tasks with comprehension questions and discussions to improve reading skills.<br>5. Writing assignments with feedback and revision opportunities to strengthen writing abilities.<br>6. Error correction and grammar drills to reinforce accurate language usage.<br>7. Role plays and simulations to provide real-life language practice. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 31 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 2 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 19 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 1 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 50 | | |

| Module Evaluation | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | Week 5, Week 10 | 2 |
| | **Assignments** | 2 | 10% (10) | Week 2, Week 12 | 2 |
| | **Report** | 1 | 10% (10) | Continuous | 1 |
| | | 1 | 10% (10) | Week 13 | 1 |
| **Summative assessment** | **Midterm Exam** | 1hr | 10% (10) | Week 7 | 2 hr |
| | **Final Exam** | 3 hr | 50% (50) | Week 16 | 2 hr |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | The tense system<br>Modal auxiliary verb<br>English tense usage<br>questions and short answers<br>Reading, Speaking, writing and listening skills |
| **Week 2** | Present Perfect Simple and Continuous<br>Reading, Speaking, writing and listening skills |
| **Week 3** | Narrative tenses<br>Past Simple and Present Perfect<br>Time clauses<br>Reading, Speaking, writing and listening skills |
| **Week 4** | Question forms<br>Negative questions<br>Reading, Speaking, writing and listening skills |

| | |
|---|---|
| **Week 5** | Introduction to future forms<br>Reading, Speaking, writing and listening skills |
| **Week 6** | Expressing quantity<br>Reading, Speaking, writing and listening skills |
| **Week 7** | Introduction to modal auxiliary verbs<br>Modal auxiliary verbs of probability, present and future<br>Reading, Speaking, writing and listening skills |
| **Week 8** | Introduction to relative clauses<br>Reading, Speaking, writing and listening skills |
| **Week 9** | Expressing habit<br>Reading, Speaking, writing and listening skills |
| **Week 10** | Modal auxiliary verbs 2<br>Questions with question words<br>Reading, Speaking, writing and listening skills |
| **Week 11** | Hypothesizing<br>Passive form and active form<br>Reading, Speaking, writing and listening skills |
| **Week 12** | Determiners<br>Reading, Speaking, writing and listening skills |
| **Week 13** | Present perfect Continuous<br>Questions with question words<br>Reading, Speaking, writing and listening skills |
| **Week 14** | Past perfect<br>Past perfect and past simple<br>Reading, Speaking, writing and listening skills |
| **Week 15** | Phrasal verbs<br>Report statement<br>Reading, Speaking, writing and listening skills |
| **Week 16** | Preparatory week before the final Exam |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Headway English Course textbooks and workbooks | Yes |
| **Recommended Texts** | 1. Authentic texts: You can find authentic texts such as articles, stories, and dialogues from various sources like news websites, literary works, and English language learning websites. Examples include BBC Learning English, The New York Times Learning Network, and TED Talks.<br>2. Writing guides and sample texts: There are numerous writing guides available online and in bookstores that provide guidance on different types of writing tasks. Websites like Purdue Online Writing Lab (OWL) and | No |

| | | |
|---|---|---|
| | Cambridge English Write & Improve offer writing resources and practice exercises. | |
| **Websites** | Online resources and interactive platforms: Many English language learning websites and platforms offer supplementary materials and practice exercises. Some popular platforms include Duolingo, Cambridge English Online, and British Council LearnEnglish. | |

**Grading Scheme**
مخطط الدرجات

| Group | Grade | التقدير | Marks (%) | Definition |
|---|---|---|---|---|
| **Success Group (50 - 100)** | **A** - Excellent | امتياز | 90 - 100 | Outstanding Performance |
| | **B** - Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| | **C** - Good | جيد | 70 - 79 | Sound work with notable errors |
| | **D** - Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| | **E** - Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| **Fail Group (0 – 49)** | **FX** – Fail | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
| | **F** – Fail | راسب | (0-44) | Considerable amount of work required |
| | | | | |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Ethics** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **UNI4707** | | | | |
| **ECTS Credits** | **1** | | | | |
| **SWL (hr/sem)** | **25** | | | | |
| **Module Level** | 4 | | **Semester of Delivery** | 7 | |
| **Administering Department** | Biology | | **College** | Sciences | |
| **Module Leader** | Hana Kadum | | **e-mail** | Hanakadum@mu.edu.iq | |
| **Module Leader's Acad. Title** | Assist. Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | Name | | **e-mail** | E-mail | |
| **Scientific Committee Approval Date** | 01/06/2023 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | None | **Semester** | |
| **Co-requisites module** | None | **Semester** | |

## Module Aims, Learning Outcomes and Indicative Contents

## أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

| | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | 1 - بيان حقائق القيم الأخلاقية الإسلامية ومبادئها وميادينها .<br>2 - التبصير بشمولية روح الأخلاق الإسلامية على كل تصرفات وسلوكيات الناس الفردية والاجتماعية.<br>3- إبراز أهمية وأثر القيم الأخلاقية الإسلامية من الناحية العلمية والاجتماعية والإنسانية والحضارية المادية والمعنوية<br>4 - توعية الطلاب بأهميته المهنية ودورها في بناء مستقبل وطنه .<br>5 - الإسهام في تعزيز المكانة العلمية والاجتماعية.<br>6 - حفز الطاب على أن يتمثل قيم مهنته وأخلاقها سلوكاً في حياته.. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1- البرهنة على ضرورة الممارسة الأخلاقية وآثرها في إنتاجية العمل وفاعليته.<br>2- تطبيق أخلاقيات المهنة في مجالات تخصصه.<br>3- قيادة الفريق والتفاعل ضمن مجموعة والمشاركة في إيجاد الحلول ، والتفاعل مع القضايا المعاصرة بهويته الثقافية.<br>4- الالتزام بالقيم الإسلامية وآداب الخلاف، واحترام الآخرين والتفاهم معهم، ومبادئ وأخلاقيات المهن. |
| **Indicative Contents**<br>المحتويات الإرشادية | يتضمن المحتوى الأصلي ما يلي.<br>مفهوم اخلاقيات المهنة: يدل مصطلح " أخلاقيات االمهنة " على مبدأ اجتماعي يركز على كون الفرد مسؤولاً عن العمل الذي يؤديه ، وينطلق من إيمان راسخ بأن للعمل قيمة جوهرية يجب احترامها والإصرار على تنميتها<br>تطور أخلاق الفرد: غالبا ما يطور الفرد مقاييس أخلاقية في ثلاثة مراحل:<br>المرحلة الأولى : ما قبل التمسك بالتقاليد والعرف:<br>المرحلة الثانية: التمسك بالتقاليد والعرف:<br>المرحلة الأخيرة: بعد الالتزام بالتقاليد :<br>المهنة هي وظيفة مبنية على أساس من العلم والخبرة اختيرت اختياراً مناسباً حسب مجال العمل الخاص بها وهي تتطلب مهارات وتخصصات معينة ويحكمها قوانين وآداب لتنظيم العمل بها<br>الفرق بين المنهة والوظيفة : المهنة هي عبارة عن عمل أو صنعة يقوم بها الشخص بغض النظر عن المؤهل العلمي او الخبرات والمؤهلات وإن المهنة تتطوّر معك وتنمو خلال فترة زمنية طويلة. مسيرتك المهنية هي بمثابة تتويج للوظائف التي قمت بها والخبرات التي اكتسبتها والشهادات والدورات التدريبية والتعليمية التي مكّنتك من إحراز التقدم وتسلّق السلم المهني. تنطوي المهنة على مسار محدد وواضح يكون طويل الأجل ويساعدك في تحقيق أحلامك المهنية.<br>انواع قيم واخلاقيات المهنة :<br>1 - بين الانسان وخالقة : الاخلاص ، اليقين ، و التوكل.<br>2 - بين الموظف ومن يتعامل معة : العدل ، الصدق، العفة و التعاون .<br>أخلاقيات المهنة في الإسلام : وضع الإسلام مجموعةً من الأخلاقيات التي يجب أن يتحلى بها الموظف في بيئة العمل مهما كانت<br>تعتبر ظاهرة الفساد والفساد الإداري والمالي بصورة خاصة ظاهرة عالمية شديدة الانتشار ذات جذور عميقة تأخذ إبعاداً واسعة تتداخل فيها عوامل مختلفة يصعب التمييز بينها، وتختلف درجة شموليتها من مجتمع إلى آخر .<br>الرشوة هي آفة قديمة حديثة يكاد لا يخلو أيّ مجتمع منها، وهي نوع من أنواع الفساد، وهي قيام شخصٌ بدفع مبلغٍ من المال لموظفٍ ما من أجل الحصول على حقّ ليس له، أو بهدف التهرّب من واجب عليه القيام به، فهي طريقة غير مشروعة لكسب المال باستغلال المنصب أو المركز أو المكانة الاجتماعيّة .<br>الفرق بين الهدية والرشوة:<br>تختلف الهدية عن الرشوة اختلافاً كبيراً، فالهدية: جمع هدايا، وهي ما يقدّمه الأصدقاء والأهل من التحف والألطاف، ويعدّ تبادل الهدايا من خصائص الثقافة البشريّة، وتشكّل أساس الاقتصاد لدى بعض السلطات. |

| | |
|---|---|
| | أما الرشوة فجمعها رُشاً، وهي ما يُعطَى لقضاء حاجة أو مصلحة، أو هي ما يقدّم من أجل إحقاق باطل، أو إبطال حق ما، وهي أيضاً فعل أو ممارسة تقود الشخص إلى خداع ثقة وواجب شخص آخر، وذلك من أجل تحقيق مصلحة ما، وعادة ما تحدث بين الموظّفين العموميين، وفي تسيير بعض المعاملات الخاصة.<br>وسائل ترسيخ اخلاقيات المهنة في العمل: على كل مؤسسة مهنية أن تقوم باتباع مجموعة من الأنظمة والقواعد لتنمية وترسيخ مفهوم أخلاقيات المهنة لدى جميع الموظفين<br>ما هو ميثاق أخلاقيات المهنة :<br>*ميثاق الأخلاق هو مجموعة من المبادئ التوجيهية التي تهدف إلى تحديد السلوكيات المقبولة لأعضاء مجموعة، أو جمعية، أو مهنة معينة.<br>*العديد من المنظمات تحكم نفسها مع مثل هذا القانون، وخاصة عندما تتعامل مع قضايا حساسة مثل الاستثمارات والرعاية الصحية، أو التفاعل مع الثقافات الأخرى.<br>ما معنى الكفاءة المهنية في التعليم؟<br>مجموعة من المهارات والقدرات التي يمكن أن يكتسبها المعلم أثناء فترة التكوين والإعداد أو من خلال الخبرة والتوجيه، وتساعده على القيام بتدريس العلوم المختلفة بنجاح وتحقيق الأهداف المرجوة.<br>ما هي نظرية الكفاءة الذاتية؟<br>إن الكفاءة الذاتية مفهوم نفسي مضمونه النهائي يلخص ثقة الفرد في قدرته على الانجاز الحقيقي، أي اتخاذ قرارات صائبة تخص خيارات سلوكية بعينها. |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | الإستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع الطلاب على المشاركة في التمارين ، مع تحسين مهارات التفكير النقدي وتوسيعها في نفس الوقت. سيتم تحقيق ذلك من خلال الفصول والبرامج التعليمية التفاعلية ومن خلال التفكير في نوع التجارب البسيطة التي تتضمن بعض أنشطة أخذ العينات التي تهم الطلاب. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 17 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 1 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 8 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 0 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 25 | | |

## Module Evaluation
تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| Formative assessment | Quizzes | 2 | 10% (10) | 5, 10 | LO #1, 2, 10 and 11 |
| | Assignments | 2 | 10% (10) | 2, 12 | LO # 3, 4, 6 and 7 |
| | Projects / Lab. | 1 | 10% (10) | Continuous | |
| | Report | 1 | 10% (10) | 13 | LO # 5, 8 and 10 |
| Summative assessment | Midterm Exam | 1 hr | 10% (10) | 7 | LO # 1-7 |
| | Final Exam | 3hr | 50% (50) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| Week 1 | مقدمة اخلاق المهنة |
| Week 2 | مفهوم المهنة |
| Week 3 | فوائد اخلاقيات المهنة |
| Week 4 | قيم واخلاقيات المهنة |
| Week 5 | أخلاقيات المهنة في الاسلام |
| Week 6 | الفساد الاداري |
| Week 7 | مفهوم الرشوة |
| Week 8 | الفرق بين الهدية والرشوة |
| Week 9 | وسائل ترسيخ اخلاقيات المهنة في العمل |
| Week 10 | ما هو ميثاق أخلاقيات المهنة |
| Week 11 | ما هو مبدأ العلاقه المهنية في الخدمةالاجتماعية |
| Week 12 | أنماط العلاقت المهنية العلاجية |
| Week 13 | اخلاقيات مهنة التعليم |
| Week 14 | واجبات المدرس المهنية |
| Week 15 | حقوق المدرس |
| Week 16 | Preparatory week before the final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | |
| **Week 2** | |
| **Week 3** | |
| **Week 4** | |
| **Week 5** | |
| **Week 6** | |
| **Week 7** | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | اخلاقيات المهنة | No |
| **Recommended Texts** | الاخلاقيات | No |
| **Websites** | https://www.noor-book.com/%D9%83%D8%AA%D8%A7%D8%A8 | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks (%)** | **Definition** |
| **Success Group (50 - 100)** | **A -** Excellent | امتياز | 90 - 100 | Outstanding Performance |
| | **B -** Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| | **C -** Good | جيد | 70 - 79 | Sound work with notable errors |
| | **D -** Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| | **E -** Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| **Fail Group (0 – 49)** | **FX –** Fail | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
| | **F –** Fail | راسب | (0-44) | Considerable amount of work required |
| | | | | |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Food Microbiology** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **Bio47026** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | 4 | | **Semester of Delivery** | 7 | |
| **Administering Department** | Biology | | **College** | Sciences | |
| **Module Leader** | Hana Kadum Shanan | | **e-mail** | hanakadum@mu.edu.iq | |
| **Module Leader's Acad. Title** | Assist. Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | Name | | **e-mail** | E-mail | |
| **Scientific Committee Approval Date** | 01/06/2023 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | None | **Semester** | |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | This course aims to<br>1 - Introducing the basic principles of food microbiology<br>2 - The course covers the biology of microorganisms and foodborne diseases<br>3 - Factors affecting microorganisms<br>4- Mechanism for control, treatment, food spoilage and preservation, and evaluation of quality and food safety |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1a - Recognize the important microorganisms in food and describe their properties related to spoilage and safety And the importance of the industry.<br>2a- Name the different sources of food contamination and food-borne diseases, their causes, and other factors. Influencing and necessary measures for the process.<br>1b- Describes foodborne diseases and food spoilage, their causes and the conditions in which they live.<br>2b- Evaluate the role of microorganisms in the composition of food and its preservation.<br>1c- Isolate microorganisms from food and diagnose them by laboratory according to health and safety guidelines.<br>2c - Writes accurate laboratory reports with clear conclusions to assess the quality of food.<br>1d - Demonstrates effective communication and teamwork skills.<br>2d- Collects and organizes information from library and web resources, overcoming difficulties and finding solutions. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>Identify important microorganisms in food and describe their characteristics related to spoilage, safety and industrial importance.<br>Names the various sources of food contamination and foodborne diseases, their causes, influencing factors, and necessary control measures.<br>Describes foodborne diseases and food spoilage, their causes, and the conditions in which they grow.<br>Evaluates the role of microorganisms in food processing, preservation and safety.<br>Microorganisms are isolated from food and diagnosed in a laboratory, according to health and safety guidelines. |
| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
| **Strategies** | Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 74 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 76 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5, 10 | LO #1, 2, 10 and 11 |
| | **Assignments** | 2 | 10% (10) | 2, 12 | LO # 3, 4, 6 and 7 |
| | **Projects / Lab.** | 1 | 10% (10) | Continuous | |
| | **Report** | 1 | 10% (10) | 13 | LO # 5, 8 and 10 |
| **Summative assessment** | **Midterm Exam** | 1 hr | 10% (10) | 7 | LO # 1-7 |
| | **Final Exam** | 4hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | **Introduction of An outline history of microbiology and microbiology in Food** |
| **Week 2** | **Sources of food contamination (natural sources of food contamination, contamination of food during trading and manufacturing)** |
| **Week 3** | **Food preservation methods - Temperature and drying** |
| **Week 4** | **Food preservation methods - radiation, freezing, and preservatives** |
| **Week 5** | **Microbiology in milk** |
| **Week 6** | **Microbiology in meat, poultry, and fish** |
| **Week 7** | **Microbiology in cereals and their products** |
| **Week 8** | **Microbiology in fruits and vegetables** |

| | |
|---|---|
| **Week 9** | **Microbiology in canned foods** |
| **Week 10** | **Pollution and poisoning food - bacterial toxins** |
| **Week 11** | **Food poisoning Salmonella , Staphylococcus and Clostridium** |
| **Week 12** | **Food fungal toxins** |
| **Week 13** | **Microbial corruption in food** |
| **Week 14** | **Standard specification for microbial limits in food** |
| **Week 15** | **Preparatory week before the final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | | |
|---|---|---|
| | **Material Covered** | |
| **Week 1** | Lab 1: | **Introduction to practical study in food microbiology (Food Microbiology Division)** |
| **Week 2** | Lab 2: | **The agriculture media (division, types, methods of preparation, farm characteristics of microorganisms.** |
| **Week 3** | Lab 3: | **Bacteria growth (Food Needs) Methods used in the growth of microorganisms in the media,** |
| **Week 4** | Lab 4: | **Preparation of samples for microbiological examination** |
| **Week 5** | Lab 5: | **Staining of bacteria** |
| **Week 6** | Lab 6: | **Study of some physical factors affecting the growth of microorganisms in food (pH, radiation, heat, pressure)** |
| **Week 7** | Lab 7: | **Study of the most important microbiological organisms causing staphylococcal food poisoning** |
| **Week 8** | Lab 8: | **Isolation of microorganisms from milk** |
| **Week 9** | Lab 9: | **Isolation of microorganisms from meat** |
| **Week 10** | Lab 10: | **Isolation of microorganisms from fruits** |
| **Week 11** | Lab 11: | **Food poisoning** |
| **Week 12** | Lab 12: | **Check canned food** |
| **Week 13** | Lab 13: | **Isolation of microorganisms from carbohydrates** |
| **Week 14** | Lab 14: | **Microbial hazards** |
| **Week 15** | Exam | **Preparatory week before the final Exam** |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Food Microbiology , Fundamentals challenger and health Implications, Elaine Perkins Editor, 2016 | Yes |
| **Recommended Texts** | Food Microbiology and laboratory practice , chris Bell , Paul Neaves & Anthony P. Williams , 2012 | No |
| **Websites** | https://books.google.iq/books/about/Food_Microbiology_and_Laboratory_Practic.html?id=nnaFQgAACAAJ&redir_esc=y | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks (%)** | **Definition** |
| **Success Group (50 - 100)** | **A** - Excellent | امتياز | 90 - 100 | Outstanding Performance |
| | **B** - Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| | **C** - Good | جيد | 70 - 79 | Sound work with notable errors |
| | **D** - Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| | **E** - Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| **Fail Group (0 – 49)** | **FX** – Fail | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
| | **F** – Fail | راسب | (0-44) | Considerable amount of work required |
| | | | | |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Industrial Microbiology** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ Theory<br>☒ Lecture<br>☒ Lab<br>☒ Tutorial<br>☐ Practical<br>☐ Seminar | |
| **Module Code** | **BIO 48031** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | **4** | | **Semester of Delivery** | **8** | |
| **Administering Department** | **Type Dept. Code** | | **College** | **Type College Code** رمز الكلية | |
| **Module Leader** | **Maitham Abas Makei** | | **e-mail** | **mabbas@mu.edu.iq** | |
| **Module Leader's Acad. Title** | **Assist. Professor** | | **Module Leader's Qualification** | **Msc** | |
| **Module Tutor** | **Name (if available)** | | **e-mail** | **E-mail** | |
| **Peer Reviewer Name** | **Name** | | **e-mail** | **E-mail** | |
| **Scientific Committee Approval Date** | **01/06/2023** | | **Version Number** | **1.0** | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | None | **Semester** | |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>**أهداف المادة الدراسية** | **1. The broad aim of the module is to provide core knowledge and understanding in the area of Industrial Biotechnology with topics drawn from research specializations in the Department. It will provide students with a critical insight into the research process, including how various factors, such as funding opportunities, new technology, methodological development, competition and often, serendipity, contribute to important breakthroughs. As appropriate, the lecture sessions will include a lab visit/tour and/or opportunity for post-docs to tell students about their research, to provide exposure to the underpinning methodological approaches, technologies and molecular mechanisms being studied.**<br>**2.Demonstrate knowledge of the factors affecting the growth and survival of microbes.**<br>**3. Demonstrate an understanding of the positive and negative associations of microbes with humans.**<br>**4. Develop and encourage the field of scientific research.**<br>**5. To provide all students with a broad education in the basic aspects in the first year and to provide them with a higher level of knowledge and understanding of the subject chosen in their second year.**<br>**6.Demonstrate knowledge and understanding of key aspects of practical microbiology..**<br>**7. In the third year, students are trained in laboratory tests,.**<br>**8. Providing fourth year students with research skills.**<br>**10. Students who successfully complete this module will be able to:**<br>**Explain the mechanistic basis of selected biotechnology applications at the molecular level.**<br>**Discuss how research has been designed and implemented for biotechnological purposes**<br>**Evaluate experimental techniques and approaches used for biotechnological applications**<br>**Recognize the importance of Intellectual Property in the context of Industrial Biotechnology**<br>**Critically evaluate scientific literature in an area of biotechnology**<br>**Synthesise an argument that draws on several (potentially contradicting) sources and considers both the biological underpinnings and commercial evaluation of a biotechnological process** |

| | |
|---|---|
| **Module Learning Outcomes**<br>**مخرجات التعلم للمادة الدراسية** | **1-Industrial Microbiology The course aims to provide the concepts needed for a good knowledge of the microbial strains used in the fermentation processes. Fermentation Chemistry The course aims to provide the concepts needed for a good knowledge of fermentation processes. Particular attention is paid to the principles and technological aspects of industrial fermentations**<br>**2-Part of "Industrial Microbiology". The course aims to provide the concepts needed for a good knowledge of the microbial strains used in the fermentation processes.**<br>**3-Part of "Fermentation Biotechnology". The course aims to provide the concepts needed for a good knowledge of fermentation processes, with particular reference to the microorganisms employed in each of them, to the mode of operation (batch, fed-batch and continuous processes), to plant typologies, to the culture media and, where required, to downstream processes for metabolite recovery.**<br>**4-The laboratory activities to be carried out in teams have the purpose of providing transversal skills in terms of communication skills and ability to work in teams** |
| **Indicative Content**<br>**المحتويات الارشادية** | **1-BASICS OF INDUSTRIAL MICROBIOLOGY.(9hr)**<br>**2-BASICS OF INDUSTRIAL MICROBIOLOGY. (9hr)**<br>**3-TECHNIQUES IN INDUSTRIAL MICROBIOLOGY. (9hr)**<br>**4-COMPONENTS OF MEDIA FOR INDUSTRIAL INOCULUM DEVELOPMENT. (9hr)**<br>**5-COMPONENTS OF MEDIA FOR INDUSTRIAL INOCULUM DEVELOPMENT. (9hr)**<br>**6-FERMENTATION PROCESSES. (9hr)**<br>**7-Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit(1hr)**<br>**8-FERMENTER DESIGN AND OPERATION. (9hr)**<br>**9-MAINTENANCE OF SELECTED CULTURES. (9hr)**<br>**10-MICROBIAL ENZYMES . (9hr)**<br>**11-AMYLASE(9hr)**<br>**12PROTEASE (9hr)** |

| | |
|---|---|
| | **13-CELLULASE (9hr)**<br>**14-PRODUCTION OF ANTIBIOTICS. (9hr)**<br>**15-PRODUCTION OF VITAMINS , SINGLE CELL PROTEIN . (8hr)** |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | **1 - The student interacts during the lecture.**<br>**2 - The student listens attentively to an explanation.**<br>**3 - The student interacts and participates in extra-curricular activities.**<br>**4 - The student learns to behave professionally.**<br>**5 - General and Transferable Skills (other skills relevant to employability and personal development)**<br>**6. Enabling the student to pass interviews and succeed in the labor market**<br>**7 - Enabling the student to develop himself after graduation**<br>**8 - The assessment include one mid examinations and final examination in addition to assignment and quiz also a home works and reports.** |

| **Student Workload (SWL)**<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>**الحمل الدراسي المنتظم للطالب خلال الفصل** | **88** | **Structured SWL (h/w)**<br>**الحمل الدراسي المنتظم للطالب أسبوعيا** | **6** |
| **Unstructured SWL (h/sem)**<br>**الحمل الدراسي غير المنتظم للطالب خلال الفصل** | **62** | **Unstructured SWL (h/w)**<br>**الحمل الدراسي غير المنتظم للطالب أسبوعيا** | **4** |
| **Total SWL (h/sem)**<br>**الحمل الدراسي الكلي للطالب خلال الفصل** | **150** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | Time/Number | Weight (Marks) | Week Due<br>الاسبوع المستحق | Relevant Learning Outcome |
| Formative assessment | Quizzes | 2 | 10% (10) | 5, 10 | LO #1, 2, 10 and 11 |
| | Assignments | 2 | 10% (10) | 2, 12 | LO # 3, 4, 6 and 7 |
| | Projects / Lab. | 1 | 10% (10) | Continuous | |
| | Report | 1 | 10% (10) | 13 | LO # 5, 8 and 10 |
| Summative assessment | Midterm Exam | 1 hr | 10% (10) | 7 | LO # 1-7 |
| | Final Exam | 4hr | 50% (50) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | Material Covered |
| Week 1 | BASICS OF INDUSTRIAL MICROBIOLOGY. |
| Week 2 | BASICS OF INDUSTRIAL MICROBIOLOGY. |
| Week 3 | TECHNIQUES IN INDUSTRIAL MICROBIOLOGY. |
| Week 4 | COMPONENTS OF MEDIA FOR INDUSTRIAL INOCULUM DEVELOPMENT. |
| Week 5 | COMPONENTS OF MEDIA FOR INDUSTRIAL INOCULUM DEVELOPMENT. |
| Week 6 | FERMENTATION PROCESSES. |
| Week 7 | Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit |
| Week 8 | FERMENTER DESIGN AND OPERATION. |
| Week 9 | MAINTENANCE OF SELECTED CULTURES. |
| Week 10 | MICROBIAL ENZYMES . |
| Week 11 | AMYLASE |
| Week 12 | PROTEASE |
| Week 13 | CELLULASE |
| Week 14 | PRODUCTION OF ANTIBIOTICS. |
| Week 15 | PRODUCTIO OF VITAMINS , SINGLE CELL PROTEIN . |
| Week 16 | Preparatory week before the final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | **Culture media using for growth of industrial microbes.** |
| **Week 2** | **Ethanol production (Lab. Method) .** |
| **Week 3** | **Ethanol production (Lab. indicator) .** |
| **Week 4** | **Acetic acid production** |
| **Week 5** | **Methods of Acetic acid production.** |
| **Week 6** | **Acetic acid filtration.** |
| **Week 7** | **Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit** |
| **Week 8** | **Citric acid production from Dates.** |
| **Week 9** | **Microbial enzymes production.** |
| **Week 10** | **Isolating microorganisms producing amylase.** |
| **Week 11** | **Dates and production of yeast (yeast bread, the leaven of the feed)** |
| **Week 12** | **The production of antibiotics by microorganisms** |
| **Week 13** | **Production of penicillin** |
| **Week 14** | **The production of beer** |
| **Week 15** | **Factors that affect the The production of beer spoilage.** |
| **Week 16** | **Preparatory week before the final Exam** |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | **-Riegel ER and Bissinger HG (2003) Industrial fermentation: Principles, processes and products; Vitamin $B_{12}$ (Cyanocobalamin).** | **Yes** |
| **Recommended Texts** | **-Gupta R, Beg QK and Lorenz P (2002) Bacterial alkaline proteases: molecular approaches and industrial applications. *Applied Microbiology and Biotechnology.*** | **Yes** |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | **التقدير** | **Marks (%)** | **Definition** |
| **Success Group (50 - 100)** | **A - Excellent** | **امتياز** | **90 - 100** | **Outstanding Performance** |
| | **B - Very Good** | **جيد جدا** | **80 - 89** | **Above average with some errors** |
| | **C – Good** | **جيد** | **70 - 79** | **Sound work with notable errors** |
| | **D - Satisfactory** | **متوسط** | **60 - 69** | **Fair but with major shortcomings** |
| | **E - Sufficient** | **مقبول** | **50 - 59** | **Work meets minimum criteria** |
| **Fail Group (0 – 49)** | **FX – Fail** | **راسب (قيد المعالجة)** | **(45-49)** | **More work required but credit awarded** |
| | **F – Fail** | **راسب** | **(0-44)** | **Considerable amount of work required** |
| | | | | |

**Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.**

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Microbial Genetics** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **Bio48029** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | 4 | | **Semester of Delivery** | 8 | |
| **Administering Department** | BIO | | **College** | COS | |
| **Module Leader** | **Yasir Adil Jabbar Alabdali** | | **e-mail** | **Yasir.alabdali@mu.edu.iq** | |
| **Module Leader's Acad. Title** | **Assist. Professor** | | **Module Leader's Qualification** | **PhD** | |
| **Module Tutor** | Name (if available) (التدريسي المساعد) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | Name (اللجنة العلمية) | | **e-mail** | E-mail | |
| **Scientific Committee Approval Date** | 01/06/2023 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | **None** | **Semester** | |
| **Co-requisites module** | **None** | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>**أهداف المادة الدراسية** | 1. The aim of this module is to introduce students to the field of microbial genetics and provide them with a solid foundation in the fundamental concepts and terminology used in this area of study.<br>2. The module aims to explore the mechanisms and consequences of genetic variation and mutation in bacteria, and to help students understand the factors that influence the rate of mutation and the role of mutagens in promoting genetic variation.<br>3. This module aims to provide students with an in-depth understanding of DNA replication and repair in bacteria, including the enzymes involved and their mechanisms of action, and to emphasize the importance of maintaining genetic integrity.<br>4. The module aims to familiarize students with the mechanisms of gene expression and regulation in bacteria, including transcription, translation, and post-translational modifications, and to highlight the role of gene regulation in bacterial adaptation, virulence, and response to environmental stimuli.<br>5. The aim of this module is to investigate the mechanisms of horizontal gene transfer in bacteria, such as transformation, transduction, and conjugation, and to explore the implications of horizontal gene transfer in bacterial evolution, antibiotic resistance, and the acquisition of new traits.<br>6. This module aims to introduce students to bacterial genomics and comparative genomics, including the methods used for whole-genome sequencing and genome annotation, and to explore the analysis of bacterial genomes, including comparative genomics and the identification of virulence factors and drug targets.<br>7. The module aims to provide students with an understanding of genetic engineering and synthetic biology in bacteria, including the principles and techniques involved, and to discuss the applications of genetic engineering in biotechnology, medicine, and agriculture.<br>8. The aim of this module is to explore the role of microbial genetics in understanding the pathogenesis of bacterial infections, including the genetic basis of antibiotic resistance, and to discuss the use of microbial genetics in vaccine development, diagnostics, and personalized medicine.<br>9. This module aims to highlight recent advances in microbial genetics, such as next-generation sequencing technologies and metagenomics, and to discuss emerging areas of research, including the study of the human microbiome and the role of microbial genetics in ecological interactions. |

| | |
|---|---|
| **Module Learning Outcomes**<br>**مخرجات التعلم للمادة الدراسية** | 1. Understand the fundamental principles of microbial genetics, including the structure and organization of bacterial genomes, and the processes of DNA replication, transcription, and translation.<br>2. Explain the mechanisms of genetic variation in bacteria, such as mutations, recombination, and horizontal gene transfer, and their significance in microbial evolution and adaptation.<br>3. Demonstrate knowledge of the regulation of gene expression in bacteria, including the role of transcription factors, operons, and regulatory networks.<br>4. Analyze and interpret experimental data relevant to microbial genetics, such as gene mapping, genetic screens, and transformation assays, and apply statistical methods for data analysis.<br>5. Understand the relationship between microbial genetics and human health, including the mechanisms of antibiotic resistance in bacteria and the impact of microbial genetics on the development of infectious diseases.<br>6. Describe the basic concepts of cell biology and their relevance to microbial genetics, including the structures and functions involved in DNA replication, transcription, and translation.<br>7. Explain the mechanisms of genetic regulation at the cellular level, including the role of signal transduction pathways, epigenetic modifications, and chromatin remodeling.<br>8. Apply critical thinking and problem-solving skills to analyze real-world scenarios related to microbial genetics, such as identifying virulence factors in pathogenic bacteria or designing genetic engineering strategies for industrial applications.<br>9. Communicate scientific concepts and findings related to microbial genetics effectively, both orally and in written form, using appropriate terminology and referencing relevant literature. |
| **Indicative Content**<br>**المحتويات الارشادية** | 1. Introduction to Microbial Genetics<br>• Definition and significance of microbial genetics<br>• Historical perspective of microbial genetics<br>• Key concepts and terminology in microbial genetics<br>2. The Chemical Basis of Heredity<br>• Introduction to DNA as the genetic material<br>• Structure of DNA and its significance<br>• RNA as a genetic molecule<br>3. Replication of DNA<br>• DNA replication process and its importance<br>• Enzymes involved in DNA replication<br>• Replication origin and characteristics<br>4. Transcription of Genetic Material and RNA Types<br>• Overview of transcription process<br>• RNA synthesis and its types (mRNA, tRNA, rRNA)<br>• Role of RNA polymerase and transcription factors<br>5. Translation of Genetic Information and Protein Synthesis<br>• Introduction to translation process<br>• Ribosomes and their role in protein synthesis |

| | |
|---|---|
| | • Genetic code and codons<br>6. Genetic Mutations, Mutagens, and Repair Mechanisms<br>• Types of genetic mutations (point mutations, insertions, deletions)<br>• Causes of mutations and mutagens<br>• DNA repair mechanisms (excision repair, mismatch repair)<br>7. Methods for Mutation Selection<br>• Introduction to mutation selection<br>• Screening methods for identifying mutants<br>• Positive and negative selection techniques<br>8. Insertion Sequences, Transposons, and Integrons<br>• Definition and characteristics of insertion sequences<br>• Transposons and their role in genetic rearrangements<br>• Integrons and their contribution to antibiotic resistance<br>9. Plasmids and Transmission and Sex in Bacteria<br>• Overview of plasmids and their significance<br>• Modes of plasmid transmission (conjugation, transformation, transduction)<br>• Plasmids as carriers of antibiotic resistance genes<br>10. Genetic Transformation<br>• Definition and mechanisms of genetic transformation<br>• Role of competence in bacterial cells<br>• Applications of genetic transformation in research and biotechnology<br>11. Bacterial Conjugation<br>• Overview of bacterial conjugation process<br>• Role of conjugative plasmids in bacterial mating<br>• Horizontal gene transfer through conjugation<br>12. Bacterial Transduction<br>• Definition and types of bacterial transduction<br>• Role of bacteriophages in transduction<br>• Genetic transfer mediated by transducing particles<br>13. Regulation of Gene Expression in Bacteria: Lac Operon<br>• Overview of gene regulation in bacteria<br>• Lac operon as a model for gene regulation<br>• Inducible and repressible systems<br>14. Control of Gene Expression in Bacteria: Arabinose Operon, Alternative Promoters and σ Factors, Codon Usage and Stringent Response<br>• Arabinose operon and its regulation<br>• Role of alternative promoters and σ factors in gene expression<br>• Codon usage bias and its impact on translation<br>• Stringent response and its role in stress adaptation<br>15. Chromosome Mapping<br>• Overview of chromosome mapping techniques<br>• Linkage analysis and genetic mapping<br>• Physical mapping methods (restriction mapping, hybridization techniques) |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 1. Active Participation and Interaction: Encourage students to actively participate in microbial genetics lectures by asking questions, sharing their insights, and engaging in discussions. This will foster a deeper understanding of the subject matter and promote critical thinking skills.<br>2. Active Listening: Emphasize the importance of attentive listening skills during microbial genetics explanations and demonstrations. Encourage students to take notes and ask for clarification when necessary to ensure they grasp the key concepts and techniques.<br>3. Hands-on Laboratory Sessions: Provide opportunities for students to engage in hands-on laboratory sessions where they can apply theoretical knowledge to practical experiments. This will enhance their understanding of microbial genetics techniques and develop their technical skills.<br>4. Case Studies and Practical Workshops: Incorporate case studies and practical workshops into the curriculum to expose students to real-world scenarios and challenges in microbial genetics. This will enable them to apply their knowledge to solve complex problems and develop critical thinking abilities.<br>5. Communication Skills Training: Include modules or workshops focusing on effective communication skills specific to microbial genetics. This includes written and oral communication skills, as students may need to present their findings or write research papers in the field.<br>6. Integration of General and Transferable Skills: Integrate general and transferable skills into the curriculum, such as critical thinking, problem-solving, time management, and research skills. These skills will not only benefit students in microbial genetics but also prepare them for future scientific endeavors.<br>7. Ethical Considerations: Teach students about the ethical considerations in microbial genetics research, including the responsible use of genetic engineering techniques and the implications of manipulating microbial genomes. Encourage discussions on ethical dilemmas and guide students in making informed decisions.<br>8. Stay Updated with Research: Encourage students to stay updated with the latest research and advancements in microbial genetics by reading scientific journals, attending conferences, or joining research groups. This will help them develop a broader perspective and keep up with emerging technologies and techniques.<br>9. Collaboration and Teamwork: Promote collaboration and teamwork among students through group projects and assignments. This will simulate real-world scientific collaborations and enhance their ability to work effectively in research teams. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>**الحمل الدراسي المنتظم للطالب خلال الفصل** | **88** | **Structured SWL (h/w)**<br>**الحمل الدراسي المنتظم للطالب أسبوعيا** | **6** |
| **Unstructured SWL (h/sem)**<br>**الحمل الدراسي غير المنتظم للطالب خلال الفصل** | **62** | **Unstructured SWL (h/w)**<br>**الحمل الدراسي غير المنتظم للطالب أسبوعيا** | **4** |
| **Total SWL (h/sem)**<br>**الحمل الدراسي الكلي للطالب خلال الفصل** | **125** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due**<br>الاسبوع المستحق | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | **2** | **10% (10)** | **5, 10** | **LO #1, 2,** |
| | **Assignments** | **2** | **10% (10)** | **2, 12** | **LO # 3,** |
| | **Projects / Lab.** | **1** | **10% (10)** | **Continuous** | |
| | **Report** | **1** | **10% (10)** | **13** | **LO # 1,2** |
| **Summative assessment** | **Midterm Exam** | **1 hr** | **10% (10)** | **7** | **LO # 1** |
| | **Final Exam** | **4hr** | **50% (50)** | **16** | **All** |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | The chemical basis of heredity |
| **Week 2** | Structural system of genetic material in the cell |
| **Week 3** | Genetic material has multiplied origin and characteristics (Replication of DNA) |
| **Week 4** | Transcription of genetic material and RNA types |
| **Week 5** | Translation of genetic information and protein synthesis |
| **Week 6** | Genetic mutations, mutations and repair mechanisms |
| **Week 7** | Methods for mutation selection |
| **Week 8** | Insertion sequences, Transposons and Integrons |
| **Week 9** | Plasmids and Transmission and sex in bacteria |
| **Week 10** | Genetic transformation |

| | |
|---|---|
| **Week 11** | Bacterial conjuration |
| **Week 12** | Transduction |
| **Week 13** | Regulation of gene expression in bacteria: Lac Operons |
| **Week 14** | Control of gene expression in bacteria: Arabinose operon, Alternative promoters and σ factors, Codon usage and Stringent response |
| **Week 15** | Chromosome mapping |
| **Week 16** | Preparatory week before the final Exam |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | DNA extraction from E.coli bacteria |
| **Week 2** | Study the results of DNA extraction and measurement |
| **Week 3** | RNA extraction from E.coli bacteria |
| **Week 4** | Spontaneous mutations |
| **Week 5** | Check the results of the Spontaneous mutations |
| **Week 6** | Preparation of cultured dishes to isolate mutations |
| **Week 7** | Study of induced mutation and study of the results of induced mutation |
| **Week 8** | Study of induced mutations and dish implantation |
| **Week 9** | Experiment with bacterial transformation in the laboratory |
| **Week 10** | Study of bacterial conjunction and F factor and its transmission |
| **Week 11** | Explain the transduction principles using T4 phage |
| **Week 12** | Exercises on spontaneous and induced mutation |
| **Week 13** | Exercises on spontaneous and induced mutation |
| **Week 14** | Study the separation between the theories of mutation and printing and dish culturing |
| **Week 15** | Preparatory week before the final Exam |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Molecular Genetics of Bacteria 4th Edition. (2010, June 10). Molecular Genetics of Bacteria 4th Edition. | **NO** |
| **Recommended Texts** | Bruce Alberts, Dennis Bray, Karen Hopkin, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts and Peter Walter (2010) Essential Cell Biology 3th ed, Garland Science, NY, USA. | **Yes** |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | **التقدير** | **Marks (%)** | **Definition** |
| **Success Group (50 - 100)** | **A - Excellent** | **امتياز** | **90 - 100** | **Outstanding Performance** |
| | **B - Very Good** | **جيد جدا** | **80 - 89** | **Above average with some errors** |
| | **C - Good** | **جيد** | **70 - 79** | **Sound work with notable errors** |
| | **D - Satisfactory** | **متوسط** | **60 - 69** | **Fair but with major shortcomings** |
| | **E - Sufficient** | **مقبول** | **50 - 59** | **Work meets minimum criteria** |
| **Fail Group (0 – 49)** | **FX – Fail** | **راسب (قيد المعالجة)** | **(45-49)** | **More work required but credit awarded** |
| | **F – Fail** | **راسب** | **(0-44)** | **Considerable amount of work required** |
| | | | | |

**Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.**

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Molecular biology** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **Bio47024** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | | 4 | **Semester of Delivery** | | 7 |
| **Administering Department** | | **Biology** | **College** | **College of Science** | |
| **Module Leader** | Nihad A.M. Al-Rashedi | | **e-mail** | nhidaee@mu.edu.iq. | |
| **Module Leader's Acad. Title** | | Professor | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | | **Version Number** | | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | None | **Semester** | |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | 1. **The module aims to explore the mechanisms and consequences of genetic variation and mutation in bacteria, and to help students understand the factors that influence the rate of mutation and the role of mutagens in promoting genetic variation.**<br>2. **This module aims to provide students with an in-depth understanding of DNA replication and repair in bacteria, including the enzymes involved and their mechanisms of action, and to emphasize the importance of maintaining genetic integrity.**<br>3. **The module aims to familiarize students with the mechanisms of gene expression and regulation in bacteria, including transcription, translation, and post-translational modifications, and to highlight the role of gene regulation in bacterial adaptation, virulence, and response to environmental stimuli.**<br>4. **The aim of this module is to investigate the mechanisms of horizontal gene transfer in bacteria, such as transformation, transduction, and conjugation, and to explore the implications of horizontal gene transfer in bacterial evolution, antibiotic resistance, and the acquisition of new traits.** |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | **1. Understand the fundamental principles of microbial genetics, including the structure and organization of bacterial genomes, and the processes of DNA replication, transcription, and translation.**<br>**2. Explain the mechanisms of genetic variation in bacteria, such as mutations, recombination, and horizontal gene transfer, and their significance in microbial evolution and adaptation.**<br>**3. Demonstrate knowledge of the regulation of gene expression in bacteria, including the role of transcription factors, operons, and regulatory networks.**<br>**4. Analyze and interpret experimental data relevant to microbial genetics, such as gene mapping, genetic screens, and transformation assays, and apply statistical methods for data analysis.**<br>**5. Understand the relationship between microbial genetics and human health, including the mechanisms of antibiotic resistance in bacteria and the impact of microbial genetics on the development of infectious diseases.** |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | **Introduce the molecular biology**<br>**Structure of DNA and RNA**<br>**DNA replication in prokaryotic and eukaryotic**<br>**Transcription of DNA**<br>**Synthesis of RNA**<br>**Protein synthesis I**<br>**Exam**<br>**Proteins correlated with nucleic acid**<br>**Protein synthesis II**<br>**Study the structure of genes**<br>**Genetic engineering**<br>**Gene cloning**<br>**Cloning steps**<br>**Uses of biotechnology**<br>**Translation**<br>**Preparatory week before the final Exam** |
| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
| **Strategies** | 1. **Case Studies and Practical Workshops: Incorporate case studies and practical workshops into the curriculum to expose students to real-world scenarios and challenges in microbial genetics. This will enable them to apply their knowledge to solve complex problems and develop critical thinking abilities.**<br>2. **Communication Skills Training: Include modules or workshops focusing on effective communication skills specific to microbial genetics. This includes written and oral communication skills, as students may need to present their findings or write research papers in the field.**<br>3. **Integration of General and Transferable Skills: Integrate general and transferable skills into the curriculum, such as critical thinking, problem-solving, time management, and research skills. These skills will not only benefit students in microbial genetics but also prepare them for future scientific endeavors.**<br>4. **Ethical Considerations: Teach students about the ethical considerations in microbial genetics research, including the responsible use of genetic engineering techniques and the implications of manipulating microbial genomes. Encourage discussions on ethical dilemmas and guide students in making informed decisions.**<br>5. **Stay Updated with Research: Encourage students to stay updated with the latest research and advancements in microbial genetics by reading scientific journals, attending conferences, or joining research groups. This will help them develop a broader perspective and keep up with emerging technologies and techniques.** |

| | |
|---|---|
| | **Collaboration and Teamwork: Promote collaboration and teamwork among students through group projects and assignments. This will simulate real-world scientific collaborations and enhance their ability to work effectively in research teams.** |

## Student Workload (SWL)
الحمل الدراسي للطالب

| | | | |
|---|---|---|---|
| **Structured SWL (h/sem)** الحمل الدراسي المنتظم للطالب خلال الفصل | 74 | **Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل | 76 | **Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)** الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

## Module Evaluation
تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5, 10 | LO #1, 2, 10 and 11 |
| | **Assignments** | 2 | 10% (10) | 2, 12 | LO # 3, 4, 6 and 7 |
| | **Projects / Lab.** | 1 | 10% (10) | Continuous | |
| | **Report** | 1 | 10% (10) | 13 | LO # 5, 8 and 10 |
| **Summative assessment** | **Midterm Exam** | 1 hr | 10% (10) | 7 | LO # 1-7 |
| | **Final Exam** | 4hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| **Week 1** | **Introduce the molecular biology** |
| **Week 2** | **Structure of DNA and RNA** |
| **Week 3** | **DNA replication in prokaryotic and eukaryotic** |

| | |
|---|---|
| **Week 4** | **Transcription of DNA** |
| **Week 5** | **Synthesis of RNA** |
| **Week 6** | **Protein synthesis I** |
| **Week 7** | **Exam** |
| **Week 8** | **Proteins correlated with nucleic acid** |
| **Week 9** | **Protein synthesis II** |
| **Week 10** | **Study the structure of genes** |
| **Week 11** | **Genetic engineering** |
| **Week 12** | **Gene cloning** |
| **Week 13** | **Cloning steps** |
| **Week 14** | **Uses of biotechnology** |
| **Week 15** | **Translation** |
| **Week 16** | **Preparatory week before the final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | **تعريف علم الحياة الجزيئي** |
| **Week 2** | **تركيب وتخليق RNA & DNA** |
| **Week 3** | **تضاعف DNA والانزيمات ذات العلاقة في بدائية وحقيقية النواة** |
| **Week 4** | **استنساخ DNA في بدائية وحقيقة النواة** |
| **Week 5** | **تخليق وبناء RNA بانواعه Mrna ,Trna ,Rrna** |
| **Week 6** | **تصنيع البروتين** |
| **Week 7** | **امتحان** |
| **Week 8** | **البروتينات المرتبطة بالاحماض النوويه** |
| **Week 9** | **تصنيع البروتين** |
| **Week 10** | **تشريح الجينات** |
| **Week 11** | **الهندسة الوراثية** |

| | |
|---|---|
| **Week 12** | **نواقل الكلونه** |
| **Week 13** | **خطوات الكلونه** |
| **Week 14** | **بعض تطبيقات الهندسة الوراثية** |
| **Week 15** | **مراجعة شاملة** |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Experiments in meteorology | Yes |
| **Recommended Texts** | Molecular biology of genes 2015 by Wucer | No |
| **Websites** | https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering | |

## Grading Scheme
مخطط الدرجات

| Group | Grade | التقدير | Marks (%) | Definition |
|---|---|---|---|---|
| **Success Group (50 - 100)** | **A -** Excellent | امتياز | 90 - 100 | Outstanding Performance |
| | **B -** Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| | **C -** Good | جيد | 70 - 79 | Sound work with notable errors |
| | **D -** Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| | **E -** Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| **Fail Group (0 – 49)** | **FX –** Fail | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
| | **F –** Fail | راسب | (0-44) | Considerable amount of work required |
| | | | | |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Pathogenic Bacteria** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **Bio 47125** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | 4 | | **Semester of Delivery** | 7 | |
| **Administering Department** | BIO | | **College** | COS | |
| **Module Leader** | **Maitham Abas Makei** | | **e-mail** | **mabbas@mu.edu.iq** | |
| **Module Leader's Acad. Title** | **Assist. Professor** | | **Module Leader's Qualification** | Msc | |
| **Module Tutor** | Name (if available) (التدريسي المساعد) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | Name (اللجنة العلمية) | | **e-mail** | E-mail | |
| **Scientific Committee Approval Date** | 01/06/2023 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | **Microbiology** | **Semester** | 3 |
| **Co-requisites module** | **None** | **Semester** | 7 |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>**أهداف المادة الدراسية** | **1.The aim of the module is to develop understanding of pathogen biology by exploring characteristics which both promote pathogen survival and make the pathogens vulnerable to targeted drug design.**<br>**2.Preparing and qualifying cadres specialized in conducting pathological analyzes.**<br>**3.Providing distinguished quality health service to the community and keeping pace with developments in medical and health sciences.**<br>**4. Develop and encourage the field of scientific research.**<br>**5. To provide all students with a broad education in the basic aspects in the first year and to provide them with a higher level of knowledge and understanding of the subject chosen in their second year.**<br>**6. Understand laboratory tests, including knowledge and understanding of human physiology, parasitology, microbiology, histology, embryology, molecular biology and genetics.**<br>**7. In the third year, students are trained in laboratory tests, medical bacteriology, virology and immunology.**<br>**8. Providing fourth year students with research skills.** |
| **Module Learning Outcomes**<br>**مخرجات التعلم للمادة الدراسية** | **By the end of the course students will be able to:**<br>**1-Discuss the association of bacteria with the mammalian host**<br>**2-Outline disease(s) caused by select bacterial pathogens, covering a wide variety of species and pathologies.**<br>**3-Describe, at the molecular level, properties and the role of key factors in the pathogenesis of bacteria, using the above as example.** |
| **Indicative Content**<br>**المحتويات الارشادية** | **1-Introduction, An Outline History of Microbiology and Infection, Glossary. (10 hr)**<br>**2-Normal Flora in Human, Factors influence normal flora, Infection of the host by normal flora, Normal flora of different parts of the human body, Bacterial Pathogenicity. (10 hr)**<br>**3-Virulence Factors, Some of the virulence factors in bacteria, Bacterial Toxins. (10 hr)**<br>**The infection process, Entry into the Human Body, Sites of Entry. (10 hr)**<br>**4-Some Medically Important Bacteria: Staphylococcus: Cluster- Forming Gram +ve cocci,**<br>**Staphylococcus aureus: Morphology and culture characters, S. aureus infections, Biochemical characters, Diagnosis. (10 hr)**<br>**5-Streptococcus and Enterococcus: Classification of Streptococci,**<br>**Streptococcus Pyogenes: Enzymes & toxins, Pathogenicity, Lab Diagnosis,** |

| | |
|---|---|
| | **Streptococcus agalactiae. (10 hr)**<br><br>**6-Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit(1 hr)**<br><br>**7-Non- beta haemolytic Streptococci:**<br><br>**Streptococcus pneumonia, Viridans Streptococci, Genus: Enterococcus (Fecal Streptococcus):- Enterococcus Faecalis, Enterococcus faecuim. (10 hr)**<br><br>**8-The Gram positive spore- forming rod: Bacillus anthracis: (10 hr)**<br><br>**General characters, Pathogenicity**<br><br>**Bacillus subtilis, Bacillus cereus**<br><br>**9-Neisseria, Moraxella: (Gram –ve cocci): Neisseria meningitides: Pathogenicity, Lab diagnosis, (10 hr)**<br><br>**Neisseria gonorrhoeae: Pathogenesis, Lab. Diagnosis. Moraxella: Moraxella catarrhalis**<br><br>**10-Gram-Negative Rods (Enterobacteriaceae): (10 hr)**<br><br>**Escherichia coli, E.coli in human infections.**<br><br>**11-Klebsiella: The virulence factors of Klebsiella. Klebsiella Pneumoniae (K. aerogenes): Lab diagnosis(7 hr)**<br><br>**12-Salmonella: Morphology, Pathogenesis, Diagnosis, (8 hr)**<br><br>**13- Shigella: Morphology& Characteristics, Pathogenicity, Diagnosis. Genus: Proteus: Identification, Pathogenicity, Pseudomonas: Characteristics, Pathogenicity, Diagnosis. (10 hr)** |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | **1 - The student interacts during the lecture.**<br>**2 - The student listens attentively to an explanation.**<br>**3 - The student interacts and participates in extra-curricular activities.**<br>**4 - The student learns to behave professionally.**<br>**5 - The student learns the methods of human communication.**<br>**6. General and Transferable Skills (other skills relevant to employability and personal development)**<br>**7 - Enable the student to take different pathological samples, how to deal with them, transport or store them, and the types of tools and tubes used for this purpose.**<br>**8 - Conducting laboratory tests, making tissue sections, and methods of infection prevention.**<br>**9 - Enabling the student to pass interviews and succeed in the labor market .**<br>**10 - Enabling the student to develop himself after graduation** |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>**الحمل الدراسي المنتظم للطالب خلال الفصل** | **74** | **Structured SWL (h/w)**<br>**الحمل الدراسي المنتظم للطالب أسبوعيا** | **5** |
| **Unstructured SWL (h/sem)**<br>**الحمل الدراسي غير المنتظم للطالب خلال الفصل** | **76** | **Unstructured SWL (h/w)**<br>**الحمل الدراسي غير المنتظم للطالب أسبوعيا** | **5** |
| **Total SWL (h/sem)**<br>**الحمل الدراسي الكلي للطالب خلال الفصل** | **150** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due**<br>الاسبوع المستحق | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | **2** | **10% (10)** | **5, 10** | **LO #1, 2,** |
| | **Assignments** | **2** | **10% (10)** | **2, 12** | **LO # 3,** |
| | **Projects / Lab.** | **1** | **10% (10)** | **Continuous** | |
| | **Report** | **1** | **10% (10)** | **13** | **LO # 1,2** |
| **Summative assessment** | **Midterm Exam** | **1 hr** | **10% (10)** | **7** | **LO # 1** |
| | **Final Exam** | **4hr** | **50% (50)** | **16** | **All** |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | **Introduction, An Outline History of Microbiology and Infection, Glossary.** |
| **Week 2** | **Normal Flora in Human, Factors influence normal flora, Infection of the host by normal flora, Normal flora of different parts of the human body, Bacterial Pathogenicity.** |
| **Week 3** | **Virulence Factors, Some of the virulence factors in bacteria, Bacterial Toxins.** |
| **Week 4** | **The infection process, Entry into the Human Body, Sites of Entry.** |
| **Week 5** | **Some Medically Important Bacteria: Staphylococcus: Cluster- Forming Gram +ve cocci,**<br>***Staphylococcus aureus*: Morphology and culture characters, *S. aureus* infections, Biochemical characters, Diagnosis.** |
| **Week 6** | **Streptococcus and Enterococcus: Classification of Streptococci,**<br>***Streptococcus Pyogenes:* Enzymes & toxins, Pathogenicity, Lab Diagnosis,** |

| | |
|---|---|
| | ***Streptococcus agalactiae*** |
| **Week 7** | **Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit** |
| **Week 8** | **Non- beta haemolytic Streptococci:**<br>***Streptococcus pneumoniae***<br>**Viridans *Streptococci*** |
| **Week 9** | **Genus: Enterococcus (Fecal Streptococcus):-**<br>***Enterococcus Faecalis, Enterococcus faecuim*** |
| **Week 10** | **The Gram positive spore- forming rod: *Bacillus anthracis*:, *Clostridium spp*.**<br>**General characters, Pathogenicity**<br>***Bacillus subtilis, Bacillus cereus, clostridium perifringens*** |
| **Week 11** | **Neisseria, Moraxella: (Gram –ve cocci): *Neisseria meningitides*: Pathogenicity, Lab diagnosis,**<br>***Neisseria gonorrhoeae*: Pathogenesis, Lab. Diagnosis.**<br>**Moraxella: *Moraxella catarrhalis*** |
| **Week 12** | **Gram-Negative Rods (Enterobacteriaceae):**<br>***Escherichia coli, E.coli* in human infections.** |
| **Week 13** | **Klebsiella: The virulence factors of Klebsiella. *Klebsiella Pneumoniae* (*K. aerogenes*): Lab diagnosis** |
| **Week 14** | ***Salmonella*: Morphology, Pathogenesis, Diagnosis,** |
| **Week 15** | **Shigella: Morphology& Characteristics, Pathogenicity, Diagnosis. Genus: Proteus: Identification, Pathogenicity، Pseudomonas: Characteristics, Pathogenicity, Diagnosis.** |
| **Week 16** | **Preparatory week before the final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | **Growth on agar plate. Measurement of Cell Mass. Media for Bacterial Growth.** |
| **Week 2** | **Staining: simple staining, Differential Staining,** |
| **Week 3** | **Staining: simple staining, Differential Staining,** |
| **Week 4** | ***Staphylococcus aureus*: Lab. diagnostic test** |
| **Week 5** | ***Streptococcus pneumoniae* Lab. diagnostic test** |
| **Week 6** | **Growth on agar plate. Measurement of Cell Mass. Media for Bacterial Growth.** |
| **Week 7** | ***Bacillus anthracis*: Lab. diagnostic test** |
| **Week 8** | ***Neisseria gonorrhoeae*: Lab. diagnostic test** |

| | |
|---|---|
| **Week 9** | **Enterobacteriaceae: *Escherichia coli*: Lab. diagnostic test** |
| **Week 10** | ***Klebsiella Pneumoniae*: Lab. diagnostic test.** |
| **Week 11** | ***Salmonella*: Lab. diagnostic test.** |
| **Week 12** | **Shigella: Lab. diagnostic test.** |
| **Week 13** | **Proteus: Lab. diagnostic test.** |
| **Week 14** | **Pseudomonas: Lab. diagnostic test.** |
| **Week 15** | ***Vibrio cholera*: Lab. diagnostic test.** |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | **Review of medical microbiology . Jawetz.** | **Yes** |
| **Recommended Texts** | **Lange Medical Microbiology, 24th Edition: Jawetz, Melnick, & Adelberg; McGraw-Hill Medical 2007.** | **Yes** |
| **Websites** | | |

## Grading Scheme
مخطط الدرجات

| Group | Grade | التقدير | Marks (%) | Definition |
|---|---|---|---|---|
| Success Group (50 - 100) | A - Excellent | امتياز | 90 - 100 | Outstanding Performance |
| | B - Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| | C - Good | جيد | 70 - 79 | Sound work with notable errors |
| | D - Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| | E - Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| Fail Group (0 – 49) | FX – Fail | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
| | F – Fail | راسب | (0-44) | Considerable amount of work required |
| | | | | |

**Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.**

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Virology** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **Bio 48030** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | | 4 | **Semester of Delivery** | | 8 |
| **Administering Department** | | Type Dept. Code | **College** | Type College Code | |
| **Module Leader** | Noor Sami | | **e-mail** | E-mail | |
| **Module Leader's Acad. Title** | | Assist Professor | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | | Name | **e-mail** | E-mail | |
| **Scientific Committee Approval Date** | | 01/06/2023 | **Version Number** | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | None | **Semester** | |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | 1. Providing students with experience in applied life sciences and methods of detection and prevention of fibrous diseases.<br>2. Supplying state institutions with specialized staff.<br>3. Preparing staff with high experience in life sciences and experience in knowing high-tech devices in virus detection.<br>4. Providing students with scientific techniques in the use of devices and equipment that can be used in their theoretical and applied studies.<br>5. Research and study all that is new in virological sciences and keep abreast of scientific developments in this field. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Providing the student with sufficient information to gain experience in knowing modern techniques in detecting viruses and methods of prevention and treatment of viral diseases.<br>2. Giving the student experience in knowing all laboratory equipment and modern technologies.<br>3. Providing the student with sufficient information to keep up with and study modern science.<br>4. Develop the student's ability to recall what he learned through<br>a-The first level is the development of knowledge about immunology.<br>b- The second level is to improve the level of comprehension and to develop the ability to interpret, predict and draw conclusions.<br>c- The third level is the development of application capabilities.<br>d- The fourth level gives the student the ability to analyze.<br>e- The fifth level is to develop the student's ability to integrate ideas and information, at the level of synthesis, which is the opposite of analysis.<br>f- Level Six: Evaluation: Developing the student's ability to judge the value of the learned material |
| **Indicative Contents**<br>المحتويات الإرشادية | Virology, definition of virus, general properties and structure of viruses<br>Shape and size of viruses, symmetry types and study atypical virus-like agents<br>Viral replication (life cycle of virus)<br>Transmision of viruses and Viral pathogenesis<br>Host immune response against viral infection<br>Vaccinology<br>Viral culture and laboratory diagnosis |

| | |
|---|---|
| | Classification some of important medical viruses (DNA)<br>Classification some of important medical viruses (RNA)<br>Exam<br>Some viruses infected human and methods of protection (Herpesviruses)<br>Some viruses infected human and methods of protection (Paramyxoviruses , Orthomyxoviridae)<br>Some viruses infected human and methods of protection (Influenza virus)<br>Some viruses infected human and methods of protection (HIV and ebola virus)<br>Some viruses infected human and methods of protection(coronaviruses and hepatitis virus) |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | •Lecture, use of the blackboard and recitation using Data show<br>• Explanations using charts, pictures and educational films<br>• Interactive discussion<br>• Self-education<br>• E-learning, scientific seminars<br>•Conducting fun scientific competitions (individual or team)<br>• Organizing lectures prepared by students.<br>•Formation of volunteer work groups.<br>•Scientific trips |

| **Student Workload (SWL)**<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 88 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 6 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 62 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

## Module Evaluation

تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| Formative assessment | Quizzes | 2 | 10% (10) | 5, 10 | LO #1, 2, 10 and 11 |
| | Assignments | 2 | 10% (10) | 2, 12 | LO # 3, 4, 6 and 7 |
| | Projects / Lab. | 1 | 10% (10) | Continuous | |
| | Report | 1 | 10% (10) | 13 | LO # 5, 8 and 10 |
| Summative assessment | Midterm Exam | 1 hr | 10% (10) | 7 | LO # 1-7 |
| | Final Exam | 4hr | 50% (50) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| Week 1 | Virology, definition of virus, general properties and structure of viruses |
| Week 2 | Shape and size of viruses, symmetry types and study atypical virus-like agents |
| Week 3 | Viral replication (life cycle of virus) |
| Week 4 | Transmision of viruses and Viral pathogenesis |
| Week 5 | Host immune response against viral infection |
| Week 6 | Vaccinology |
| Week 7 | Viral culture and laboratory diagnosis |
| Week 8 | Classification some of important medical viruses (DNA) |
| Week 9 | Classification some of important medical viruses (RNA) |
| Week 10 | Exam |
| Week 11 | Some viruses infected human and methods of protection (Herpesviruses) |
| Week 12 | Some viruses infected human and methods of protection (Paramyxoviruses , Orthomyxoviridae) |
| Week 13 | Some viruses infected human and methods of protection (Influenza virus) |
| Week 14 | Some viruses infected human and methods of protection (HIV and ebola virus) |
| Week 15 | Some viruses infected human and methods of protection(coronaviruses and hepatitis virus) |
| Week 16 | |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: Introduction introduction to the virus, its definition, composition and size |
| **Week 2** | Lab 2: Classification of viruses |
| **Week 3** | Lab 3: The effect of physical and chemical factors on the virus |
| **Week 4** | Lab 4: Types of viral samples and methods of preservation |
| **Week 5** | Lab 5: Virus isolation and identification by cell cultures |
| **Week 6** | Lab 6: Characteristics of viral growth in cell cultures |
| **Week 7** | Lab 7: Isolation of virus by laboratory animals |
| **Week 8** | Lab 8: Inoculation of Virus into Embryonated eggs |
| **Week 9** | Exam |
| **Week 10** | Lab 9: Immunofluorescence technique |
| **Week 11** | Lab 10: The Neutralization Test |
| **Week 12** | Lab 11: Haemagglutination Test (HA) |
| **Week 13** | Lab 12: Haemagglutination Inhibition Test (HI) |
| **Week 14** | Lab 13: Virus identification by PCR |
| **Week 15** | Lab 14: Virus identification by electron microscope |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | | No |
| **Recommended Texts** | **1-Medical Microbiology: Jawetz, Melnick & Adelberg's.**<br>**2-Medical Microbiology & Immunology: Warren Levinson .** | No |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks (%)** | **Definition** |
| **Success Group (50 - 100)** | **A -** Excellent | امتياز | 90 - 100 | Outstanding Performance |
| | **B -** Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| | **C -** Good | جيد | 70 - 79 | Sound work with notable errors |
| | **D -** Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| | **E -** Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| **Fail Group (0 – 49)** | **FX –** Fail | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
| | **F –** Fail | راسب | (0-44) | Considerable amount of work required |
| | | | | |

**Note:**Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.