Ministry of Higher Education and Scientific Research - Iraq
AL Mustaqba University
College of science
Department of biology

"COURSE PORTFOLIO"

Module Information معلومات المادة الدراسية					
Module Title	**Microbial Physiology**			**Module Delivery**	
Module Type	**Basic**			✓ **Theory** ✓ **Lecture** ✓ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio-**				
ECTS Credits	**7.0**				
SWL (hr/sem)	**175**				
Module Level	**3**	**Semester**	**1**		
Department	**Biological**	**College**	**College of Science**		
Module Leader		**E-mail**			
Module Leader's Acad. Title	**Assistant lecturer**	**Module Leader's Qualification**	**MSc**		
Module Tutor	**Dhuha salah sahib**	**e-mail**	**dhuha.salah.sahib@uomus.edu.iq**		
Peer Reviewer Name	**Name**	**e-mail**	**E-mail**		
Scientific Committee Approval Date		**Version Number**			

Student Workload (SWL): Structured SWL (h/w) (Two contact hours of lectures) + Unstructured SWL (h/w) .

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	111	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.40
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Relation with other Modules:-

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	
COURSE DESCRIPTION:	This course, which is considered an introduction to Microbial physiology, is the study of the biological processes and functions of microorganisms, including how they obtain and utilize energy, nutrients, and other resources from their environment. It explores how microbial cells grow, reproduce, and adapt to their surroundings, encompassing the study of their metabolic pathways, biochemical reactions, and structural components addition to theoretical information, the department is keen to provide students with laboratory techniques related to microbiology.
Module Aims أهداف المادة الدراسية	**. Course Objectives** The teaching of the Medical Microbiology course aims to provide a set of theoretical and practical concepts that ultimately lead to Introducing and understanding students of microbiology, its scientific division, and the most important common and rare microbial diseases As well as graduating students who can: - Identify the requirements for the growth of microorganisms. - Obtain the skills required for the post-graduation plan (postgraduate studies). - Submit to external tests by local/regional/international bodies. Or treat it according to local, regional, and international standards - Identify the ability of microorganisms to synthesize amino acids, nucleic acids, lipids, and other growth requirements. - Identify other processes carried out by microorganisms, such as photosynthesis, fermentation, aerobic oxidation, and other decomposition and construction processes. - One of the most important goals that the Microbiology Department aspires to achieve in the future is to establish a research unit affiliated with the department to be a scientific and research source for other branches and to work on providing graduate students with information and scientific means to ensure raising the scientific level
Module Learning	**Course Outcomes, Teaching, Learning, and Evaluation Methods** A- Cognitive Objectives

Outcomes مخرجات التعلم للمادة الدراسية	A 1- Obtaining basic information on Microbial physiology. A 2- Students should be able to analyze experimental data, interpret results, and propose solutions to problems related to microbial physiology. A 3- Enabling students to know the structure and function of microbial cells, including prokaryotic and eukaryotic microorganisms, and the roles of key molecules like DNA, RNA, and proteins A 4- Students should be able to explain how microbes interact with each other and their environment, including processes like quorum sensing, symbiosis, and competition. A 5- This includes understanding how microbial physiology principles are used in industrial processes like fermentation, wastewater treatment, and the production of pharmaceuticals. A6- Students should be able to understand how microbial physiology principles are used in industrial processes like fermentation, wastewater treatment, and the production of pharmaceuticals **B- Course-specific skill objectives.** B 1 -Gain proficiency in techniques used to study microbial physiology, including culturing, microscopy, and biochemical assays. B 2- Interpret experimental data related to microbial growth, metabolism, and interactions B 3 – Apply knowledge of microbial physiology to solve problems related to microbial behavior and application B 4- Evaluate information, synthesize data, and apply theoretical concepts to practical situations. B 5- Designing and executing experiments related to Basic Microbiology, Immunology, Molecular Biology, Recombinant DNA Technology, and Microbial Genetics **Teaching and learning methods** □ Delivering detailed theoretical lectures according to the curriculum □ Providing students with the basics and additional topics related to the previous educational outcomes of skills, to solve scientific problems □ Engaging students in discussions about controversial topics in microbial physiology, promoting critical thinking and communication skills □ Conducting experiments to measure microbial growth, enzyme activity, and metabolic pathways. □ - Student contribution by actual participation in tests □ Workshops and student groups, Project Team. □ - E-learning. **Evaluation methods** □ Daily exams with practical and scientific questions. □ Student participation individually or in groups in solving daily questions □ Retaking exams to increase the student's understanding and identify weaknesses to

avoid them
 Participation grades for difficult competition questions between students orally.
 Grade homework assignments and reports.
 Participate in students presenting reports to their peers to increase behavioral and emotional skills
 Quarterly exams for the theoretical and practical curriculum, in addition to the final exam

C- Emotional and value objectives

C 1- A student might feel motivated to use their knowledge of microbial physiology to address challenges like disease outbreaks, food spoilage, or pollution
C 2- Understanding microbial processes is crucial for maintaining a healthy environment. Students might value the role of microbes in nutrient cycling, waste decomposition, and bioremediation.
C 3-Studying microbial physiology promotes scientific literacy and critical thinking, enabling students to evaluate information about microbes and their impact on the world.

C 4- Students might develop a personal connection to the field as they learn about the role of microbes in their health and well-being and the health of the planet.

Teaching and learning methods

 - Providing students with the basics and topics related to the outputs of thinking and analysis.
 Forming a discussion group through theoretical and practical lectures to discuss the topic presented, which requires thinking, analysis, and conclusion.
 Asking students a set of thinking questions during lectures, such as (what, how, when, and why) specific topics
 Giving students homework that requires different scientific explanations.
 Teaching students how to build thinking and analysis methods.
Evaluation methods
 Daily exams with practical and scientific questions.
 Participation grades for difficult competition questions between students.
 Setting grades for homework and reports assigned to them.
 Semester exams for the theoretical and practical curriculum, in addition to the final exam
D- General and transferable skills (other skills related to employability and personal development).
D 1- Enabling students to write reports on topics related to microbiology.
D 2- Enabling students to link the occurrence of diseases to health reality and

	diagnostic methods. D 3- Enabling students to pass medical tests in health laboratory courses. D 4- Enabling students to continue self-development after graduation by learning about the laboratory management mechanism D 5- Holding special seminars for students for the self-development of their personalities
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
1- Required textbooks	Microbial Physiology	No
2- Main references (sources)	Medical Microbiology\ Jawetz, E.:Melizik, J.L. WAWERREN LEVENSON and Adelberg, E.A Microbial Physiology	No
A- Recommended books and references (scientific journals, reports, etc.)	مكتبة الكلية والتي تحوي مصادر ذات العلاقة	No

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)	A considerable amount of work is 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.

COURSE SCHEDULE:-

Week	hours	Topics Covered	Learning Outcomes
1	2	Introduction to Microbial Physiology	
2	2	Bacterial cell structure and physiological functions	
3	2	Nutritional requirements	
4	2	Growth regulators and culture media	
5	2	Stages and methods of measuring growth	

6	2	Exam	
7	2	Methods of controlling microorganisms	
8	2	Energy production in living organisms	
9	2	Oxidation-reduction reactions	
10	2	Fermentation, aerobic, and anaerobic respiration	
11	2	Biosynthesis and photosynthesis	
12	2	Enzymes	
Final Exam			

Learning Outcomes and Assessment Methods for "Microbiolog" Course.

Topics Covered	Learning Outcomes	Strategies for Achieving Outcomes	Assessment Methods
Topic Introduction to Microbial Physiology,	1-6	Report Writing, Field Visits, Theoretical Lectures, Scientific Films, Exploratory Work Teams.	Quizzes, Major reports, discussions during lectures, Written Exams, and oral exams.
Topic II: - Bacterial cell structure and physiological functions, Nutritional requirements	1-3	Problem-Based Learning, Report Writing, Field Visits, Scientific Trips, Theoretical Lectures, Small Group Discussions, Scientific Films, Exploratory Work Teams.	Seminars, Major reports, and discussions during lectures. Written Exams, oral exams.
Topic III: - Growth regulators and culture media, Stages and methods of measuring	3-6	Problem Based Learning, Report Writing, Theoretical Lectures, Small Group Discussions, Scientific Films.	Quizzes, discussions during lectures, Written Exams, homework, and oral exams.

growth			
Topic IV: - Methods of controlling microorganisms,	1-6	Report Writing, Scientific Trips. Theoretical Lectures, Small Group Discussions, and Scientific Films.	Seminars, Major reports, and discussions during lectures. Written Exams, oral exams.
Topic V: Oxidation-reduction reactions,	1-3	Theoretical Lectures, Small Group Discussions,	Seminars, quizzes, discussions during lectures, Written Exams, and oral exams.
Topic VI: -Fermentation, aerobic, and anaerobic respiration, Biosynthesis, and photosynthesis	1-6	Problem-Based Learning, Report Writing, Field Visits, Scientific Trips, Theoretical Lectures, Small Group Discussions, Scientific Films, and Exploratory Work Teams.	Seminars, quizzes, Major reports, Written Exams, homework, and oral exams.
***Topic VII*: Enzymes**	2-3	Problem-Based Learning, Theoretical Lectures, Small Group Discussions.	Quizzes and discussions during lectures. Written Exams, Homework.

Module Evaluation:-

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment (40%)	**Quizzes**	2	10% (10)	5, 10	LO #1, 3 and 5
	Assignments & H.W.	2	10% (10)	2, 12	LO # 1, 3 and 6
	Projects / Lab.	1	10% (10)	Continuous	
	Seminar	1	10% (10)		
	Field Visits Report	1	10% (10)	10	LO # 3, 6
	Discussions During Lectures	10	10% (10)	Continuous	ALL
Summative assessment	**Midterm Exam (10%)**	2 hr	10% (10)	8	LO # All
	Final Exam (50%)	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

توزيع الساعات المجدولة و الغير مجدولة (SWL= SSWL +USWL)

Activity types	Structured SWL	Un structured SWL	No. of weeks	Time Factor	SWL (hr)
Class	32	66	15	2	98
Lab.	32	45	15	2	77
Tutorial					
Self Study		7.40	15		7.40
Quizzes	2		2	30 min.	2
discussions during lectures	5		15	20 min.	5
Projects / Lab.	15	2	15	1 hr.	16
Seminar	2	5	1	15 min.	12
Assignments, Home Work		4	1		4
Report		10	1		10
Midterm Exam (10%)	4		1		4
Final Exam (50%)	4		1		4
		Total SWL (hr/ Semester)			175
		ECTS			7