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 معلومات المادة الدراسية					
Module Title	**Animal physiology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**BIO36020**				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level	**3**		**Semester of Delivery**	**6**	
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 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 **أهداف المادة الدراسية**	**1. 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.** **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** **3. learning the students of normal physiological actions in the all body organs in the deferent systems. The students able to determine the normal and abnormal physiological action in the body.**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	**1- Understand the basic principles of Animal physiology** **2- Studying the internal physiology of the human body and knowing the most important vital processes affecting the state of equilibrium of the organism's body.** **3- Finding functional and structural similarities and differences between neighborhoods** **4- Studying the link between the different branches, such as studying the relationship between comparative anatomy, physiology, and histology**
Indicative Content **المحتويات الارشادية**	**Introduction of physiology (10 h)** **Integumentary System(10 h)** **Nervous system(10 h)** **Cardiovascular system (9 h)** **Blood cells(9 h)** **Respiratory system(9 h)** **Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit(1h)** **Digestive system(9 h)** **Urinary system(9h)** **Male reproductive sys. (9h)** **Female reproductive sys. (9 h)** **Skeletal system (9h)** **Muscular system(9 h)** **Endocrinology 1(7h)** **Endocrinology 2(7 h)**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1 - The student interacts during the lecture.** **2 - The student listens attentively to an explanation.** **3 - The student interacts and participates in extra-curricular activities.** **4 - The student learns to behave professionally.** **5 - General and Transferable Skills (other skills relevant to employability and personal development)** **6. Enabling the student to pass interviews and succeed in the labor market** **7 - Enabling the student to develop himself after graduation** **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) 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**	**51**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**3**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**125**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due** 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) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction of physiology**
Week 2	**Integumentary System**
Week 3	**Nervous system**
Week 4	**Cardiovascular system**
Week 5	**Blood cells**
Week 6	**Respiratory system**
Week 7	**Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit**
Week 8	**Digestive system**
Week 9	**Urinary system**
Week 10	**Male reproductive sys.**
Week 11	**Female reproductive sys.**
Week 12	**Skeletal system**
Week 13	**Muscular system**
Week 14	**Endocrinology 1**
Week 15	**Endocrinology 2**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Introduction to animal physiology**
Week 2	**Types of tubes used in lab**
Week 3	**Blood group test**
Week 4	**Hb measurement**
Week 5	**WBC Count test**
Week 6	**RBC Count test**

Week 7	Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit
Week 8	Differential WBC count test
Week 9	Platelets count test
Week 10	Coagulation test
Week 11	Erythrocyte sedimentation rate test
Week 12	Blood pressure test
Week 13	Determination of blood glucose test
Week 14	The respiratory system function
Week 15	Pregnant test
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Medical physiology , Gunstream's Anatomy & Physiology	Yes
Recommended Texts	Biology journals, medical journal	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 معلومات المادة الدراسية					
Module Title	**Cell Biology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio35012**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		3	**Semester of Delivery**		5
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		01/06/2023	**Version Number**		

Relation with other Modules 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 أهداف المادة الدراسية	**1.This course is designed to cover aims of General cell biology course make the students able to understand the basic principles and concept of the living organism learn how linking the aspects of life and to increase the student's applied skills through didactic activities improve students' ability to learn concrete concepts about Biology, such as the composition of living beings, growth, and characterization.** **2. This course give an overview Cell , Chemistry of the Cell, tissue types , Structures and Functions of Cell organelles and their functions, Essential bioreactions in the cell, Evolution.**
Module Learning Outcomes 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.** **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.** **3. Demonstrate knowledge of the regulation of gene expression in bacteria, including the role of transcription factors, operons, and regulatory networks.** **4. Analyse and interpret experimental data relevant to microbial genetics, such as gene mapping, genetic screens, and transformation assays, and apply statistical methods for data analysis.** **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 المحتويات الإرشادية	**Introduction of the cell** **Eukaryotic cell** **Life Chemistry** **Structure and Function of Cell Wall** **Transportation cross the cell membrane** **Cytoplasm** **Endoplasmic reticulum and Golgi apparatus** **Mitochondria** **Plastids** **Nucleus and Nuclei**

	Protein Synthesis **Regulation of Gene Expression** **Interaction between cytoplasm and nucleus** **Chromosomes** **Mitosis and meosis** **Cellular Genetics** **Preparatory week before the final Exam**
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**- The student interacts during the lecture.** **2 - The student listens attentively to an explanation.** **3 - The student interacts and participates in extra-curricular activities.** **4 - The student learns to behave professionally.** **5 - General and Transferable Skills (other skills relevant to employability and personal development)** **6. Enabling the student to pass interviews and succeed in the labor market** **7 - Enabling the student to develop himself after graduation** **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) 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	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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	Introduction of the cell
Week 2	Eukaryotic cell
Week 3	Life Chemistry
Week 4	Structure and Function of Cell Wall
Week 5	Transportation cross the cell membrane
Week 6	Cytoplasm
Week 7	Endoplasmic reticulum and Golgi apparatus
Week 8	Mitochondria
Week 9	Plastids
Week 10	Nucleus and Nuclei
Week 11	Protein Synthesis Regulation of Gene Expression
Week 12	Interaction between cytoplasm and nucleus
Week 13	Chromosomes
Week 14	Mitosis and meosis
Week 15	Cellular Genetics
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Calibration of Microscope**
Week 2	**Detection of components of plant cell wall**
Week 3	**Types of Cells**
Week 4	**Plastids**
Week 5	**Kill biosample and fixing**
Week 6	**Mitosis**
Week 7	**Mitochondria. Golgi apparatus**
Week 8	**Preparation of cell for mitosis**
Week 9	**Mitosis**
Week 10	**Meosis**
Week 11	**Exam.**
Week 12	**Giant chromosome**
Week 13	**Barr Body**
Week 14	**Karotype**
Week 15	**Examples of genetic diseases**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required 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. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter (2002) Molecular Biology of the Cell, 4th ed. Garland Science, NY, USA	Yes
Recommended Texts	ويلسون واخرون: ترجمة جبرائيل بصوم عزيز واخرون 1978 علم الخلية .الطبعة الثانية.المكتبة الوطنية العراقية هناء فاضل الرحماني واخرون (لايوجد سنة نشر) ملزمة علم الخلية العملي.طلية التربية.جامعة بغداد.	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 معلومات المادة الدراسية					
Module Title	**Ecology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** × ☒ **Tutorial** ×☐ **Practical** ×☐ **Seminar**	
Module Code	**Bio35013**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Ali Abdulhamza Al-Fanharawi		**e-mail**	alialfanharawi@mu.edu.iq	
Module Leader's Acad. Title	Assistant 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 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 أهداف المادة الدراسية	1. The student learns: Basic facts, 2. concept of Environment, 3. its main branches, 4. its importance, 5. environmental zones, 6. ecosystem and components, 7. relationship between biota, 8. sample collection and analysis.

Learning and Teaching Strategies 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) 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	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, Definition of ecology and its relation to other science.
Week 2	Branches of ecology, Aquatic ecology and classification, Terrestrial ecology and classification
Week 3	Ecosystem and components
Week 4	Limited factors and tolerance laws
Week 5	A biotic factors as limited factors
Week 6	Food chains and food nets
Week 7	Productivity and measurement methods, Environmental pyramids
Week 8	Gasous and sedimentary cycles
Week 9	Population, distribution, structures
Week 10	Communities, classification and analysis
Week 11	Ecosystem diversity: Freshwater ecosystems
Week 12	Ecosystem diversity: Terrestrial ecosystem
Week 13	Environmental succession, water and land succession, Ecosystem development.
Week 14	Local Environment: case study
Week 15	Open Lecture
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to ecology lab., types of environment and ecosystems. Ecology lab. safety.
Week 2	Laboratory equipment, Air temperature, pressure and measurement
Week 3	Air humidity, rain measurement
Week 4	Wind, light intensity
Week 5	Devices and tools used in sampling.
Week 6	Water flow and measurement
Week 7	Soil types, soil moisture measurement
Week 8	Analysis of soil textures by two methods
Week 9	Productivity and plant area surface measurement
Week 10	Study of ecosystem
Week 11	Types of food chain in the environment
Week 12	Population size measurement
Week 13	Visit to the meteorological station.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Ecology and pollution. Hussein Al-Saadi, 2002	Yes
Recommended Texts	Ecology, Hattog& Ubaidah, 2009 Basic concepts of ecology and pollution. Ihsan al-Gohary, 2019 Essentials of Ecology. Miller and Spoolman, 2009	No
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 معلومات المادة الدراسية					
Module Title	**Fungal Taxonomy**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**BIO36121**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	BIO. DEPT		**College**	COS	
Module Leader	Emad Abd Atia		**e-mail**	Emadabd2210@mu.edu.iq	
Module Leader's Acad. Title	**Lecturer**		**Module Leader's Qualification**	**Master**	
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 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 أهداف المادة الدراسية	1. Clarify the basic principles of tests in the classification of fungi 2. Clarification of the discrepancy and difference between the types of fungi according to the taxonomic characteristics 3. As well as clarifying the mechanics of tests and how to deal with fungal models of various kinds 4. As well as knowing the importance of fungi and the benefit of conducting classification of different fungal species 5. As well as knowledge of the interpretation of the interdependence between fungi and their overlap with the forms of public life
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of the module a student will be able to: 1. Describe the basic structure and classification of pathogenic fungi; 2. Demonstrate knowledge and understanding of the pathogenesis of the various mycoses, their clinical manifestations, diagnosis and management; 3. Apply relevant identification techniques and skills in any laboratory settings using molds or yeasts
Indicative Contents المحتويات الإرشادية	Comparison between old and new classification Kingdom of Protozo True slime molds Myxomycetes Plasmodiophoromycetes Oomycetes Chytridiomycetes Zygomycetes Ascomycetes Euascomycetes Virimomycetes Heterobasidiomycetes Homobasidiomycetes Deutromycetes mondiales melanconiales

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures and tutorials provide background information on each type of fungal infection / disease and introduce the fungal identification methods. The practical classes enable students to develop the skills to identify fungi and learn how to use their knowledge of the diseases and fungi to aid on the interpretation the laboratory tests. The practical's are considered essential to develop the skills needed to take the practical based exam. 2 - The student interacts during the lecture. 3 - The student listens attentively to an explanation. 4 - The student interacts and participates in extra-curricular activities. 5 - The student learns to behave professionally. 6 - General and Transferable Skills (other skills relevant to employability and personal development) 7. Enabling the student to pass interviews and succeed in the labor market 8 - The assessment include one mid examinations and final examination in addition to assignment and quiz also a home works and reports. 9. The practical assessment tests the practical skills and understanding of identification keys and methods, which when combined lead to an identification result. However, it also requires knowledge and understanding of the clinical aspects of fungal infection which might be characteristic of a particular fungus or disease type. Many of the exam questions include clinical information. 10. The coursework essay tests the understanding of one species of fungus in terms of what type of fungus it is, how it is identified, epidemiology, what diseases it causes, what pathogenicity features it has, how infections are managed and treated. It is representative of the lectures that would have covered for a range of medically important fungi, but provides an opportunity for the individual to demonstrate their in-depth knowledge and understanding of just one species. It also enables the student to demonstrate their ability to research a topic and prepare a concise report in the style of a review article from the Journal of Clinical Microbiology. 11. This course provides theoretical knowledge of fungal infections and practical skills to identify fungi in a laboratory, therefore the assessment tests both aspects.

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	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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	Comparison between old and new classification
Week 2	Kingdom of Protozo
Week 3	True slime molds
Week 4	Myxomycetes Plasmodiophoromycetes
Week 5	Oomycetes
Week 6	Chytridiomycetes
Week 7	Zygomycetes
Week 8	Ascomycetes
Week 9	Euascomycetes
Week 10	Virimomycetes
Week 11	Heterobasidiomycetes
Week 12	Homobasidiomycetes
Week 13	Deutromycetes
Week 14	mondiales
Week 15	melanconiales

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Classification characters of fungi
Week 2	Study characters and some species of Phylums of Protozo
Week 3	Study characters and some species of True slime molds
Week 4	Study characters and some species of Myxomycetes Plasmodiophoromycetes
Week 5	Study characters and some species of Oomycetes
Week 6	Study characters and some species of Chytridiomycetes
Week 7	Study characters and some species of Zygomycetes
Week 8	Study characters and some species of Ascomycetes
Week 9	Study characters and some species of Euascomycetes
Week 10	Study characters and some species of Virimomycetes
Week 11	Study characters and some species of Heterobasidiomycetes
Week 12	Study characters and some species of Homobasidiomycetes
Week 13	Study characters and some species of Deutromycetes
Week 14	Study characters and some species of mondiales
Week 15	Study characters and some species of melanconiales

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Basic in classification of fungi (Adul Aziz Nkailan2010) Introductory Mycology, fourth edition, Alexopoulos, Mins and Blackwell , reprint: 2013. Introduction to Fungi, Third Edition, JohnWebster and RolandWeber, 2007	Yes
Recommended Texts	1- Classification of fungi 2- Basic in classification of fungi	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 معلومات المادة الدراسية					
Module Title	**Genetics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**BIO36023**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	6	
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	01/06/2023		**Version Number**		

Relation with other Modules 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 أهداف المادة الدراسية	**1.This course is designed to cover aims of General cell biology course make the students able to understand the basic principles and concept of the living organism learn how linking the aspects of life and to increase the student's applied skills through didactic activities improve students' ability to learn concrete concepts about Biology, such as the composition of living beings, growth, and characterization.** **2. This course give an overview Cell , Chemistry of the Cell, tissue types , Structures and Functions of Cell organelles and their functions, Essential bioreactions in the cell, Evolution.**
Module Learning Outcomes 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.** **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.** **3. Demonstrate knowledge of the regulation of gene expression in bacteria, including the role of transcription factors, operons, and regulatory networks.** **4. Analyse and interpret experimental data relevant to microbial genetics, such as gene mapping, genetic screens, and transformation assays, and apply statistical methods for data analysis.** **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 المحتويات الإرشادية	**مقدمة** **الوراثة المندلية** **تداخل الفعل الجيني** **الوراثة الكمية** **اليات متعددة-وراثة لون الفرد وغيرها** **تعيين الجنس في الاحياء** **الوراثة المرتبطة بالجنس** **الارتباط والعبور** **الاساس الكيميائي للوراثة** **الطفرات الجينية**

	الطفرات الكروموسومية **الوراثة السايتوبلازمية** **الهندسة الوراثية** **وراثة الاقارب** **وراثة العشائر**
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**- The student interacts during the lecture.** **2 - The student listens attentively to an explanation.** **3 - The student interacts and participates in extra-curricular activities.** **4 - The student learns to behave professionally.** **5 - General and Transferable Skills (other skills relevant to employability and personal development)** **6. Enabling the student to pass interviews and succeed in the labor market** **7 - Enabling the student to develop himself after graduation** **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) 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	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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	مقدمة
Week 2	الوراثة المندلية
Week 3	تداخل الفعل الجيني
Week 4	الوراثة الكمية
Week 5	اليات متعددة-وراثة لون الفرد وغيرها
Week 6	تعيين الجنس في الاحياء
Week 7	الوراثة المرتبطة بالجنس
Week 8	الارتباط والعبور
Week 9	الاساس الكيميائي للوراثة
Week 10	الطفرات الجينية
Week 11	الطفرات الكروموسومية
Week 12	الوراثة السايتوبلازمية
Week 13	الهندسة الوراثية

Week 14	**وراثة الاقارب**
Week 15	**وراثة العشائر**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**حشرة دروسفلا**
Week 2	**التمييز بين الذكر والانثى**
Week 3	**دراسة نسخ المظهرية**
Week 4	**دراسة قانون مندل الاول**
Week 5	**تكملة قانون مندل الاول ودراسة التضريب الاختباري له**
Week 6	**دراسة قانون مندل الثاني**
Week 7	**تكملة قانون مندل الثاني ودراسة التضريب الاختباري له**
Week 8	**فحص نتائج مندل الثاني**
Week 9	**الامتحان الفصلي الاول**
Week 10	**دراسة الوراثة المرتبطة بالجنس**
Week 11	**الوراثة البشرية ودراسة الامثلة عليها**
Week 12	**الارتباط والعبور**
Week 13	**تكملة الارتباط والعبور**
Week 14	**امتحان الفصل الثاني**
Week 15	**الوراثة الكمية**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	مقدمة في علم الوراثة	Yes
Recommended Texts	Genetics For Dummies, 2nd Edition Principles of genetics / D. Peter Snustad, .Michael J. Simmons. — 6th ed	No
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 معلومات المادة الدراسية					
Module Title	**Histology**			**Module Delivery**	
Module Type	**Core**			☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**BIO35014**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	**3**		**Semester of Delivery**	**5**	
Administering Department	**Type Dept. Code**		**College**	**Type College Code** رمز الكلية	
Module Leader	**Bassim Abdullah Jassim**		**e-mail**	**bassimabd@mu.edu.iq**	
Module Leader's Acad. Title	**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 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 **أهداف المادة الدراسية**	**1. The broad aim of the module is to provide core knowledge and understanding in the area of Histology 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.** **2.Determined the histological structures that composed the body.** **3. Classified the deferent tissue types that composed the all parts of the body.** **4. Showed the relationship between the deferent systems histologically.** **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 third year.** **6. Enhancing the skills of the students in reading and diagnosis of the deferent histopathological lesions .** **7. In the third year, students are trained in laboratory tests,.** **8. training the students on made the tissue section as typical slide.** **10. Students who successfully complete this module will be able to:** **Explain the mechanistic basis of selected biotechnology applications at the molecular level, so how they can differentiation between normal and abnormal tissue.** **Discuss how research has been designed and implemented for biotechnological purposes** **Evaluate experimental techniques and approaches used for biotechnological applications** **Critically evaluate scientific literature in an area of biotechnology** **Synthesize 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 **مخرجات التعلم للمادة الدراسية**	**1-Histology the course aims to teaching the students through the theoretical and practical levels to investigated the deferent types of tissue that composed of the all organs in the body, so concepts needed for a good knowledge of the tissue that possessing with deferent stains. Particular attention is paid to the principles and technological aspects of histology** **2-Part of "histology". The course aims to provide the concepts needed for a good knowledge of the tissue that composed of the body.** **3-Part of "histology". The course aims to provide the concepts needed for a good knowledge of tissue and the role function for each type of tissue in the body, so appeared the role of tissue types in controlling on the many functions in the body** **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 **المحتويات الارشادية**	**1-classified the basic Histology.(9hr)** **2-epithelial tissue. (9hr)** **3-connective tissue. (9hr)** **4-muscular tissue. (9hr)** **5-nervous tissue. (9hr)** **6-digestive system. (9hr)** **7-Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit(1hr)** **8-cardiovasscular tissue. (9hr)** **9-lymphatic system (9hr)** **10-urinary system . (9hr)** **11- respiratory system (9hr)** **12- male reproductive system (9hr)** **13-female reproductive system (9hr)** **14- Intigumantry system (9hr)** **15- endocrinology . (8hr)**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1 - The student interacts during the lecture.** **2 - The student listens attentively to an explanation.** **3 - The student interacts and participates in extra-curricular activities.** **4 - The student learns to behave professionally.** **5 - General and Transferable Skills (other skills relevant to employability and personal development)** **6. Enabling the student to pass interviews and succeed in the labor market** **7 - Enabling the student to develop himself after graduation** **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) 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**	**51**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**3**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**125**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due** 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) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction in histology and classified the basic histology.**
Week 2	**Epithelial tissue, classified, function, modification of epithelia.**
Week 3	**Connective tissue, classified the connective tissue, mechanisms of bone ossifications.**
Week 4	**Muscular tissue, muscles types, muscle function and mechanisms.**
Week 5	**Nervous tissue, central and peripheral nervous systems, neurulation.**
Week 6	**Digestive system, oral cavity, associated digestive glands.**
Week 7	**Mid. Term exam**
Week 8	**Cardiovascular system, heart, blood cells, blood vessels**
Week 9	**Lymphatic system, lymphatic node, lymph fluid.**
Week 10	**Urinary system, kidney, nephron, urine formation.**
Week 11	**Respiratory system, mechanism of respiration .**
Week 12	**Male reproductive system, spermatogenesis**
Week 13	**Female reproductive system Oogensis**
Week 14	**Integumentary system, hair, nail, sweat gland**
Week 15	**Endocrinology, main glands, mechanisms of secretion**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Main steps of histological technique.**
Week 2	**types of simple and stratifies epithelia, glands**
Week 3	**Proper c.t. bone, cartilage .**
Week 4	**tissue sections of skeletal, cardiac and smooth muscles**
Week 5	**Nerve cell types, nerve fibers, spinal cord, ganglions**
Week 6	**Tongue, teeth, stomach, intestine**
Week 7	**Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit**

Week 8	**Heart, artery, vein, capillary.**
Week 9	**Lymph organs, lymphocyte, lymphatic vessels**
Week 10	**Kidney, nephron, ureter, urinary bladder.**
Week 11	**Trachea, bronchial tree, lung**
Week 12	**Spermatogenesis, seminiferous tubules, epididymis**
Week 13	**Oogenesis, ovary, oviduct**
Week 14	**Thick skin, thin skin, hair, nail**
Week 15	**Primary glands. Secondary glands, hormonal secretions.**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**-Basic histology 2016 (gonquira , delman and brown)**	**Yes**
Recommended Texts	**Applied histology 2012, luna**	**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 معلومات المادة الدراسية					
Module Title	**Immunology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio35016**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
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 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 أهداف المادة الدراسية	1.Explain the basic principles of immunology 2.Clarify the interferences that may occur in the interactions between antibody and antigen 3. Clarifying the mechanisms of tests and how to deal with all types of pathological samples 4. knowing the clinical importance and benefit of immunological tests 5. knowing the interpretation of results and how to write test results reports
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Provide the student with sufficient information to gain experience in dealing with life sciences and laboratory techniques. 2. Provide the student with experience in knowing all laboratory equipment and modern technologies. 3. Providing him with sufficient information to keep up with and study modern science. 4. Develop the student's ability to recall what he learned through a-The first level is the development of knowledge about immunology. b- The second level is to improve the level of comprehension and to develop the ability to interpret, predict and draw conclusions. c- The third level is the development of application capabilities. d- The fourth level gives the student the ability to analyze. 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. f- Level Six: Evaluation: Developing the student's ability to judge the value of the learned material
Indicative Contents المحتويات الإرشادية	Introduction to Immunology as Science Innate Immunity Cells of the immune system Adaptive immunity Lymphatic organs The effectiveness of the immune system and the immune response
	Antigens and Immunogenic Antibodies Exam Antigen-Antibody Reaction Complement System Autoimmune diseases Immunologic Tolerance Immunodeficiency Relationship between tumor and immunity

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

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	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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**	1hr	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	Introduction to Immunology as Science
Week 2	Innate Immunity
Week 3	Cells of the immune system
Week 4	Adeptive immunity
Week 5	Lymphatic organs
Week 6	The effectiveness of the immune system and the immune response
Week 7	Antigens and Immunogen
Week 8	Antibodies
Week 9	Exam
Week 10	Antigen-Antibody Reaction
Week 11	Complement System
Week 12	Autoimmune diseases
Week 13	Immunologic Tolerance
Week 14	Immunodeficiency
Week 15	Relationship between tumor and immunity
Week 16	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Immunology as practical Science
Week 2	Blood Components
Week 3	Antibodies
Week 4	Types of Dilution
Week 5	The mechanism of the body's reaction to the antigen
Week 6	Agglutination Test
Week 7	Example for Agglutination (Widal test+blood groups)
Week 8	Pregnancy Test+ C – reactive protein

Week 9	Exam
Week 10	Complement fixation
Week 11	Precipitation Test
Week 12	Monoclonal antibodies
Week 13	Laboratory diagnosis of viral hepatitis infects
Week 14	ELISA Test
Week 15	Immunoelectrophoresis

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts	**1-Medical Microbiology and Immunology,Warren Levinson,2016.** **2-Microbiology and Immunology ,Subhash Chandra Parija,2012**	No
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 معلومات المادة الدراسية					
Module Title	**Microbial physiology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**BIO 36022**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	BIO		**College**	COS	
Module Leader	**Mouna Akeel Hamed**		**e-mail**	**mouna@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 العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**None**	**Semester**	**None**
Co-requisites module	**None**	**Semester**	**None**

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims **أهداف المادة الدراسية**	**1. The objective of this module is to enhance our understanding of microbial physiology by investigating the characteristics that contribute to microbial survival as well as how can benefit from their characteristics** **2. The module aims to train and certify professionals who are specialized in conducting microbial analysis.** **3. Our primary goal is to deliver high-quality scientific services to the community while staying up-to-date with advancements in microbial sciences.** **4. Strivation to foster and promote scientific research in the field.** **5. Students receive a comprehensive education covering fundamental aspects of various subjects. Then, they delve deeper into microbial physiology field of study, gaining advanced knowledge and understanding.** **6 The curriculum emphasizes the comprehension of laboratory tests, encompassing microbial physiology including microbial (growth , nutrition , sterilization and enzyme production).**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	**Upon completing the course, students will possess the following abilities:** **1. Analyze the impact of various physical conditions such as nutrition, pH, oxygen levels, temperature, and light on the growth of microorganisms.** **2. Summarize the enzymes secreted by microorganisms that may contribute to disease development.** **3. Explain the diverse methods employed by microorganisms for synthesizing various materials.**

Indicative Content **المحتويات الارشادية**	**1-Introduction, An Outline History of microbial physiology. (10 hr)** **2- Bacterial structure ,cell wall structure and their function (10 hr)** **3- Other microbial structure and their function. (10 hr)** **4- Microbial movement physiology, methods used according to the types of microbes. (10 hr)** **5- Different shapes of germ cells and their physiological functions contribute to their capability to withstand various environments.(10 hr)** **6- Microbial growth, The prokaryotic cell cycle (binary fission), Microbial Growth phases . (10 hr)** **7- Environmental Factors Affecting Growth including Nutrients , Hydrogen Ion Concentration (pH), Temperature , Aeration , Ionic Strength & Osmotic Pressure and Light. (10 hr)** **8- Uptake of Nutrients by the microbial cell, Passive transport, Active transport and Iron uptake, Endocytosis - (10 hr)** **9- Microbial Bioenergetics , Anabolism, Catabolism, Oxidation – Reduction Reactions , The Thermodynamics and Bioenergetics (10 hr)** **10- Photosynthesis , Photophosphorylation , Oxygenic Photosynthesis** **Fixation of CO2 by Autotrophs , Lipid Synthesis , Amino Acids Synthesis , Glutamate (7 hr)** **11- Microbial Enzymes including Enzymes structure , Classification of Enzymes** **And Cofactors and Coenzymes (8 hr)** **12-. Enzymes Inhibitors , characteristics types and structure also theirs work** **(10 hr)** **13- Beta-lactamases enzymes , Necrotizing enzymes , Digestive exoenzymes (10 hr)** **14- Exotoxins properties , types and role in microbial and another organism in the same niches (10 hr)** **15 – Endotoxins properties , functions (10 hr)**

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

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**	**51**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**3**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**125**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due** 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	**4 hr**	**50% (50)**	**16**	**All**
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction, An Outline History of microbial physiology.**
Week 2	**Bacterial structure ,cell wall structure and their function**
Week 3	**Other microbial structure and their function.**
Week 4	**Microbial movement physiology, methods used according to the types of microbes.**
Week 5	**Different shapes of germ cells and their physiological functions contribute to their capability to withstand various environments.**
Week 6	**Microbial growth, The prokaryotic cell cycle (binary fission), Microbial Growth phases .**
	Med exam
Week 7	**Environmental Factors Affecting Growth including Nutrients , Hydrogen Ion Concentration (pH), Temperature , Aeration , Ionic Strength & Osmotic Pressure and Light.**
Week 8	**Uptake of Nutrients by the microbial cell, Passive transport, Active transport and Iron uptake, Endocytosis**
Week 9	**Microbial Bioenergetics , Anabolism, Catabolism, Oxidation – Reduction Reactions , The Thermodynamics and Bioenergetics**
Week 10	**Photosynthesis , Photophosphorylation , Oxygenic Photosynthesis**
Week 11	**Fixation of CO2 by Autotrophs , Lipid Synthesis , Amino Acids Synthesis , Glutamate**
Week 12	**Microbial Enzymes including Enzymes structure , Classification of Enzymes And Cofactors and Coenzymes**
Week 13	**Enzymes Inhibitors , characteristics types and structure also theirs work**
Week 14	**Exotoxins properties , types and role in microbial and another organism in the same niches , Endotoxins properties , functions**
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) 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	**Sterilization, methods of sterilization (Chemical and physical)**
Week 4	**The growth of bacterial population and measurement of bacterial growth tests**
Week 5	**Methods for measurement of cell mass tests**
Week 6	**Direct and indirect counts plate or counts cell viable tests**
Week 7	**The bacterial growth curve and phases tests**
Week 8	**Effect of temperature on microbial growth test**
Week 9	**Effect of hydrogen ion concentration on microbial growth test**
Week 10	**Effect of radiation on microbial growth test**
Week 11	**Effect of osmotic pressure on microbial growth test**
Week 12	**Effect of antimicrobial agents on microbial growth test**
Week 13	**Bacterial enzymes using biochemical test1**
Week 14	**Bacterial enzymes using biochemical test2**
Week 15	**Yeast enzymes test**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Microbial Physiology 3rd Edition by Albert G. Moat (Author), John W. Foster (Author)**	**No**
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 معلومات المادة الدراسية					
Module Title	**Microbiology (Aquatic& soil)**			**Module Delivery**	
Module Type	**Core**			☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**BIO 36118**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	**3**		**Semester of Delivery**	**6**	
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 العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**Microbiology**	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims **أهداف المادة الدراسية**	**1. This course is designed to cover the effects of soil environment and water parameter on microbial occurrence, relationships and significant of microbes to mineral transformations, plant development ,environ quality** **2. This course give an overview of microorganism living in soil and water , their activities that are of agriculture and environmental significance. The interrelationship of microbes/ organic matter in soil and the cycles of C,N,P, and S elements. The importance of water microorganisms as producers or polluted agents** **3. The topics provide students with an understanding of soil structure, soil and water organisms, their types numbers, activities. Participants able to discuss soil and water life in relation to human existence, and the environment.** **4. Develop and encourage the field of scientific research.** **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.** **6. Understand laboratory tests, including knowledge and understanding of human physiology, parasitology, microbiology, histology, embryology, molecular biology and genetics.** **7. In the third year, students are trained in laboratory tests,.** **8. Providing fourth year students with research skills.** **9. explain the concept of micro-organisms and its divisions and classify public and attributes her knowledge of the extent of its impact on the soil and the aquatic environment and knowledge of the physical and chemical factors affecting the microbial activity in both environments**

Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	**1)The topics provide students with an understanding of soil structure, soil and water organisms, their types numbers, activities. Participants able to discuss soil and water life in relation to human existence, and the environment.** **2) Cell microbial growth.** **3) Environmental conditions affecting the growth and activities of microbes and their classification based on these requirement conditions.** **4) Microbial metabolisms (biochemical pathways).** **5) Ecology of the major groups of micro-flora and their functions in soils: bacteria,** **actinomycetes fungi ,actinomycetes and algae** **6) Different means of estimating the activity of microorganism in soils.** **7) Water Environment microbial** **8) Microbial contamination of water sources**
Indicative Content **المحتويات الارشادية**	**1-Soil characteristics (9hr)** **2-Soil microbial environment(9hr)** **3-Soil microbes(9hr)** **4-The role of soil microbes in the carbon turnovers(9hr)** **5-Microbial nitrogen cycle(9hr)** **6-The role of microbes in the soil phosphorus turnovers(9hr)** **7-Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit(1 hr)** **8-The role of microbes in the soil sulfur turnovers(9hr)** **9-The role of soil microbes in pesticide residue analysis(9hr)** **10-Water Environment microbial(9hr)** **11-Microbial contamination of water sources(9hr)** **12-Bacterial and marine and fresh groundwater and hot water(9hr)** **13-Physical and chemical factors affecting microbial activity(9hr)** **14-Physical and chemical factors affecting microbial activity(9hr)** **15-The relationship between microbial water with all of the plants and aquaculture, The waste liquid treatment of drinking water. (8hr)**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1 - The student interacts during the lecture.** **2 - The student listens attentively to an explanation.** **3 - The student interacts and participates in extra-curricular activities.** **4 - The student learns to behave professionally.** **5 - General and Transferable Skills (other skills relevant to employability and personal development)** **6. Enabling the student to pass interviews and succeed in the labor market** **7 - Enabling the student to develop himself after graduation** **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) 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**	**51**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**3**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**125**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due** 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**	**1hr**	**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	**Soil characteristics**
Week 2	**Soil microbial environment**
Week 3	**Soil microbes**
Week 4	**The role of soil microbes in the carbon turnovers**
Week 5	**Microbial nitrogen cycle**
Week 6	**The role of microbes in the soil phosphorus turnovers**
Week 7	**Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit**
Week 8	**The role of microbes in the soil sulfur turnovers**
Week 9	**The role of soil microbes in pesticide residue analysis**
Week 10	**Water Environment microbial**
Week 11	**Microbial contamination of water sources**
Week 12	**Bacterial and marine and fresh groundwater and hot water**
Week 13	**Physical and chemical factors affecting microbial activity**
Week 14	**Physical and chemical factors affecting microbial activity**
Week 15	**The relationship between microbial water with all of the plants and aquaculture, The waste liquid treatment of drinking water.**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Methods of withdrawing and preserving soil samples for microbiological studies**
Week 2	**Methods of sterilizing tools and materials**
Week 3	**Methods for preparing culture media**
Week 4	**Estimation of soil microorganisms by dilution and plate counting**
Week 5	**Estimating the number of microorganisms using the most likely method (MPN).**
Week 6	**Isolation and purification of azotobacter strains and study of their morphological properties**
Week 7	**Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit**
Week 8	**Isolation of root nodule bacteria from leguminous plants**
Week 9	**Microbiological tests of water**
Week 10	**Isolate and count fungi present in the water**
Week 11	**Isolation and acount of Clostridium perifringenes**
Week 12	**Isolation of Streptococcus faecalis from water**
Week 13	**Isolation and identification of microorganisms from air**
Week 14	**Bacteria polluting pool water**
Week 15	**Investigation of pathogenic bacteria in the water**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Paul, Eldor Alvin. II. Paul, Eldor Alvin. Soil microbiology and biochemistry. QR111.P335 2007 579.1757—dc22**	**Yes**
Recommended Texts	**Soil microbiology, ecology, and biochemistry / editor, Eldor A. Paul. — 3rd ed. p. cm. Rev. ed. of: Soil microbiology and biochemistry / E.A. Paul, F.E. Clark. 1989. Includes bibliographical references and index. ISBN 13: 978-0-12-546807-7 (hardcover : alk. paper) ISBN 10: 0-12-546807-5 (hardcover : alk. paper) 1. Soil microbiology. 2. Soil biochemistry.**	**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 معلومات المادة الدراسية					
Module Title	**Mycology**			**Module Delivery**	
Module Type	**Core**			☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**BIO 35015**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	**3**		**Semester of Delivery**	**5**	
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)**		**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 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 **أهداف المادة الدراسية**	**1.Examine the major aspects of human fungal infections and how to identify the pathogens.** **2. Describe the basic structure and classification of pathogenic fungi.** **3. Demonstrate knowledge and understanding of the pathogenesis of the various mycoses, their clinical manifestations, diagnosis and management;.** **4. Develop and encourage the field of scientific research.** **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.** **6.Demonstrate knowledge and understanding of key aspects of practical microbiology..** **7. In the third year, students are trained in laboratory tests,.** **8. Providing fourth year students with research skills.** **9. Apply relevant identification techniques and skills in any laboratory settings using moulds or yeasts** **10. The morphology and taxonomy of pathogenic fungi** **11. The mycoses - superficial and cutaneous, subcutaneous, and systemic;** **12. Virulence factors, immunology, aspects of treatment.**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	**Upon successful completion of the module a student will be able to:** **1. Describe the basic structure and classification of pathogenic fungi;** **2. Demonstrate knowledge and understanding of the pathogenesis of the various mycoses,** **their clinical manifestations, diagnosis and management;** **3. Apply relevant identification techniques and skills in any laboratory settings using molds or yeasts**

Indicative Content **المحتويات الارشادية**	**1-Characteristics of fungi (10hr)** **2-Principles of living fungi(10hr)** **3-Reproduction of fungi(10hr)** **4-Morphology of fungi (10hr)** **5-Morphology of fungi (10hr)** **6-Fungal cell Structure and Function(10hr)** **7-Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit(1hr)** **8-Fungal cell Structure and Function(10hr)** **9-Pathogenesis of fungi (Mycoses) (9hr)** **10-Fungal Diseases (Mycoses) (9hr)** **11-Fungal Diseases (Mycoses) (9hr)** **12-Laboratory diagnosis of mycoses(9hr)** **13-Mycotoxin (9hr)** **14-Characteristics of mycotoxin induced disease(7hr)** **Candidiasis**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1. Lectures and tutorials provide background information on each type of fungal infection / disease and introduce the fungal identification methods. The practical classes enable students to develop the skills to identify fungi and learn how to use their knowledge of the diseases and fungi to aid on the interpretation the laboratory tests. The practicals are considered essential to develop the skills needed to take the practical based exam.** **2 - The student interacts during the lecture.** **3 - The student listens attentively to an explanation.** **4 - The student interacts and participates in extra-curricular activities.** **5 - The student learns to behave professionally.** **6 - General and Transferable Skills (other skills relevant to employability and personal development)** **7. Enabling the student to pass interviews and succeed in the labor market** **7 - Enabling the student to develop himself after graduation** **8 - The assessment include one mid examinations and final examination in addition to assignment and quiz also a home works and reports.** **9. The practical assessment tests the practical skills and understanding of identification keys and methods, which when combined lead to an identification result. However, it also requires knowledge and understanding of the clinical aspects of fungal infection which might be characteristic of a particular fungus or disease type. Many of the exam questions include clinical information.** **10. The coursework essay tests the understanding of one species of fungus in terms of what type of fungus it is, how it is identified, epidemiology, what diseases it causes, what pathogenicity features it has, how infections are managed and treated. It is representative of the lectures that would have covered for a range of medically important fungi, but provides an opportunity for the individual to demonstrate their in-depth knowledge and understanding of just one species. It also enables the student to demonstrate their ability to research a topic and prepare a concise report in the style of a review article from the Journal of Clinical Microbiology.** **11. This course provides theoretical knowledge of fungal infections and practical skills to identify fungi in a laboratory, therefore the assessment tests both aspects.**

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**	**51**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**3**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**125**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due** 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 # 1-3**
	Final Exam	**4hr**	**50% (50)**	**16**	**All**
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Characteristics of fungi**
Week 2	**Principles of living fungi**
Week 3	**Reproduction of fungi**
Week 4	**Morphology of fungi**
Week 5	**Morphology of fungi**
Week 6	**Fungal cell Structure and Function**
Week 7	**Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit**
Week 8	**Fungal cell Structure and Function**
Week 9	**Pathogenesis of fungi (Mycoses)**
Week 10	**Fungal Diseases (Mycoses)**
Week 11	**Fungal Diseases (Mycoses)**
Week 12	**Laboratory diagnosis of mycoses**
Week 13	**Mycotoxin**
Week 14	**Characteristics of mycotoxin induced disease**
Week 15	**Candidiasis**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Fungal culture**
Week 2	**Preparation of fungal cultures**
Week 3	**Preparation of fungal cultures**
Week 4	**staining method**
Week 5	**staining method**
Week 6	**spore staining**
Week 7	**Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit**
Week 8	**Mycoses**
Week 9	**Cutanous Mycoses**
Week 10	**subcutaneous mycoses**
Week 11	**Otomycosis**
Week 12	**Epidermophyton**
Week 13	***Microsporum canis***
Week 14	***Trichophyton sp.***
Week 15	***Tinea capitis***
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Course text book: Identification of Pathogenic Fungi by CK Campbell *et al.***	**Yes**
Recommended Texts	**Mycology textbooks available in the LSHTM library.** **Journals: Medical Mycology, Journal of Clinical Microbiology, Clinical Microbiology Reviews, etc.** **Deacon, J. W. (2000) *Modern Mycology*. Blackwell, Oxford.** **Carlile, M. J., Watkinson, S. C. and Gooday, G. W. (2001) *The Fungi* (2nd edn).** **Academic, London**	**Yes**
Websites	**The Mycology online website is excellent and is curated by expert mycologists :_** **https://mycology.adelaide.edu.au/**	

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 معلومات المادة الدراسية					
Module Title	**Plant physiology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio35017**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	**Biology**		**College**	**College of Science**	
Module Leader	**Faiq H.A. Alradi**		**e-mail**	**Faiq_alradi73@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 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 أهداف المادة الدراسية	**1.The aim of the module is to develop understanding of plant by exploring characteristics ,definition,** **2. Preparing and qualifying students for preparing glass slides** **3. Develop and encourage the field of scientific research.** **4. 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.** **5. Understand laboratory diagnosis, .**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**By the end of the course students will be able to:** **1- Differentiate between protoplasmic content and non protoplasmic content** **2-Deferentiate between prokaryotic cell and eukaryotic cell** **3-Describe, plant cell content** **4- Describe physiological process occur in plant**
Indicative Contents المحتويات الإرشادية	**Introduction of plant Physiology** **Relation of water with plant** **Mechanism of water absorption** **Osmatic potential** **Photosynthesis reactions, light & dark** **Fixation of carbon** **Respiration** **Hormones** **Enzymes** **Physiological stress** **Salt stress** **Water stress** **Dormancy** **Exam**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1 - The student interacts during the lecture.** **2 - The student listens attentively to an explanation.** **3 - The student interacts and participates in extra-curricular activities.** **4 - The student learns to behave professionally.** **5- General and Transferable Skills (other skills relevant to employability and personal development)** **6 - Enabling the student to pass interviews and succeed in the labor market .** **7 - Enabling the student to develop himself after graduation**

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	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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	**Introduction of plant Physiology**
Week 2	**Relation of water with plant**
Week 3	**Mechanism of water absorption**
Week 4	**Osmatic potential**
Week 5	**Photosynthesis reactions, light & dark**
Week 6	**Fixation of carbon**
Week 7	**Respiration**
Week 8	**Hormones**
Week 9	**Enzymes**
Week 10	**Physiological stress**
Week 11	**Salt stress**
Week 12	**Water stress**
Week 13	**Dormancy**
Week 14	**Exam**
Week 15	
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	البروتوبلازم والحالة الغروية
Week 2	طرق التعبير عن تركيز المحلول
Week 3	الانتشار
Week 4	التشرب
Week 5	النفاذية Permeability
Week 6	الازموزية Osmosis
Week 7	النتح Transpiration
Week 8	التركيب الضوئي Photosynthesis

Week 9	التنفس عند النباتات Respiration in Plants
Week 10	النمو ومتطلبات النمو
Week 11	الحركة في النبات
Week 12	الانزيمات
Week 13	الكشف عن المركبات الايضية
Week 14	الاجهاد البيئي
Week 15	موجز لمناقشة بعض التجارب

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**The principles of plant physiology.**	Yes
Recommended Texts	**Plant physiology.**	No
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 معلومات المادة الدراسية					
Module Title	**Environmental pollution**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** × ☒ **Tutorial** ×☐ **Practical** ×☐ **Seminar**	
Module Code	**Bio36119**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Ali Abdulhamza Al-Fanharawi		**e-mail**	alialfanharawi@mu.edu.iq	
Module Leader's Acad. Title	Assistant 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 العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Ecology	**Semester**	First
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The student learns the concept of the environmental pollution, 2. its main sources, 3. its types, 4. its effects on biota and environment. 5. Recognizing the importance of preserving the environment.

Learning and Teaching Strategies 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) 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	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to pollution, characteristics of pollutants.
Week 2	Effect of pollutants
Week 3	Air pollution
Week 4	Major air pollutants, sources and effects
Week 5	Global warming and ozone layer
Week 6	Radiation pollution, sources and effects
Week 7	Water Pollution
Week 8	Major water pollutants
Week 9	Oil Pollution
Week 10	Heavy metal pollution
Week 11	Soil pollution
Week 12	Pollution with pesticides
Week 13	Noise pollution
Week 14	Visual pollution
Week 15	The most famous disasters associated with environmental pollution
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Definition of pollution, types of pollutants in the air
Week 2	Effect of dust pollution on plants
Week 3	Determination of carbon monoxide
Week 4	Determination of carbon dioxide
Week 5	Dissolved oxygen measurement
Week 6	Measurement of electrical conductivity and salinity
Week 7	Measurement of radiation levels
Week 8	BOD measurement
Week 9	Alkalinity measurement
Week 10	Hardness measurement
Week 11	Measurement of calcium and magnesium
Week 12	Effect of pesticides on biota
Week 13	Noise measurement
Week 14	Turbidity measurement

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Ecology and pollution. Hussein Al-Saadi, 2002	Yes
Recommended Texts	Basic concepts of ecology and pollution. Dr. Ihsan al-Gohary, 2019 Environmental Science, Das & Behera, 2008	No
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.